AN ASSESSMENT OF THE USEFULNESS
OF STANDARDIZED DEFINITIONS IN A THESAURUS THROUGH
INTERINDEXER TERMINOLOGICAL CONSISTENCY MEASUREMENTS

by

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A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy
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ABSTRACT

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An important function of the thesaurus of descriptors in its use as indexing aid is to clarify meaning, thus increasing the possibility that indexers will consistently select the same term to express the same indexable concept. Given the low levels of consistency observed among indexers working with a thesaurus, it is suggested that meaning may not be specified clearly enough in this tool.

The purpose of this project was to look at the effect on interindexer terminological consistency of providing clear and prescriptive information on the meaning of each descriptor in a thesaurus, in the form of a standardized terminological definition.

A small prototype thesaurus describing the field of adult literacy was developed. Definitions were written for each descriptor with the help of a defining model and in accordance with defining rules borrowed from the field of Terminology. Three test versions of the thesaurus were created. The standard version did not contain definitions; the augmented version provided a definition for each descriptor in
addition to the display of semantic relationships traditionally found in thesauri; the stripped version provided definitions, but did not display hierarchical and associative relationships among terms. The test versions were used in a controlled experiment by novice non-specialist indexers to describe a set of twelve informative abstracts. Three sets of data were used in the analysis: average number of descriptors used, group consistency in assignment of all descriptors, and group consistency in main descriptor selection.

The analysis revealed that: 1) indexers who had worked with the augmented thesaurus were not more consistent than indexers who had worked with the standard thesaurus; 2) the use of the stripped thesaurus led to a significant decrease in overall consistency among indexers; 3) there was a tendency among indexers working with the augmented thesaurus to be more consistent in main descriptor selection than all other indexers; 4) the indexers working with the stripped thesaurus were as consistent in main descriptor selection as indexers working with the standard thesaurus.
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INTRODUCTION

1.1 Statement of the problem

Indexing quality, which determines whether the information content of a document is represented completely and accurately, is of primary importance in information transfer systems that rely on human-based subject indexing for conceptual structuring and access. It is no easy task, however, to control and evaluate the quality of indexing, and there is no consensus as to the best methods and instruments that should be used to do so. Traditionally, database producers have considered various measures of indexing consistency as acceptable indicators of indexing quality. High consistency is therefore considered a desirable outcome of the indexing process.

To increase consistency among indexers, general indexing guidelines have been distributed by international and national standardization organizations, and individual institutions have been encouraged to design and apply local indexing policies. Over the years, however, it is more often to controlled indexing languages that indexers and index producers alike have turned to direct and regulate their activities. It has been observed repeatedly that the use of controlled indexing languages does indeed lead to greater consistency among indexers, though consistency levels rarely cross the 0.5 threshold on a standard scale of 0 to 1.
One type of controlled indexing language, the thesaurus of descriptors, has developed in the past thirty years into an essential working tool in a wide variety of institutions involved with information organization and dissemination. In that context, the thesaurus is a controlled list of potential indexing and searching terms, showing equivalence, hierarchy, and other types of relationships among terms, the major function of which is to provide a standardized vocabulary for use in information storage and retrieval systems.

A critical function of the thesaurus is that of clarifying meaning, of fixing the link between the object or concept existing in a field of knowledge or activity and its verbal representation in the controlled language of an information system. Indexers working with a thesaurus are expected to consistently select the most precise and appropriate term to express a concept or describe a subject, but they most likely cannot do so if they do not perceive clearly the meaning of each descriptor.

It seems increasingly difficult for indexers using modern thesauri, however, to ascertain the meaning of individual descriptors. Not surprisingly, the problem is felt even more deeply among indexers working with social science thesauri; in the social sciences, a significant number of concepts and terms are ambiguous and unclear.

In thesauri, meaning has traditionally been specified in one or more of three ways: through the lexicon itself (i.e. all single words and multiword terms listed in the thesaurus), by way of scope notes, and through the network of semantic relationships linking terms.

It appears now that the defining information provided with individual descriptors in contemporary thesauri is either inappropriate and unclear, or simply insufficient. The lack of proper defining information leads to difficulties in using the thesaurus as indexing aid, and more importantly, to inconsistencies in descriptor selection, with assumed consequences on the overall quality of indexing. The
inconsistency problem is more apparent among novice indexers unfamiliar with the complex structure of controlled indexing languages.

1.2 Purpose of this study

The thesaurus is, and is likely to remain for years to come, an essential indexing aid, in many types of information transfer environments. It is important to consider at this time alternate and more direct ways of providing indexers with much-needed semantic information about individual subject descriptors, while trying to gain some insight into the usefulness of traditional elements of semantic content in a thesaurus at the time of descriptor selection.

The focus of this study is on the potential usefulness of definitions in the thesaurus of descriptors used as indexing aid. The study looks closely at apparent effects on interindexer terminological consistency of making available standardized definitions to assist in the process of descriptor selection.

The idea of systematically providing standardized definitions in thesauri has surfaced several times over the past four decades, but it has not been pursued within firm theoretical boundaries and with the help of well-established principles and procedures, and it never went as far as being submitted to any kind of practical assessment. Previous research work has not led to a definite answer as to whether or not standardized definitions would be a useful addition to the traditional content of a thesaurus used as indexing aid.

The purpose of this study is to explore further this issue, and to introduce quantitative data to support either proponents of, or opponents to, the idea of systematically integrating standardized definitions into thesauri.
1.3 Definitions

The following concepts are central to this study. They are defined as:

*Controlled indexing language*¹: finite list of single words or multiword terms established specifically for indexing purposes, i.e. to express concepts and subjects described in documents.

*Definition*: verbal description of a concept, based on the listing of a number of its characteristics, which conveys the meaning of this concept with reference to the conceptual system of which it forms part.

*Descriptor* (or *subject descriptor*): single word or multiword term selected to represent a specific concept in a thesaurus and in indexed documents.

*Human-based subject indexing*: subject indexing performed by human indexers (as opposed to "computer-based indexing").

*Indexing aid*: any instrument used by human indexers to assist in the indexing process, such as a list of postable index terms, a checklist, a thesaurus, a worksheet, etc.

*Interindexer terminological consistency*: quantitative measure of the degree to which two or more indexers agree in their selection and assignment of index terms to represent indexable concepts in a document.

*Non specialist indexers*: indexers with little or no knowledge about the subjects of documents they have to index.

*Novice indexers*: individuals with minimal or no practical indexing experience.

¹ The controlled indexing language was originally referred to in the field of library and information science as "standard vocabulary" or "standard index terminology" (Bernier 1968), and as "information language", "information retrieval language", "information description language", or "documentary language" (Soergel 1967).
**Semantic information** (or *defining information*) *in a thesaurus*: description or explanation, in any form, of the meaning of individual descriptors.

*Standardized definition*: definition written in accordance with specific lexico-semantic and morpho-syntactic rules, whose form and content conform to a preestablished model.

*Subject indexing*: process by which appropriate index terms are selected to describe the topical content of documents, and recorded in order to facilitate later retrieval of these documents.

*Thesaurus of descriptors* (or *indexing and retrieval thesaurus*): controlled list of postable indexing and searching terms, showing equivalence, hierarchy, and other types of relationships among terms, the major function of which is to provide a standardized vocabulary for use in information retrieval systems.

1.4 **Background**

1.4.1 **Human-based subject indexing**

In 1978, Lancaster was describing with remarkable enthusiasm the coming of the paperless society, and predicting a "continuing move towards data bases of text, without human indexing, and the development of postcontrolled vocabularies" (1980, 229).

Full text databases and natural language querying are a reality of our times, but so is general data, information, and document overload. The ever-expanding banks of documents available for searching and retrieval in all fields of knowledge have in fact rendered human-based subject indexing critical, if not essential, to the
successful transfer of pertinent information. All indexing techniques, be they entirely manual, computer-assisted, or fully automated, are being refined in the hope of increasing retrieval effectiveness. Contrary to Lancaster's predictions, "indexes continue to be both compiled and used by humans, and there is no evidence that this situation will change in the near future" (Milstead 1994, 577). Human-based indexing is today as strong as ever, supported by powerful technology, and liberated from the limitations imposed by traditional paper-based systems. Human-based indexing, with various degrees of computer assistance, remains value added to information processing because end users, who have been given more freedom in their quest for information, are still asking for interpretation, evaluation, and grouping of like documents.

The human indexer is well-suited to this filtering role. The indexer acts as an agent for the end user of the information system, analyzing the document at hand, assessing its possible uses, and making relevance judgments on behalf of the information seeker. Soergel aptly describes this function as "scientific prethinking" (1985, 248), and not only posits that "the quality of retrieval depends on indexing, query formulation, and comparison/match," but adds that "indexing is the basis for the two other functions and thus sets an upper limit for retrieval performance" (1985, 327).

Human-based indexing, an admittedly expensive and time consuming operation, remains essential because

information retrieval is about meaning. While we can in many cases get at meaning through statistical and syntactic/semantic processing, in many other cases—perhaps the most important ones—we cannot, and human judgment—no matter how often it is maligned as subjective—must step in (Soergel 1994, 598).
Milstead concurs: "indexing has remained necessary because the capabilities of retrieval systems to sort sets on the basis of importance of the items retrieved have been minimal at best" (1994, 579).

Subject indexing is a multiphase operation which results in the production of the subject index, a searching tool designed in such a way as to facilitate later retrieval of documents pertinent to an information need. Figure 1.1 is a schematic representation of the indexing process, showing cognitive activities on the top line, sources and products on the bottom line. In a first phase, the indexer analyzes the intellectual contents of a document (whatever its physical form) and identifies all subjects and/or concepts that are dealt with in this document. In a second phase, the indexer determines which ones of these subjects and/or concepts must be represented in the index, taking into account the particular needs of the information system's users. In a third phase, the indexer translates the selected subjects and/or concepts into concise or symbolic verbal forms that will be used for later retrieval.

In a process as complex as human-based indexing, the potential for failure is great. Lancaster has described two important types of indexing failures. Conceptual analysis failures occur at the time of identification and selection of subjects and/or concepts, when the indexer fails to recognize the importance in context of a particular element of content. Translation failures occur when the indexer decides on the use of an inappropriate index term to represent a concept, out of carelessness or lack of
background knowledge (Lancaster 1991, 76). Both types of failure constitute serious threats to the quality, consistency, and effectiveness of indexing.

1.4.2 Indexing quality, effectiveness, and consistency

It is safe to assume that good indexing in a particular environment should lead to good retrieval within this same environment. An increase in indexing quality is likely to bring lower costs and better search results (Soergel 1985, 245).

But what is good indexing? Svenonius writes that "the question does not seem to be difficult to answer [since] over the last century and a half, there seem to have been as many answers to this question as there have been indexing systems proposed" (1975, 33). Cutter, Ranganathan, Cleverdon and others have indeed presented widely divergent views on the issue (Svenonius 1975), but did not succeed in compiling a definite list of "good indexing" characteristics. Lancaster defines good indexing very pragmatically as "indexing that allows items to be retrieved from a database in searches in which they are useful responses and prevents them from being retrieved when they are not" (1991, 74).

Indexing is not a black or white, right or wrong, type of situation. Good indexing has been described over the years in terms of correctness, effectiveness and consistency. Indexing correctness is determined in terms of completeness (all indexable concepts are indexed) and purity (only appropriate descriptors have been assigned) (Soergel 1994). Indexing effectiveness measures whether an indexed document is correctly retrieved every time it is relevant to a query (Rolling 1981). Indexing consistency is the degree of agreement among different indexers describing the same documents or documents on the same subject at some point in time, or the agreement of an indexer with him/herself in the description of the same document or of documents on the same subject at various moments in time.
Due to the difficulty of obtaining hard and objective data on indexing outcomes, none of the previous measures has ever been considered a truly scientific evaluative measure of indexing quality. All of these measures have met with scepticism in our field, and their influence over the evolution of information transfer systems has been at best minimal.

The value of indexing consistency as a significant indicator of goodness of indexing and as a predictor of retrieval quality, at least in terms of recall, has been questioned as much as that of other measures used to appraise indexing outcomes. Lancaster warned that "quality and consistency are not the same", but added that "one intuitively feels that consistency and quality should be related" (1991, 81). This may explain why, over the past forty years, interindexer consistency measurements have been used more often than any other measurements in research projects concerned with indexing quality, and by researchers interested in indexers' behaviour.

Interindexer consistency can be measured at two critical moments of the indexing operation: conceptual consistency is established at the point of selection of concepts that will be represented in the index, and terminological consistency is calculated at the time of translation of the selected concepts into index terms.

Cooper (1969) suggests that interindexer consistency is devoid of any interest unless it can be shown that it has anything to do ultimately with retrieval effectiveness. For Zunde and Dexter, however, it is clear that a "difference in the judgment of indexers introduces a great deal of uncertainty in any information retrieval system based on human indexing" (1969b, 259). Tinker (1966) uses indexing consistency in his proposed measure of "chance of retrieval", because he believes that the descriptors assigned by the indexers to the subjects covered in an abstract can be considered to be the search program they would first formulate if they were
attempting to find information on those subjects (1966, 98).

Leonard also thinks it reasonable to assume that

the greater the agreement among indexers regarding the terms that best describe a document’s content, the higher the probability that the index terms will also match terms used in a search for which the document is regarded as a relevant item (1977, 32).

Data obtained from two separate indexing tests support his hypothesis that high consistency in assignment of index terms leads to higher retrieval effectiveness of the documents indexed, and Leonard concludes that "inter-indexer consistency and retrieval effectiveness exhibit a tendency toward a direct, positive relationship" (1977, 33). Soergel states that indexing consistency is not important in itself, but concedes that

high indexing correctness [i.e. the absence of errors of omission and of commission] results in high consistency (two indexers achieving indexing completeness and purity of 1 are also entirely consistent); thus, high indexing consistency is a necessary, but not sufficient, condition for high correctness (1994, 594).

Lancaster observes that "if the indexing has been inconsistent, the searcher may think of some, but not all, of the headings under which documents have been indexed, and recall failures will occur" (1986, 140); he therefore recommends a close look at any significant variation in interindexer performance when evaluating information retrieval systems (1979, 124).

As a cognitive and language-based process, human-based indexing is a highly subjective operation where personal interpretation is a critical factor. Bernier
emphasizes the difficulty of "keeping isolated groups of indexers for the same index in harmony" (1968, 102); inconsistency in human-based indexing has always, and will always, occur.

Not surprisingly, a free indexing system "appears to provide an atmosphere for greater indexer inconsistency than one which restricts the freedom of indexing" (Slamecka 1963, 223). To reduce inconsistency, control over various components of the indexing system has therefore been advocated repeatedly. Major factors of indexing failures have been documented and consistently presented as those relating to the document being indexed, those relating to the indexer, and those relating to the indexing process.

No control is possible over the indexable document. Control over the component "indexer" is theoretically applicable: better indexers, with better training, would produce better indexes. But demographic and economic factors come into play, and it soon becomes obvious that this second component of the system cannot be significantly regulated. It is then over the indexing process itself that the greatest amount of control can be exerted. Policies, guidelines and rules are created and implemented. Useful aids, such as indexing checklists and standard indexing vocabularies, are provided. Validation and quality control mechanisms are developed.

In information systems where interindexer consistency is considered a valuable predictor of indexing and retrieval quality, controlled indexing languages, sometimes considered the intellectual mechanisms that make the system operate (Mooers 1985, 249), remain the indexing aid of choice. Serving as a specialized communication device between authors, indexers, and eventually users, the indexing language "provides a framework that allows for a meeting of minds to take place" (Soergel 1985, 248-249).
1.4.3 Controlled indexing languages

Since Cutter, all controlled languages used for the purpose of subject representation and retrieval have played the role of regulators of the indexing and searching processes.

In the information transfer system, controlled indexing languages perform the following functions:

1. allow an indexer to represent the subject matter of documents in a consistent way;

2. bring the vocabulary used by the searcher into coincidence with the vocabulary used by the indexer;

3. provide means whereby a searcher can modulate a search strategy to attain comprehensive or selective results as user needs dictate (Lancaster 1986, 146-147).

It was predicted that controlled indexing languages would not anymore be required once it had been demonstrated that natural language systems appeared able to produce results as good, if not better, than controlled vocabulary systems, and that "as far as users [were] concerned, uncontrolled natural language indexing [was] good enough" (Svenonius 1981, 96). Controlled indexing languages have survived and thrived, however, despite the force of a very sensible economic argument. The high cost of creating and maintaining any type of controlled indexing language should have seriously jeopardized their survival, but, according to Svenonius, "so long as we are interested in the comprehensive coverage of some domain of knowledge vocabulary control is a sine qua non" (1976, 149). The necessity to bring together all information on the same subject, the need to deal with general and inclusive concepts, and the
higher levels of representational predictability\(^2\) associated with the use of controlled indexing languages all led to a confirmation of their importance in information transfer systems.

Preschel (1972) and Iivonen (1990b) have both reported that indexers were much more likely to agree on what concepts should be indexed than on which index terms should be used. Indexing consistency studies have repeatedly shown that the use of a controlled indexing language is indeed an important factor in increased interindexer terminological consistency, without necessarily being a guarantee of high consistency (Slamecka 1963; Tinker 1966; Funk and Reid 1983; Chan 1989; Iivonen 1990b; Sievert and Andrews 1991; Reich and Biever 1992; Bertrand and Cellier 1995). Bertrand and Cellier have recently explained that significant semantic distortions are introduced during the translation phase of the indexing process because "it is sometimes difficult to establish equivalence relations between the document and the indexing language, for these two signifying systems obey their own rules" (1995, 460).

In their investigation of the effectiveness of various types of controlled languages, Slamecka and Jacoby observed that controlled indexing languages could serve one or both of the following functions at the time of indexing: prescribe the term to be assigned, and/or suggest concepts and terms to be considered instead of, or in addition to, terms thought of by the indexer without the aid (Slamecka 1963, 224). The investigators concluded that the effect of indexing languages on the reliability or consistency of indexers depended greatly on the prescriptive force of this type of indexing aid (Slamecka 1963, 225).

\(^2\) Fugmann (1982) suggests that representational predictability, rather than consistency, should be the prominent goal of indexing. Representational predictability exists when an enquirer is able to reconstruct or predict the modes of expression of a topic in the file. Fugmann believes that it is beyond the power of natural language to achieve representational predictability.
Slamecka also alluded to the importance of clarity and definition in an indexing language (1963, 225), but Tinker was the first to address directly the issues of meaning and understanding as they relate to indexing, declaring that

> the utility of the index is still affected by the precision of the meaning of the indexing terms; . . . a system with perfect display and optimum weighing factors is useless to someone who does not understand the meaning of the words that it uses (1966, 97).

During the indexing process, a subject statement is translated into a set of descriptors "via an indexer's understanding of concepts" (Wall 1980, 74). In order for their work to be consistent, indexers must have "a common understanding of the concepts used in a given corpus of knowledge and the words to be associated with these concepts" (Tinker 1966, 102). In his own experiment, Tinker (1966) used a measure of the consistency with which a term was applied to a concept to assess whether or not its meaning was understood with precision. When the meaning of postable index terms is not entirely clear to indexers, translation failures are likely to happen at the time of descriptor selection, carrying with them a serious risk of misrepresentation of the informational content of a document. The need for meaning specification is even more significant in large controlled indexing vocabularies since "consistent indexing becomes increasingly difficult the greater the number of terms in the vocabulary, and hence, the finer the shades of meaning that the vocabulary can express" (Lancaster 1972, 111). Lancaster believes that "careful term definition and adequate cross-referencing will reduce problems of incorrect term assignment" (1986, 149).

The need for meaning specification has become critical in the thesaurus of descriptors, the controlled indexing language of choice in today's information transfer systems.
1.4.4 The thesaurus of descriptors

The information retrieval thesaurus made its appearance in the late forties, with various teams working on the idea of a new type of controlled indexing language to solve more of the four categories of linguistic problems (i.e. the syntactic, semantic, generic, and viewpoint problems) encountered in information retrieval (Krooks and Lancaster 1993). The exact nature and role of the thesaurus were to remain undefined for more than a decade. In 1959, the thesaurus was taken out of the hands of theorists and put to use to resolve practical retrieval problems at E.I. Dupont de Nemours\(^3\); the new controlled language had been developed with the objective of providing with every term its synonyms, see references, generic relationships and lists of related terms. The thesaurus was not a prescriptive aid, but an openly suggestive one: it was meant to enrich the language of the indexer, much as the literary thesaurus is used to expand the vocabulary of the writer (Roberts 1984). Somehow, the thesaurus soon became more of a searching aid, with its regulatory function at the output end of the information system characterized as major, and its role as an authority list at the input end considered minor (Kim 1973, 150).

Defined most simply as controlled lists of single words and multiword terms selected to express generic and specific concepts for information indexing and searching purposes, thesauri have become essential working and reference instruments in information organizations, where they are now used to regulate both input and output of information transfer systems. Maniez observes that the usefulness of thesauri is now "beyond all question", emphasizing that "the increasing effectiveness of language processing has not stopped their proliferation" (1988, 133). Schmitz-

\(^3\) The Dupont Chemicals Company had adopted Taube's Uniterm system in 1957, but it immediately became obvious that this system could not solve many of the vocabulary problems that made it difficult, if not impossible, to retrieve all documents needed to answer a question (Roberts 1984).
Esser's position is also clear: "Advanced information services with a truly human interface? Not without thesauri" (1990, 132).

The indexing and retrieval thesaurus has the following functions:

1. mapping of terms' meaning;

2. mapping, and selective definition, of semantic and other relations between different terms of a natural language;

3. establishment of preferential terms, and along with it: 3a. standardization of term use in closed language systems, 3b. improvement of predictability of term use in such systems, 3c. definition of semantic and other relations between preferential terms (system language) and terms of the natural language (Schmitz-Esser 1990, 130).

The first clear descriptions of thesaurus contents are found in early writings by Wall, between 1957 and 1962 (Krooks and Lancaster 1993, 336). Contemporary thesauri still conform to the original model: the vast majority of them are composed of a lexicon, of scope notes, and of a display of semantic relationships among terms.

To be efficient in an information transfer situation, thesauri must create a one-to-one unambiguous relationship between a concept and its verbal representation. In the natural language, this relationship between concept and term is always "muddy at best" (Soergel 1985, 218). Thesaurus designers must then identify and deal with concepts to which several terms are attached, and conversely, with terms that represent several concepts, the meaning of which is often ambiguous. The first problem is solved by grouping synonyms and generating semantic equivalence relationships between all terms pointing to the same concept. The second problem, the ambiguity problem, has not been dealt with satisfactorily.
It is in the lexicon, in the scope notes, and in the display of paradigmatic relationships among terms, that the exact meaning of a descriptor in the field of knowledge described in the thesaurus is supposedly found. But in fact, "thesauri give little or no answer at all with respect to the semantics of a single term" (Schmitz-Esser 1991, 143). In many thesauri currently in use, the entry vocabulary is large, heavily precoordinated and very specific, and it has become increasingly difficult to distinguish descriptors that are close in meaning or whose meanings overlap. In most contemporary thesauri, not enough scope notes are provided, and when scope notes are available, they are more likely to be a set of pragmatic recommendations for the use of a specific term than a description of the characteristics of the concept represented by this term. In modern thesauri, finally, the network of relationships among descriptors is deliberately loose, and it does not clearly limit the intended meaning of each term. This network of relationships is "far from being fully clear and explicit, and it seems that lists of related terms often rely on intuition rather than on a reasoned view of their effectiveness" (Maniez 1988, 133).

Construction and maintenance of thesauri is a well-established, well-proven and rarely contested technology (Schmitz-Esser 1991). Problems relating to the organization of terms, those relating to the form of terms, and those relating to the entry vocabulary were considered solved by 1967 (Krooks and Lancaster 1993), and the various editions of standard reference tools for thesaurus designers have brought nothing new for the past thirty years. Minor revisions have been made by experts, but few research findings have been available to support their work.

Normal practice in thesaurus use has been to provide indexers and searchers with the same tool, a reflection, according to Cochrane (1992), of the symmetry shown in the early models of retrieval systems which emphasized the likeness of the indexing and searching processes; both operations, as depicted, involve a conceptual analysis and a translation process. Although they all recognize that indexers and searchers have different needs when they use a controlled indexing language,
Lancaster (1972), Svenonius (1981), and Cochrane (1992) do not go as far as to suggest that they might in fact do better with different tools. But Maniez envisions a multi-part thesaurus including:

1. a comprehensive list of descriptors and non-descriptors (with USE reference);

2. a semantic display reflecting the macrostructure of a field, which should be enough to reach the first aim of an accurate choice of the best descriptors to express the subject of a document or request;

3. a restricted list of useful relationships reserved for searching and allowing for exhaustive retrieval (1988, 137-138).

Kim found it "not at all understandable" (1973, 149) that so few people would be concerned with theoretical problems of thesaurus design, and deplored that "no attempt was made to develop a theory of thesaurus-construction and updating, [which] if developed, should at least account for the concepts of meaning and knowledge" (1973, 148). In 1981, Svenonius designated index language semantics as a promising area for research (1981, 90), but years later Maniez could still report on the general lack of fundamental research on thesauri:

it is striking that while a lot of thesauri have been created, and excellent manuals for thesaurus-making are published every year, few theoretical investigations have been raised by this area in the last thirty years, as if the uncontested efficiency of the tool were in itself its justification (1988, 133).

Leska believes that in order to continue to fulfil their task satisfactorily, thesauri must still be improved "by expanding their lexical references (non-descriptors) making more precise the concepts represented by descriptors, as well as by defining the concepts" (1981, 583). Bertrand and Cellier suggest that present
documentary languages must be enriched to solve the problem of semantic distortion occurring at the time of translation of concepts into index terms (1995, 471). Schmitz-Esser (1991) predicts a great future for a thesaurus looking very much like a machine-operable dictionary, in the broad field of language and knowledge engineering.

Such improvements as those suggested by Leska, Bertrand and Cellier, and Schmitz-Esser, would be particularly welcome in numerous social science thesauri where difficulties of understanding and use are significantly greater than in thesauri describing pure and applied sciences.

1.4.5 Controlled indexing languages and thesauri in the social sciences

Noting a significant increase in the number and importance of information transfer systems in various disciplines of the social sciences, Wall remarked that these systems presented the greatest challenge with respect to terminology and conceptual structure. He wrote:

it is difficult to see how natural language retrieval alone can provide a solution, despite the sophisticated machine search means now available . . . The interdisciplinary links of the Social Sciences with other subject areas are becoming ever more complex, and its terminology almost as diffuse as the entire language (Wall 1980, 77).

Vasarhelyi concurred, qualifying indexing based on text words in the social sciences as "hopelessly imprecise" (1980, 7).
The need for conceptual and terminological control over the language used for social science information indexing and retrieval is critical, and there has indeed been a proliferation of specialized thesauri in various social disciplines since 1967⁴.

Svenonius, who believes that "it is up to the designer of a controlled vocabulary to decide just how much control and what forms of control to incorporate in it" (1986, 335), wonders if it would not make sense to "custom tailor a vocabulary-control tool to the vocabulary being controlled" (1986, 336). She notes though that "there has been little imagination or innovation brought to design considerations of this sort; normal practice has been to design controlled vocabularies on models embodied in one of the standards for thesaurus construction" (Svenonius 1986, 336), standards that were written on the basis of experience gained through the development of thesauri describing scientific fields.

Nowhere is such a lack of imagination and innovation more obvious than in specialized thesauri in the social sciences. It is remarkable indeed that social science thesauri display "explanatory characteristics little different from those in the sciences and technologies" (Roberts 1985, 58). Indexing languages in the social sciences were obviously modeled on those already created to describe scientific domains characterized by rigid conceptual structures and well-established terminologies (Rees-Potter 1992), even though the terminological problems of the social sciences were already documented when the first thesauri were designed.

The conceptual and terminological problems of the social sciences gained official recognition at a 1974 UNESCO meeting, with experts on the difficulties and strategies of incorporating the social sciences into the World Science Information System (UNISIST) concluding that "terminological problems [were] greater in the

⁴ The Thesaurus of ERIC descriptors, released in 1967, was the first social science thesaurus to become widely available. Most specialized thesauri in the various fields of the social sciences are still built on the model of ERIC, now in its 13th ed. (1995).
social sciences than in the natural sciences" (Riggs 1981, 8). Social scientists must deal with conceptual and terminological problems at the primary level of knowledge production, and again at the secondary level of information processing. It is obvious that this language problem can affect text comprehension, and consequently, information indexing and retrieval.

The natural language of the social sciences is described as a "soft" language. The softness of current social science terminology is most likely due to

1. the fact that most social scientists are reluctant to use new terms for new concepts;

2. the attitude of many social scientists who do not accept terms used by their colleagues, and create their own school of thought with its own terminology;

3. the use of neotems (neologisms) without adequate definitions (Dahlberg 1986, 528-529).

Sartori claims that social scientists live and work in a context of collective ambiguity that they have created themselves through a lack of discipline and of methodological awareness (1984, 50). Indeed, there is a typical tendency in the social science community to attribute new meanings to existing, often already overused, words and expressions, rather than to create new terms. Riggs understands this reluctance to create new terms: social scientists

think of themselves as writing about human beings and their relationships with each other, matters which ought to be explained as much as possible in familiar everyday language. Moreover, insofar as laymen want to read and understand the work of social scientists because it relates to their own urgent problems, there is a powerful incentive to report social science research in a style that is widely accessible to non-specialists (1993, 195).
Nikitina agrees:

[the] dual involvement of a subject (as an object of consideration and as an investigator) in the object of humanitarian research makes the language of relevant disciplines resemble the language which proves best suited to the expression of subject’s consciousness, i.e. natural language, with its fuzzy meanings, its polysemy and synonymy (1992, 21).

Social scientists thus favour the use of common words as terms. To give a scientific description of a phenomenon (human behaviour, for instance), "scholars operate with familiar words and believe they are specifying their use, while in fact they are creating new concepts" (Nikitina 1992, 21). Such a practice leads to "term overloading", the "unbridled proliferation, by stipulation, of new technical senses for familiar words" (Riggs 1979, 154), adding "at best, profusion to confusion" (Sartori 1984, 50). Any reader who fails to recall that a new meaning has been assigned to a known term assumes that this term is still used with its older sense, and is at risk of misunderstanding the author's message.

In the language of the social sciences, there are many concepts, but relatively few terms. Figure 1.2 illustrates this phenomenon, showing the complexity of the concept-term relationship in the social sciences. Term 1 is used to represent both concepts A and D, term 2 is used to represent concepts A, B, and C, and term 3 is used to represent concepts A, C, and D; this does not mean, however, that terms 1, 2, and 3 are synonymous. In figure 1.2, the thickness of the arrows indicates that the strength of association of concepts and terms may vary; concept A, for example, can be expressed by any one of three terms, but term 3 is likely the best one (or the most precise one, or the most meaningful one, or the most popular one, etc.) since its link to the concept is represented by a thicker and darker arrow.
Most social science terms are polysemic. Polysemy becomes equivocation in the language of a specialty when it is found that a single term has acquired two or more significations within a single subject field. In ordinary language and in everyday conversations, it is relatively easy for senders and recipients of a message to deal with polysemy. But, while it is often unnecessary to distinguish between the different possible senses of a polyseme in general language, it is usually important to be able to distinguish clearly between the different significations of an equivocal term-form in a given special language (Riggs 1982, 11).

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5 Ogden and Richards would refer to social science terms as "degenerates" since they have a multiplicity of referents (1946, 136).
Polysemy and equivocation become sources of ambiguity when readers or listeners cannot determine which of a term's meanings is intended. Therefore, the more term overloading has occurred, the more important it is to delimit a specific context of usage and to provide definitions. Ambiguity should not be equated with vagueness in sense however. Vague words are unclear in meaning; so too are ambiguous terms. But ambiguity must be distinguished from vagueness in signifying not indefinite or uncertain meaning, but rather multivocal meaning (Svenonius 1982, 128). When a term is known to be ambiguous, it is only the relation word-to-meaning, and not the relation meaning-to-referent that is defective, and "the defect is not in the multiplicity of the meanings of each word per se (out of context) but resides in their entanglement" (Sartori 1984, 26). Few social science terms could be said to be vague; most of them are ambiguous, but it remains feasible to provide for them verbal definitions.

In information indexing and retrieval, unresolved equivocation and ambiguity may cause serious problems. As discussed in section 1.4.3, it is difficult for an indexer to select the most appropriate descriptor, and to consistently select the same term to represent a concept, if the meaning given to each descriptor available in the indexing vocabulary is not clear.

The traditional indirect way of conveying meaning in thesauri is also used in contemporary social science thesauri. Descriptors are defined implicitly by the contextual display of equivalent, narrower, broader and related terms in which they are placed (Roberts 1985, 60).

It is a prevailing belief that the equivalence and the hierarchical relationships in a thesaurus, because they are paradigmatic in nature and true in every situation, are in fact useful for delimiting the meaning of a term in logically structured fields of knowledge (biology or chemistry, for example). In disciplines of the social sciences, however, even these relationships are unreliable when it comes to specifying meaning.
Because most social science terms can potentially represent many concepts, when "different words are used as synonyms, it is often difficult to determine whether they designate the same or slightly different concepts" (Riggs 1993, 199). And because in the social sciences emotional, cultural, and political connotations are most important in determining meaning, inappropriate equivalence relationships are easily established between terms which refer to the same concept, but from a significantly different perspective. In a social science thesaurus, it might be better to keep more quasi-synonyms as descriptors and to define them, than to subsume them under one term. In such an environment, the value of the equivalence relationship as a predictor of meaning is greatly reduced in any case.

The hierarchical relationship also loses much of its defining power since most social science fields are characterized by their "lack of clear paradigmatic structure" (Hutchins 1975, 103).

Information scientists and thesaurus designers may put too much hope in the value of all semantic relationships in social science thesauri, especially when it comes to elucidating the meaning of individual descriptors in order to guide indexers in their term selection. Roberts declares that "it was optimistic, to put it at its lowest, to expect conceptual structures, arrived at by retrievalists, to provide adequate term clarification unaided by explicit verbal definition" (1985, 60). He notes that "thesauri which ran to a number of editions were likely to increase the proportion of scope notes in the later versions" (Roberts 1985, 58).

The absence of a theory of thesaurus design, and particularly the apparent lack of interest of compilers of thesauri in issues relating to interpretation and meaning, compound a very real terminological problem in social science thesauri. In these

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6 The Thesaurus of ERIC descriptors, for example, started life without scope notes but was operating on the basis of one scope note for every two descriptors just a few editions later (Roberts 1985).
thesauri, the need to remove ambiguity from the terminology appears to have been confused with a need to remove vagueness, and inappropriate solutions might have been applied to the problem. Svenonius contends that "it might be assumed that less context is needed to resolve ambiguity than to resolve vagueness; to choose from among several meanings than to delimit the meaning of a word with indeterminate boundaries" (1982, 130). In social science thesauri, increasingly complex networks of semantic relationships are generated in an attempt to specify meaning, but a systematic provision of descriptors’ definitions might be more efficient in resolving the ambiguity problem.

Potential solutions to the problems of ambiguity and definition in languages for special purpose (LSP) have been developed and refined by another category of language workers, the terminologists. Many social scientists and information specialists are well acquainted now with Terminology and its products. A closer connection is probably needed between fields which share a common goal of facilitating the communication of specialized information.

1.4.6 The contribution of Terminology

1.4.6.1 Terminology and the social sciences

The language employed by social scientists presents difficulties of understanding and interpretation not only for lay persons, but also for fellow practitioners. Social scientists have had to acknowledge growing difficulties in communicating social science knowledge and information, whether the result of

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7 In this thesis, the word "terminology" must be used to represent different concepts. To facilitate reading and prevent confusion, the following convention is adopted. The word appears with a capitalized initial (i.e. Terminology) when it refers to the field of knowledge and practice which deals with concepts and their representation. In all other cases, the initial "t" appears in lower case (i.e. terminology, terminologies).
research work or personal theses and opinions. They eventually turned to Terminology for insights and maybe even solutions.

Sager presents Terminology as a "number of practices that have evolved around the creation of terms, their collection and explication and finally their presentation in various printed and electronic media" (1990, 1). The aim of modern Terminology is the "optimal designation of the meanings of individual concepts and of the precise limitation of these meanings" (Leska 1981, 584).

Terminology as a field of practice is rooted in the scientific domain. In the natural sciences, standardization of terminology started in the nineteenth century; in applied sciences and technology, the need for terminological control was felt early in the twentieth century. The terminologist’s ideal of creating one term for each concept and of limiting each term to one meaning is characterized by Riggs as the "engineering approach to term planning" (1981, 21). Not surprisingly, the approach appeals to engineers and the like, but not so much to social scientists who would understandably feel threatened by the prescriptive nature of terminological tools and by the very idea of language control.

Nevertheless, the idea of a termbank for the social sciences was submitted at the first Infoterm symposium in 1973. The INTERCONCEPT project was officially launched five years later, when it became obvious that conceptual and terminological analysis were urgently needed in the social sciences to support research, to improve presentation and understanding of social science research results, and to facilitate information storage and retrieval.

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8 The International Information Centre for Terminology (Infoterm) was set up in 1971 as a Unesco/UNISIST centre, in the framework of the Unesco’s General Information Programme. A goal of the centre was to build an international network of terminology (TermNet) and to act as a focal point for its activities.
The main objective of the INTERCONCEPT project was to create a global information system to "promote international understanding by the means of conceptual control and analysis in the fields of social sciences" (INTERCONCEPT 1976, 1). Terminological control, which had to be at the heart of the system, was presented as "a service function that provides factual information, making no value judgments, based on data received from scholars and appropriate publications" (INTERCONCEPT 1976, 14-15). The planned INTERCONCEPT database was to be composed of: terms, definitions of terms, equivalents in different languages and/or schools of thought, context of use, and relations between terms. The database would permit the preparation of specialized dictionaries, facilitate translation work, and become a preferred source of terms for "the construction of controlled vocabularies designed to serve the needs of indexers engaged in the production of retrieval services for the social sciences" (Riggs 1981, 7).

UNESCO terminated the INTERCONCEPT project in 1981, but the program resurfaced immediately as INTERCOTA, under the auspices of the Committee on Conceptual and Terminological Analysis, a joint research committee of the International Political Science Association and of the International Sociological Association. The committee recommended the development of an Integrated Thesaurus of the Social Sciences, along with appropriate guidelines for the creation of such (Aitchison 1981; CONTA 1982).

The database and the thesaurus projects brought together for the first time terminologists, social scientists, and information specialists; together, they were able to demonstrate that conceptual and terminological control in the social sciences was a definite possibility. Researchers for both projects left behind a considerable number of working documents discussing issues such as semantic structures, fixation of term
meanings, and term definition⁹. This theoretical work is now used in all attempts at clarifying meaning in existing social science thesauri.

1.4.6.2 Terminology and information science

Twenty years ago, Kim remarked that we were "inundated with a huge quantity of literature on how a thesaurus is built, but very little—or no—literature which discusses why such and such rules need to exist" (1973, 149). Kim recommended that thesaurus designers look into other fields concerned with meaning and with its representation in language for explanations and justifications.

Information specialists first turned to the science of linguistics in the hope of finding there insights and innovative practices that might allow their own discipline to surge forward. Sparck-Jones and Kay declared themselves "impressed by the great overlap in the subject matter of linguistics and information science and, at the same time, by the lack of interpenetration between the fields" (1973, 1). The absence of cooperation between information scientists and linguists might be explained by the fact that linguistics is very theoretical in nature and not that useful for as practical a process as information organization and transfer. Furthermore, linguistics is concerned with language for general purpose (LGP), and not with the languages for special purpose (LSP) used by field specialists to communicate and exchange information.

From linguistics, though, a short path led to Terminology, a relatively new field of practice which revealed itself as having much to offer to information specialists concerned with language control. Wüster described Terminology as a border field between linguistics, logic, ontology, information science, and the subject

⁹ A bibliography of these documents can be found in Riggs (1981).
fields (1981, 55), and in his *Terminology manual*, Felber (1984) made numerous references to information science. Sager remarked that "Terminology exhibits a number of striking similarities with information science, a subject of similar age, which has undergone a parallel process of searching for its identity" (1990, 5). Terminology and information science are similar in that

1. both can be called applicable sciences;

2. both are relatively young fields and are still expanding their theoretical foundations and scope of application;

3. both have taken a pragmatic attitude to their work with a view to solving communication problems and are, therefore, heavily dependent on empirical evidence such as usage, user needs and preferences, as well as responsive to the requirements of society, or at least of a known segment of society;

4. both serve the purpose of facilitating communication in special languages (Sager 1990, 5-6).

Terminology work and thesaurus design have much in common: their scope "is not to list comprehensively the words of a language pertaining to the same domain (as in an analogical dictionary) but to index all the concepts of a field and to link every concept to one word of a language" (Maniez 1988, 134). Working methodologies are therefore similar: it is the onomasiological model, leading from concepts and meanings to words, which is adopted. Termbanks and terminologies, the products of Terminology work, and thesauri are all anchored in the conceptual space, rather than in the strictly verbal space.

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10 Leading, on the contrary, from words to their meanings, the semasiological line is followed by lexicographers, whose task it is to compile dictionary-type tools reflecting the richness, flexibility, and adaptability of natural language (or language for general purpose).
Termbanks and thesauri have been compared as to their contents, structure, and functions. Termbanks and thesauri reflect the linguistic habits of the field they describe; they are made of term records that have a very similar structure and that provide much of the same semantic information. But where terminologists exert total control over the meaning of a term in a termbank, information specialists have traditionally imposed little control, if any, over the meaning of their descriptors.

Among the many objectives of Terminology work, the following are of critical interest to thesaurus designers:

1. to link concepts and words;
2. to describe accurately the meaning of a concept.

Within the field of Terminology, the latter objective is normally pursued through the development of one or more definitions for each LSP term. The terminological definition describes a concept and determines its position in the system of concepts to which it belongs. In Terminology, the definition is a central object of study. Terminologists work with defining theories, principles, methodologies, models, guidelines and rules, all of which are used in the structuring of termbanks that have become essential for efficient communication of scientific and technical knowledge and information.

It is our belief that the defining theories, principles, models and methodologies supporting Terminology work can also be useful in thesaurus design.
1.5 Research questions

It is a widely accepted assumption in our field that there exists a positive relationship between quality of retrieval and consistency of indexing. Consistency is thus seen as a highly desirable outcome of the indexing process. Controlled indexing languages in general, and thesauri in particular, play a definite role in increasing terminological consistency among indexers describing the same document, or describing documents discussing the same subject. Interindexer terminological consistency remains relatively low, however, even when a thesaurus is used as indexing aid.

The indirect provision of defining information in most contemporary thesauri (mainly through paradigmatic relationships) might make it difficult, especially for novice indexers and non subject specialists, to identify the most appropriate index terms for a particular document, and to consistently select the same term to represent a given concept. Indexers are more likely to be consistent in their selection of index terms if they understand the meaning of available thesaurus descriptors. The meaning of individual descriptors should therefore be made as clear as possible, especially in the many disciplines of the social sciences which are characterized by weak conceptual structures and ambiguous terminologies.

In termbanks, a product of Terminology work similar in content and structure to the indexing and retrieval thesaurus, one or more standardized definitions accompany each term to prevent misunderstanding, misinterpretation and misuse, and to ultimately facilitate scientific communication.

There might also be a place and a role for standardized definitions in the thesaurus. Descriptors' definitions would give more prescriptive power to the thesaurus used as indexing aid, and could be a key factor in ensuring consistency and reliability of indexing. For the indexer, an access to standardized definitions in the
thecaurus itself may make it easier to identify the most specific descriptor available to express a concept, to recognize synonyms and quasi-synonyms, and to be accurate in term selection and assignment. The availability of standardized definitions may also make it possible for individuals who do not relate well to complex networks of semantic relationships (novice indexers, for example) to make better use of a controlled indexing language.

Looking more closely at the behaviour of novice non specialist indexers, this research project was designed and conducted with the aim of providing an answer to the following two research questions.

Our first research question focuses on the effect on interindexer terminological consistency of increasing the amount of semantic information provided with each descriptor in a thesaurus used as indexing aid. The question is:

Does the availability of standardized definitions in a thesaurus of descriptors, as an addition to the conventional display of semantic relationships generally provided in such a tool, lead to an increase in consistency among novice non specialist indexers?

Our second research question focuses on the effect on interindexer terminological consistency of modifying the nature of the semantic information provided with each descriptor in a thesaurus used as indexing aid. The question is:

Does the availability of standardized definitions in a thesaurus of descriptors lead to acceptable levels of consistency among novice non specialist indexers who do not have access to the conventional display of semantic relationships normally provided in such a tool?
1.6 General and specific objectives of this study

It is hoped that this study can make a contribution to the specific areas of subject indexing and of thesaurus design and use, and, in doing so, to the general field of information studies.

The general objectives of this project were:

1. to create and to integrate into a traditional thesaurus structure a different type of semantic information, namely a set of standardized definitions;

2. to assess the usefulness to the indexer of this new type of semantic information, by way of calculating and comparing interindexer consistency measurements.

The specific objectives pursued were:

1. to develop a prototype thesaurus in a field of knowledge connected to the social sciences;

2. to develop a reusable defining model on the basis of principles and rules applied in the field of Terminology;

3. to use the defining model in the preparation of definitions for each descriptor appearing in the prototype thesaurus;

4. to integrate the standardized definitions into the prototype thesaurus;

5. to produce three different versions of the prototype thesaurus, each version containing a different set of elements of semantic information;

6. to use the prototype thesaurus in an experimental indexing situation, where indexing consistency would be measured;
7. to analyze the results of the indexing experiment;

8. to draw preliminary conclusions on the apparent effects on interindexer terminological consistency of making available standardized definitions at the time of descriptor selection;

9. to make recommendations for further research in this area.

1.7 Scope of the project

The present study is concerned exclusively with the use of a thesaurus of descriptors as indexing aid; at the input end of the information transfer system, the thesaurus is an aid whose function it is to provide semantic information to help human indexers select the most appropriate term to represent a concept, and to do so consistently, thus creating predictable groupings of documents on the same topic.

In this thesis, the thesaurus is to be seen as a special language used for the communication of knowledge and information, the product of a consensus in groups of field specialists. The thesaurus is considered here as a self-sufficient terminological system, itself a faithful representation of a specialized conceptual structure.

The prototype thesaurus developed and used in this project describes partially the field of adult literacy theory and practice, a field which exhibits most of the conceptual and terminological problems that characterize the social sciences more generally. Most terms used by adult literacy specialists are borrowed, with or without a change of meaning, from more established disciplines such as education, sociology, and psychology (e.g. Bilingual instruction, Content area reading, Instructional strategies, Learners, Reading difficulties, Self confidence, etc.) Other terms are
neologisms originating and used in a geographic region, in a school of thought or an ideology, or even in the writings of one specialist (e.g. Intergenerational literacy programs, Literacy health relationships, Pseudo literacy, Refrancisation, etc.) Many literacy terms are ambiguous, with meanings that regularly overlap.

The prototype thesaurus includes standardized definitions especially written for the purpose of this study. In this project, the only goal of the defining work was to produce a new type of defining information to enrich the semantic structure of a thesaurus. Although we tried to improve on the current practice of including some definitions in thesauri, the identification of the best way to define, or of the most appropriate defining model, was not our goal. The defining model used in this study evolves from a model proposed by terminologists, and it was selected because of its clarity, simplicity, flexibility, and relative ease of application.

In this study, it is only the potential influence of definitions over an indexer's term selection decision that is under observation. Other potential uses of definitions in a thesaurus, in the design of a correct search strategy at the output end of the information system for example, are not taken into account at this time.

We subscribe to the assumption that consistent indexing is good indexing, and in this project we used measures of interindexer terminological consistency to compare indexing outcomes. Three sets of data were used to rate consistency: average number of descriptors used to represent the subject content of a document, group consistency in assignment of all descriptors, and group consistency in main descriptor selection. The formula used to calculate consistency ratios does not take into account the agreement of indexers on non assignment of a term, nor the appropriateness, relevance, or relative value of each descriptor assigned. Of interest to us in this project was the difference in levels of consistency of various groups of indexers, rather than the consistency levels themselves.
Participants in the experimental portion of this project were novice indexers, i.e. individuals without formal training and experience in indexing. The use of novice indexers in this experiment appears as a logical choice for the following reasons:

1. in the typically small, community-based organizations flourishing in the many fields of application of the social sciences, given the current economic and technology-assisted context, the use of untrained indexers to organize specialized information is common practice;

2. novice indexers are known to rely heavily on any indexing aid available when they describe the content of a document; but, although they are often provided with controlled indexing languages in the form of thesauri, they cannot relate easily to complex semantic structures, and likely cannot make full use of the semantic information given with each descriptor;

3. any potential improvement to a controlled indexing language which would have a positive effect on the outcome of the work of novices, would likely be also beneficial to the work of trained and experienced indexers.

Participants in this study were also non specialists of the discipline described in the prototype thesaurus. Non specialist indexers are less likely to rely on previous knowledge, prejudices, or intuition to decide on descriptor assignment, and are also more likely to consult, willingly or not, the semantic information provided to help them.

1.8 Outline of the thesis

A review of the body of research and of the literature pertinent to this study follows this introductory chapter. The review covers several distinct areas:
1. the nature, content and functions of the thesaurus, with emphasis on its role in maintaining consistency among indexers;

2. the specification of meaning in thesauri, from both the information science and the Terminology perspectives;

3. the nature, functions, content and style of the terminological definition;

4. the evaluation of thesaurus contents and usefulness, with emphasis on the use of interindexer consistency measurements in evaluating the thesaurus as indexing aid.

Chapter 3 delineates the project methodology. The research hypotheses are stated in section 3.4. The first part of the chapter describes the creation of the prototype Core Literacy Thesaurus, which integrates standardized definitions; it proposes a set of guidelines and a model usable by thesaurus designers to construct definitions, and it reports on the application of those by this researcher to prepare definitions for each descriptor appearing in the prototype thesaurus. The second part of Chapter 3 describes the data collection process through a controlled indexing experiment conducted to obtain interindexer terminological consistency measurements. The methods and techniques chosen for data coding, data analysis and statistical testing are presented in the last part of the chapter.

Chapter 4 presents the results of the indexing experiment, and reports on the testing of the research hypotheses.

In the first and main section of Chapter 5, results are discussed with respect to our own research questions, hypotheses, and expectations. In the second part of the chapter, the findings of this study are related to those of previous interindexer consistency studies conducted in similar conditions. The limitations of our own methodology are presented in the last section of Chapter 5.
A summary of the project is given in the last chapter (Chapter 6) of the thesis. Insights and suggestions for further research in the area are offered, along with comments on the contribution of this investigative study to the body of knowledge on human-based subject indexing, and on thesaurus design and use.
2
REVIEW OF THE LITERATURE

2.1 Introduction

This study is based on various observations, assumptions, suggestions and recommendations for further research made by previous investigators in several areas of concern to information studies, and it draws on principles, models, and pragmatic work done by terminologists. Chapter 2 presents the body of literature and the findings of previous research that are particularly relevant to our study’s content and design.

The nature and role of the indexing and retrieval thesaurus are described in section 2.2. Section 2.3 focuses on meaning specification in languages for special purpose (LSP) in general, and in thesauri in particular; both the information science and the Terminology perspective are presented. Section 2.4 presents various ways in which the content and usefulness of thesauri as indexing aids have been evaluated, with special emphasis on the use of interindexer consistency measurements in that context.
2.2 The indexing and retrieval thesaurus

Following a "lengthy and confused intellectual" pre-history (Roberts 1984, 282), the first modern thesaurus emerged in 1959 as a secondary, suggestive rather than prescriptive, indexing aid, used by indexers to enlarge their vocabulary. First presented as a potential indexing and searching tool by Mooers in 1947, then shortly after as a searching aid only by Luhn, as well as by Bernier and Crane, then again as a tool for indexing and searching by Luhn in 1957, the role of the thesaurus was, at the beginning of the sixties, marginal and not altogether clear.

The thesaurus had developed over a period of fifteen years under the combined pressures of rapidly growing entirely new subject areas and collections, of new patterns in the use of information, and of the spreading application of machines in information storage, processing, and retrieval (Mooers 1985, 249). In this transformed information world, two parallel views of the necessity for controlled languages coexisted. While a first group of information specialists chose to abandon the orthodox retrieval principles applied by libraries, particularly through bibliographic classification schemes, a second group asserted the value of terminological control and conceptual structuring (Roberts 1984). Following Mooers, and later Bernier, members of the latter group accepted the intellectual challenge of selecting and taking some of the best parts of old language systems, and of adding new elements to shape the whole into a new form so that it would behave well in current uses (Mooers 1985, 249). The modern thesaurus owes much to their work.

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1 Although there is evidence that a few indexing and retrieval languages similar in form and content to the thesaurus had been used during the previous decade in experimental situations (Roberts 1984), the first thesaurus of the modern era is considered to be the thesaurus developed in 1959 for the indexers at E.I. Dupont de Nemours Engineering Department. This thesaurus was not published and was not widely distributed. The first published thesauri were the *Thesaurus of ASTIA Descriptors*, made available in 1960, and the *Chemical Engineering Thesaurus*, a direct derivative of the Dupont tool, published in 1961 (Krooks and Lancaster 1993).
2.2.1 Nature and content of the thesaurus

The indexing and retrieval thesaurus is

a controlled vocabulary arranged in a known order in which equivalence, homographic, hierarchical, and associative relationships among terms are clearly displayed and identified by standardized relationship indicators, which must be employed reciprocally (National Information Standards Organization 1994, 38).

The Cranfield studies considered all indexing languages as fundamentally similar, consisting of an indexing vocabulary together with means of showing semantic relationships to help improve recall in retrieval and syntactic devices to help improve relevance (Cleverdon 1967). The traditional content of a thesaurus conforms to this description. The usual components of a thesaurus are: a lexicon, a set of scope notes, and a network of relationships among terms.

The lexicon, or entry vocabulary, is constituted by all terms selected to represent concepts in the particular field of knowledge described in the thesaurus. Terms are included on the bases of literary warrant (they must appear in the literature of the field), of user warrant (they must be in common usage), or of scholarly warrant (they must be used by the specialists of the field) (Svenonius 1990, 85-86). Thesaurus terms can be descriptors (i.e. terms used preferentially for indexing and for searching), or non-descriptors (i.e. synonyms and quasi-synonyms which, in many information systems, cannot be used for indexing and/or for searching). Thesaurus terms are designed for use in information systems that allow for syntactic combinations to be established at the time of searching only.
Scope notes are provided with some descriptors when there is a need to clarify their meaning or to give directions for their use, the latter function being given precedence:

scope notes explicate how a term is to be used in the context of a given thesaurus or classification scheme. Normally, scope notes are not full-fledged definitions; however, there are cases when they must be expanded to such, for instance when a term is interpreted loosely in common usage or when it has various meanings which cannot be easily distinguished by a parenthetical qualifier (Svenonius 1990, 94).

The third component of a thesaurus, its network of paradigmatic relationships of equivalence, hierarchy, and affinity between terms and/or between the concepts represented by these terms, is often considered its focal point. The relationships allow thesaurus users to perceive the underlying logical structure of a domain, as it is represented in its literature. The integration of relationships into the then developing thesauri was suggested by Bernier as late as 1957. Bernier strongly believed in the existence of permanent conceptual relationships that could be used to structure this new language tool (Bernier 1968, 103; Roberts 1984, 276). From that time on, much emphasis was placed on this component of the thesaurus which was to become a critical structural element distinguishing thesauri from other types of controlled indexing languages.

Most thesauri are now developed in accordance with sets of national and international guidelines formalized in the sixties, and to which few significant modifications have been made since. Krooks and Lancaster establish that by 1964, with the publication of the Engineers Joint Council’s Thesaurus of Engineering Terms (EJC),
major aspects of the problems of entry vocabulary, hierarchical organization, the associative relationship, scope notes, and reciprocal relations between terms had already been identified... the entire framework of issues that surround thesauri had already been articulated, and actual practice had gone a long way toward defining how future thesauri would in fact look (1993, 337).

2.2.2 Functions of the thesaurus

Holm and Rasmussen believed that the thesaurus being developed at E.I. Dupont de Nemours offered the level of conceptual and terminological control needed "to eliminate the educated guesses... made by both indexers and retrievers in order to find information stored in the system" (1961, 187). Since then, the main functions of the thesaurus have been defined as follows:

to promote consistency [italics are mine] in the indexing of documents, predominantly for postcoordinated information storage and retrieval systems, and to facilitate searching by linking entry terms with descriptors (National Information Standards Organization 1994, 38).

Reich and Biever describe these functions as the indexing consistency function, a thesaurus introducing "order and language standards into indexing terminology", and the retrieval function, a thesaurus serving as a "source for searching vocabulary" (1991, 336).

Despite this universally recognized dual function, the role of a thesaurus in terminology control at input has often been seen as minor, and secondary to that of assisting the information searcher (Kim 1973). Cochrane (1992) remarked recently that, although the utility of indexing languages for both indexing and searching
processes had never been challenged, it seemed obvious that thesauri were not anymore of much use to searchers; she suggested that it may be time to get thesauri out of our systems, apparently unconcerned with the needs of indexers who have always been, and remain, the main users of thesauri as well as their developers. To a large extent then, the precise role of this widely used working tool remains blurred after four decades, even though the thesaurus has become an essential component of most major information transfer systems.

2.2.2.1 Thesauri and consistency: the postulate

The consistency function of the thesaurus was given a prominent place in the first set of guidelines offered to thesaurus developers in 1967. In the Committee on Scientific and Technical Information (COSATI) Guidelines for the development of information retrieval thesauri, the thesaurus was defined as "a compilation of selected terms with appropriate term interrelationships displayed in such a way as to promote maximum consistency in the description of concepts for indexing and searching" (Kim 1973, 149). It has always been assumed that, at the input end of an information system, the availability of a thesaurus facilitates the indexing process and contributes to the maintenance of indexing quality.

The availability of a controlled indexing vocabulary is listed by Zunde and Dexter (1969a) as one of the semantic factors that affect indexing performance. The semantic factors are those "which determine the variations in the interpretation of the meaning of expressions, statements, phrases and words in the document being indexed, as well as the meaning of indexing terms assigned to it" (Zunde and Dexter 1969a, 314).
2.2.2.2 Thesauri and consistency: the reality

It appears, however, that "the relationship between vocabulary control and indexer consistency is not as straightforward as it might seem at first sight" (Lancaster 1991, 64-65). Lancaster believes that a controlled vocabulary will improve the consistency of indexing in the long run, but only "after indexers have learned the particular nuances of a vocabulary and the rules and protocols associated with its use" (1986, 150).

Controlled indexing vocabularies in general, and thesauri in particular, have been a primary variable in a number of indexing consistency studies conducted over the past forty years. Slamecka and Jacoby in 1963, Fried and Prevel in 1966, Lancaster in 1968, Tarr and Borko in 1974, Leonard in 1975, and Funk and Reid in 1983 are among those investigators who studied the effect of controlled vocabularies on interindexer consistency. They found that consistency tends indeed to be higher among indexers who are provided with any type of controlled vocabulary than among those who are not (Leonard 1977; Markey 1984). Even novice indexers (those without formal indexing training or experience), and indexers who are not subject specialists, are more likely to select the same term to represent a concept in the index if a thesaurus is provided as indexing aid. But previous investigators also concluded that consistency among indexers remains relatively low, and is certainly not as high as could be expected, even when a controlled vocabulary is in use (Slamecka 1963; Funk and Reid 1983; Chan 1989; Iivonen 1990a; Sievert and Andrews 1991; Bertrand and Cellier 1995).

Iivonen remarks that indexers participating in her study used different terms to refer to the same concept even if a controlled vocabulary was available; she suggests that this illustrates the poor ability of controlled vocabularies to standardize description (1990a, 261). Chan also concludes that "total consistency among indexers is difficult to achieve, even when they use the same controlled vocabulary and attempt
to follow the same indexing policies" (1989, 357). In their evaluation of the consistency of indexing in Index Medicus, Funk and Reid found that the highest degree of consistency attained by indexers in their selection of main headings (i.e. all MESH terms assigned to a document) was only 0.482. Yet, the researchers believe that "MEDLINE, with its excellent controlled vocabulary, exemplary quality control, and cadre of highly trained indexers, probably represents the state of the art in manually indexed data bases" (Funk and Reid 1983, 183). Looking at duplicate entries in Information Science Abstracts, Sievert and Andrews (1991) established that, even with only one main heading per document chosen from a small controlled vocabulary, the mean consistency in their sample still reached only 0.5225. All of these findings confirm Thomas' observation that there is still room for different interpretations of thesaurus descriptors, "however carefully the tree and other components of a modern thesaurus are agreed and designed" (1989, 47).

Small banks of descriptors have been shown to be beneficial to consistency (Borko 1964; Tinker 1966; Henzler 1978). Mooers' descriptor system was a small set containing a maximum of three hundred terms over which control could be effectively exerted (Mooers 1985, 253), and Gilchrist recommended that 500 descriptors at the most be used to start with in an information system of medium size (1971, 127). Mooers warned that we "shouldn't let the indexing language [of an information retrieval system] develop by a series of crude accidents" (1985, 253). But modern thesauri appear to be allowed to grow almost uncontrollably, the result, according to Fugmann, of "the ease with which newly emerging terms and relations between terms can, purely physically, be entered into a thesaurus" (1974, 78). The semantic field described by a thesaurus is rarely delimited precisely enough, and it is therefore quite easy to justify the addition of new concepts and terms. The meanings of available descriptors often appear unclear, vague, or equivocal; one adds to what is already

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2 Consistency figures can be reported in the form of a percentage (e.g. 48.2%) or as a decimal number representing a specific point on a scale of 0 to 1 (e.g. 0.482). In this thesis, all consistency figures are consistently presented as decimal fractions.
there in a well-intentioned effort to clarify and specify, but in the process splitting and confusing term meanings even more. As the human mind quickly loses track of the spread and growth of a conceptual structure, and since the whole picture is never seen (McNaught 1983, 92), relationships between terms are freely added, and the complex network of semantic relationships gradually loses its discriminating power, as every term becomes extremely specific and related to a large number of others.

Modern thesauri often reflect distinctions in terminology that, although academically defensible, are making indexing unnecessarily difficult (Blagden 1968, 347). Maniez states that

le vocabulaire du thésaurus doit être assez précis pour permettre de caractériser les zones d'intérêt de chaque document dans leur individualité. Mais au-delà d'un certain degré, la finesse des nuances forgées dans la langue entre les termes sémantiquement voisins nuit à l'efficacité de la recherche : l'indexeur hésitera entre plusieurs termes au moment de traduire les thèmes du document en une suite de descripteurs (1977, IV-42).³

The sheer size of their lexicons may now put thesauri at risk of failing to fulfil their role as an efficient device for reliable terminological control (Fugmann 1974). Reich and Biever compared sets of index terms assigned to the same documents by two organizations, the National Agricultural Library in the United States and the Commonwealth Agricultural Bureaux in the United Kingdom, both of which use the CAB Thesaurus. Consistency figures obtained in two different samples were 0.24 and 0.45. At the time of the experiment, the CAB Thesaurus contained 48,000 terms, and the investigators note that in such a large thesaurus "the vocabulary contains many

³ "The vocabulary of a thesaurus must be precise enough to allow for the characterization of all relevant themes in every document. But beyond a certain level, the introduction of nuances between terms that are semantically very close becomes a threat to the efficiency of retrieval: when translating concepts into descriptors, the indexer will not know which of many terms should be selected" [my translation].
terms that are approximate equivalents of another" (Reich and Biever 1991, 340). Reich and Biever suggest that this is a factor in interindexer consistency failure, observing that "consistency—and, therefore, the ability [for a searcher] to predict the indexer's terminology—appears to be more difficult to attain with increasing vocabulary specificity" (1991, 342). When too many terms and relationships are offered, "the indexer will fail intersubjectively and intrasubjectively to assign consistently to the documents and search topics the most appropriate terms provided by the thesaurus" (Fugmann 1974, 79).

Lancaster believes that "the finer the shades of meaning possible, the more subject expertise may be required of indexers and searchers", and claims that only a nonspecific vocabulary has the potential to improve indexing consistency (1972, 111). Aitchison and Gilchrist also suggest that specificity of the vocabulary, a precision device of the information system, demands greater skills in indexing (1987, 8).

In thesauri with a large entry vocabulary, the optimal semantic distance and distinction between neighbouring terms⁴ have been lost, and users are left to guess the meaning given to individual descriptors when several terms appear to refer to the same concept (Maniez 1977, IV-42). If the meaning of descriptors is not clear, indexing outcomes, and among them consistency, will necessarily be adversely affected. Tinker (1966) did show that consistency was influenced by how precisely the indexing terms were defined, the precisely defined terms being used more consistently than those less precisely defined; he found that subject descriptors representing older concepts were used more frequently, appropriately or not, than terms representing new and ill-defined ones (1966, 100). Funk and Reid reached similar conclusions, observing that older, well-established and well-classified MESH terms were used more consistently than terms belonging to categories where the terminology was not as well-established (1983, 182).

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⁴ "la distance sémantique optimale entre termes voisins" in the original French version.
2.3  Meaning specification

The thesaurus is a language for special purpose (LSP). It is designed with the objectives of facilitating and of making more efficient the transfer of information from those who create and disseminate it to those who want or need it. But contrary to other controlled languages used for similar purposes, classification schemes for example, the thesaurus is not an artificial language. Because it uses natural language words to express concepts and subjects, a thesaurus "necessarily suffers from several deficiencies inherent to natural language if it is used for information retrieval purposes. Among these are the ambiguity of many terms and their vacillation in meaning over the years" (Fugmann 1974, 78).

The problems evoked by Fugmann are no different from those encountered in any language created and used by a community of specialists for the purpose of communication. It seems appropriate to look first, briefly, outside of the field of information science, for insights into the issue of dealing with meaning in LSPs.

2.3.1  Specifying meaning in languages for special purpose (LSPs)

Communities of specialists have a particular need to "delimit the area of reference of lexical items and, inversely, to define the concepts they are operating with as closely as possible" (Sager 1982, 212). In new disciplines, specialized terminologies are often created through the process of redesigning existing terms or words; in this context, ill-defined terms may proliferate and concepts may not be understood when they are represented by words which permit inappropriate associations (Sager 1982, 213). But the effectiveness of LSPs depends on univocal reference: a term must refer to one concept only, and a concept must be represented by a single terminological unit. Since natural language is anything but univocal, standardization is needed.
Terms and meanings are standardized to improve the quality and efficiency of scientific communication. Standardization of terminology aims at unifying concepts and systems of concepts, reducing homonymy, eliminating synonymy, and creating, if necessary, new terms in line with terminological principles (Felber 1984). Standardization is critical in a mediated situation. Strehlow observes that terms have meanings that are intended by the speaker and those that are supplied by the listener. In face-to-face conversation, these frequently disparate meanings can be analyzed or clarified by a negotiating discussion. If the medium of communication is a document, however, this process is inefficient, time consuming, and may require correspondence or publication of comment. This is clearly not an optimal way to develop the intended sense of a term (1993, 135).

Effective communication through published papers and reports is possible if a controlled language, faithful representation of a well-structured concept system, is available for use by producer, mediator, and recipient of a message.

The usual meaning of terms forming the controlled language of a specialty is established by consensus among field specialists, thus creating a social norm which should facilitate communication and exchange of information in that field. But whilst the social norm represents a tacit agreement on the bounds of a concept, the individual is nonetheless free to interpret the social norm in the light of the structure of the totality of his own beliefs. This flexibility which permits individual variation has important consequences for communication, since the participants involved may each use the same lexical item, fixed in form by the social norm, but with reference to subtly different regions of their own knowledge space, each of which may individually represent only partially the reference sanctioned by the social norm (Sager 1990, 18).
Ogden and Richards suggest that we "regard communication as a difficult matter, and close correspondence of reference for different thinkers as a comparatively rare event" (1946, 123). Sager believes indeed that "chances that the knowledge structure of any individual will actually correspond exactly to the social norm—or to that of any other individual for that matter—are very small" (1990, 17).

Given these individual variations, a term can quickly become ambiguous again. To avoid potential misinterpretation and to reduce the impact of communication difficulties within a discipline, terminologists have looked for efficient ways of clarifying and fixing the meaning of a term within a domain by describing clearly and accurately its referent. This allows field specialists to "retain consistently what may be called 'a sense of position'" (Ogden and Richards 1946, 131).

Terminologists describe the concepts of any one discipline in three ways:

by definition, by their relationship to other concepts—as expressed by the conceptual structure and realised in linguistic forms—and by the linguistic forms themselves, the terms, phrases or expressions chosen for their realisation in any one language (Sager 1990, 21-22).

Of the means described above, the definition provides the most complete and useful description of a concept.

Dahlberg refers to the definition quite simply as "a means to connect something unknown to something already known" (1981a, 17), a clear and personal interpretation of the official definition given in the International Organization for Standardization *Principles and methods of Terminology*: "a definition is a comprehensive description of a concept by means of known concepts expressed mainly by verbal means" (1987, 5).
Definitions are a vital constituting element of any terminological system. Without definitions, there is no scientific language (De Bessé 1990, 253), and no scientific system (Dahlberg 1981b, 245). Furthermore, collections of definitions are "an essential support for general services such as translation, knowledge organization, information retrieval, interdisciplinary communication, knowledge representation in expert systems, etc." (Rahmstorf 1993, 41).

In section 2.3.4 below, we will look closely at the nature, functions, content and form of the terminological definition.

2.3.2 Specifying meaning in thesauri: the information science perspective

As maker of a language for special purpose, the thesaurus designer is "confronted with the challenge of clarifying the muddled terminological and conceptual systems of a field (or perhaps several fields combined) and detecting its underlying logical structure, thus laying a foundation for successful communication" (Soergel 1985, 249).

Well after the first sets of thesaurus construction guidelines had been written and distributed, there was an expression of concern regarding the conspicuous absence of theoretical bases to the process of thesaurus development. Kim suggested that the thesaurus was not simply a tool used for vocabulary control for input and output [since] we are interested in controlling vocabularies not simply to retrieve words, but primarily to retrieve words that reflect concepts. The problems of retrieving words are largely clerical in nature. The problems of retrieving words that reflect concepts add another dimension to the problem (1973, 150-151).
For that author, the real challenge was to find efficient ways of dealing with the latter category of problems. And since vocabulary control is achieved partly through "delineation of the scope, or meaning, of descriptors" (National Information Standards Organization 1994, 1), it seems that a theory of meaning, in this context defined as "the reciprocal and reversible relationship between concepts . . . and words" (Kim 1973, 150), would have been a useful starting point. Kim asserted that thesaurus construction had to presuppose primarily a referential theory of meaning (1973, 151).

Soergel classifies the problem of defining concepts as an intellectual problem in the development of a thesaurus, insisting that "the intension and extension of concept [sic] and the boundaries separating it from related concepts have to be determined" (1974, 9).

The issue of specifying meaning, however, appears not to have been considered seriously enough in thesauri. Problems related to the entry vocabulary, among which one would find those relating to meaning specification, were dealt with and considered solved early in the history of thesauri, along with those issues relating to the form of terms and to their organization (Krooks and Lancaster 1993). Since then, thesauri have been developed not only as if they were to be used exclusively by subject specialists, but also as if the meaning of individual descriptors was necessarily agreed on by all potential users.

This is not to say that no provisions were made for expressing and specifying meaning in thesauri: thesaurus development guidelines and thesaurus specialists recommend several more or less efficient ways of doing so without having to produce real definitions. In a thesaurus, the meaning of individual descriptors is to be found in their global and immediate environment.
2.3.2.1 The thesaurus lexicon

The meaning of a descriptor is first provided by its very presence in a thesaurus which describes a particular field of knowledge as it is represented in its literature: "the scope of descriptors is restricted to selected meanings within the domain of the thesaurus" (National Information Standards Organization 1994, 2). Such a context, however, can give little more than a general idea of the meaning of a specific term. Furthermore, given the tendency of modern thesauri to grow well beyond their original conceptual boundaries, individual descriptors might in fact acquire more than one meaning in the same thesaurus, and become ambiguous again.

The proximity of other descriptors selected to appear in the same thesaurus can also, theoretically, help specify the meaning of an individual term (Van Slype 1987, 43). In order for this to happen, the user of a thesaurus must be able to reconstruct and visualize, often in the abstract, the semantic field to which the concept represented by this term belongs; graphic displays of thesaural data (such as tree structures and arrowgraphs) are an attempt at facilitating this process. Soergel believes that "a descriptor should always be seen in its place in the overall structure before it is used in indexing and searching" (1974, 192); consequently, he sees the classified display, rather than the alphabetical display, as the most important one in a thesaurus.

The previous means of indicating meaning in a thesaurus are not very effective, and they would qualify only as minor. More significant of course are those efforts to specify meaning that result in the production of scope notes and in the development of complex networks of semantic relationships among terms.
2.3.2.2 The scope notes

Thesaurus development guidelines describe the scope note and its functions as follows:

a scope note is used to restrict or expand the application of a descriptor, to distinguish between descriptors that have overlapping meanings in natural language, or to provide other advice on term usage to either the indexer or the searcher. A scope note should state the chosen meaning of a descriptor; it may also indicate other meanings that are recognized in natural language, but which have been deliberately excluded from the controlled vocabulary (National Information Standards Organization 1994, 3).

Scope notes appeared early in published thesauri, in response to an expressed need for disambiguation revealing itself to be more critical than had been predicted or expected by the first thesaurus developers. Following remarks on the softness of the vocabulary of management, for example, Blagden emphasized that an early version of the British Institute of Management (BIM) thesaurus included more scope notes than one would find in most thesauri available at the time (1971, 141). The number of scope notes in all thesauri has been steadily increasing over the years, and in each new edition of a thesaurus, the number of scope notes tends to be significantly higher than in the previous one (Roberts 1985, 58; Browne 1992, 3).

The exact role of the scope note, however, remains far from clear. Although Mooers and Bernier obviously considered definitions and scope notes to be equivalent concepts and entities, E. Wall observed that there were in fact three distinct kinds of scope notes in thesauri: the qualifying scope note, the instructional scope note, and the definitional scope note (Krooks and Lancaster 1993, 337); only the latter was meant to provide true defining information. A recent study of scope notes in the controlled language used for indexing and searching Library and Information Science...
Abstracts (LISA) reports that scope notes may have acquired even more roles in recent years. The LISA vocabulary includes notes that limit the scope of a descriptor in that thesaurus, true definitions, history notes, and online manual notes indicating how the term should be used in the faceted scheme (Browne 1992, 3). Aitchison and Gilchrist recommend that scope notes be used to indicate restrictions placed on the meaning of a potential index term, specify the range of topics covered by a concept for which only the generic term is used in the thesaurus, convey instructions to indexers, indicate "dummy terms" needed to elucidate the structure of a systematic display, and provide a term history indicating when it was adopted or when changes in its scope took place (1987, 20-22). The scope note can finally give information on the source of a term, in the case of neologisms, for example (International Organization for Standardization 1986, 9). For Sager, Somers and McNaught, this is a clear overloading of the functions of the scope note (1982b, 66).

Browne's study reveals that definitional scope notes make up in fact a very small percentage of all scope notes in the LISA vocabulary, with only two of the eighty-seven notes appearing in her sample fitting this category. In LISA, scope notes seem to be more of a patching-up device, introduced in a belated attempt to prevent "indexing problems, including those which show that indexers were not fully aware of the way the subject headings were meant to be applied" (Browne 1992, 14).

Thesaurus guidelines and specialists recommend that scope notes be added whenever there is a need for meaning clarification. Lancaster specifies that unusual terms, foreign language terms, very recent terms, and terms used in a way that is different from common usage should be provided with a scope note, which could even be a true definition (1986, 70-71). But scope notes are not used systematically in thesauri, even where they are obviously needed. Not surprisingly, they tend to be missing in difficult places where the availability of terms with clearly overlapping meanings is most likely to lead to inappropriate descriptor assignment and inconsistency in indexing. Browne points to the descriptors WORDS, SUBJECT
HEADINGS, and TERMS\(^5\), all included in the LISA vocabulary, but with no note to help the user distinguish between them (1992, 12). Browne's observation is similar to one made earlier by Thomas in his comment on the way the Thesaurus of ERIC descriptors deals with guidance and group counselling, a field of practice within the larger domain of the social sciences whose terminology is characteristically ambiguous and not fully efficient in a communication situation. Thomas notes that in the 11th edition of ERIC, both SMALL CLASSES and SMALL GROUP INSTRUCTION, two descriptors likely to be used interchangeably by indexers even if in fact they refer to concepts of a different nature, appear without scope notes (1989, 40).

A look at current editions of three widely used social science thesauri confirms the previous observations. In the Thesaurus of ERIC descriptors (13th edition, 1995), the Thesaurus of psychological index terms (7th edition, 1994), and the Thesaurus of sociological indexing terms (3rd edition, 1992), scope notes are either definitional (providing the equivalent of a true definition), instructional (providing directions on the use of a term), or of a mixed nature (including both definitional and instructional information). Table 2.1 presents the results of our examination of a sample including 5% of the total number of terms appearing in each one of those three thesauri\(^6\), with a view to estimating the proportion of scope notes, and the proportion of defining scope notes, to the number of descriptors.

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\(^5\) By convention, in this thesis, actual thesaurus descriptors will appear in upper case letters.

\(^6\) In each thesaurus, a starting term was chosen at random. Terms were then counted until a predetermined number of terms corresponding to the 5% sample needed was obtained. In the Thesaurus of ERIC descriptors, we used 520 terms appearing in the sequence Plant life to Pushtu; in the Thesaurus of psychological index terms, 366 terms were counted from LEGAL INTERROGATION to METABOLIC RATES; in the Thesaurus of sociological indexing terms, 363 terms were counted from the starting point, EVIDENCE (LEGAL) to GERONTOCRACY. Personal and geographic names were excluded from all samples. In ERIC, now invalid descriptors still appearing in the list with previous dates of use were also excluded.
A large number of scope notes are currently available in *ERIC* (13th), and most of them are definitional in nature. It is estimated from our sample that one out of every 1.7 *ERIC* descriptors appears with a scope note containing definitional information (i.e. a definitional scope note or a mixed scope note). In 1984, Roberts had estimated that one out of every two terms in *ERIC* was accompanied by a scope note (1984, 60); the proportion of scope notes to the total number of *ERIC* descriptors has thus continued to increase with each new edition. The situation is slightly different in the *Thesaurus of psychological index terms* (*PSYCH*), and in the *Thesaurus of sociological indexing terms* (*SOCIO*). In *PSYCH* (7th), one out of every 3 descriptors appears with a scope note, and one out of every 3.6 descriptors can be considered to be defined. In *SOCIO* (3rd), one out of every 4.4 valid descriptors appears with a scope note, with one out of every 4.8 descriptors being defined.

Although the proportion of defined terms in these thesauri is relatively high, it seems that the inclusion of definitional notes might be more a factor of the ready availability of definitions for some terms than a response to a real need. In *ERIC*,

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Table 2.1
Nature and use of scope notes in major social science thesauri

<table>
<thead>
<tr>
<th></th>
<th>ERIC (13th)</th>
<th>PSYCH (7th)</th>
<th>SOCIO (3rd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of terms in thesaurus</td>
<td>10,400</td>
<td>7,311</td>
<td>7,300 (est.)</td>
</tr>
<tr>
<td>Number of terms in 5% sample</td>
<td>520(^a)</td>
<td>366(^b)</td>
<td>363(^c)</td>
</tr>
<tr>
<td>Number of descriptors in sample</td>
<td>296</td>
<td>262</td>
<td>179</td>
</tr>
<tr>
<td>Number of non-descriptors in sample</td>
<td>224</td>
<td>104</td>
<td>184</td>
</tr>
<tr>
<td>Number of scope notes in sample</td>
<td>172</td>
<td>84(^d)</td>
<td>40</td>
</tr>
<tr>
<td>Defining scope notes in sample</td>
<td>122</td>
<td>46</td>
<td>32</td>
</tr>
<tr>
<td>Instructional scope notes in sample</td>
<td>1</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Mixed scope notes in sample</td>
<td>49</td>
<td>23</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^a\) Previously used descriptors still appearing in the list with a history note excluded from the sample.
\(^b\) Names excluded from the sample.
\(^c\) Names excluded from the sample.
\(^d\) Number of scope notes provided with descriptors (postable terms) only. This thesaurus also provides occasional scope notes with non-descriptors.
PROBLEM CHILDREN, PROGRAM GUIDES, POTENTIAL DROPOUTS, and POLITICAL ISSUES, are among those terms appearing without a scope note, definitional or otherwise, whose meaning could hardly be said to be unambiguous, exempt of connotation, and generally agreed upon. In PSYCH (7th), neither one of LEXICAL ACCESS and LEXICAL DECISION (two terms linked through a hierarchical relationship) is defined. Consistent selection in the appropriate context of either LIVING ARRANGEMENTS or LIVING ALONE, and of MEANINGFULNESS or MEANING, is likely to be difficult since none of these terms has been provided with a definitional scope note. SOCIO (3rd) does not fare any better. What is the exact meaning in context of EXTENSION SERVICES, FAMILY POWER, FUTURE ORIENTATIONS? How and when should these descriptors be assigned?

When definitional scope notes are provided in contemporary thesauri, they are not given in a standardized form, they are not necessarily appropriate, and they may not give much information on the real nature of the concept represented by a descriptor. Thesaurus development guidelines have little to recommend when it comes to the actual contents, style, and wording of the scope note. Consequently, there is no discernable pattern of expression in most established notes. In LISA for example, it is obvious that no attempts have been made to present the notes in concise and consistent fashion (Browne 1992). In SOCIO (3rd), FATHER ABSENCE is explained as: "studies of the impact of missing father figures on family life and child development" (Thesaurus of sociological indexing terms 1992, 89); this note, which is in fact an incomplete instructional note rather than a definitional note, is an indication of the type of document to which this descriptor should be assigned rather than a description of the characteristics of the concept represented. In the same thesaurus, FEMALE HEADED HOUSEHOLDS is presented as a "family situation" (Thesaurus of sociological indexing terms 1992, 90) rather than characterized as a type of household.
A scope note whose own intent and meaning is not entirely clear cannot help an indexer determine the signification of a descriptor. This leaves the indexer with little choice but to rely on intuition for the identification of appropriate terms to represent concepts (Maniez 1977), therefore reducing the probabilities of consistent descriptor selection.

2.3.2.3 Semantic relationships among descriptors

Traditionally, two types of context have been used to clarify the meaning of terms in indexing languages: the syntagmatic context, which shows the terms within the stretches of discourse in which they are used, and the paradigmatic context which puts terms at their proper location within a field-restricted conceptual and terminological structure (Svenonius 1982, 131). Paradigmatic relationships are assumed to be definitional (Svenonius 1982, 131). Indeed, there is a widespread belief in our field that in a well-constructed thesaurus, a term will be self-defined by its relationships with the other terms of the vocabulary (Soergel 1974, 146; International Organization for Standardization 1986, 9; Buchan 1989, 173), and that in a vocabulary with a sufficiently developed network of semantic links among terms, the indexer will be guided to the term most appropriate to represent a particular topic (Lancaster 1991, 80-81). It has been assumed that the display of more relations in the cross-reference structure contributes to an improvement of indexes and thesauri, but supporting evidence that this is the case has always been lacking (Kochen and Tagliacozzo 1968). Many believe on the contrary that "excessive richness of structure appears to be a disadvantage, to the extent that it confuses the user and overloads the thesaurus" (Bureau Marcel Van Dijk 1976b, 31).

A thesaurus displays relationships of equivalence and subordination, as well as various other types of associations among concepts represented by its descriptors. Through these relationships, it is theoretically possible to see a concept in its
environment, and from there to circumscribe the meaning of the term which represents it. Svenonius describes thesaural relationships as relationships of meaning:

> two terms stand in an equivalence relationship if they are equivalent in meaning, in a hierarchical relationship if the meaning of one is broader than the meaning of the other, and in the related term relationship [if] the two terms are related in meaning (1990, 95).

Bernier played a key role in the integration of semantic relationships into thesauri. He proposed that it should not be the transient, or syntactical relationships established during the indexing process that should appear in a thesaurus, but only conceptual connections of a permanent kind (Bernier 1968, 103). Examples of descriptors to be associated included synonyms and antonyms, terms representing group, genus or class and terms representing kind, species, or subclass, terms representing wholes and those representing their parts (Roberts 1984, 276). Bernier's proposal was obviously much inspired by traditional bibliographic systems. At about the same time, however, linguistic experts at the Cambridge Language Research Unit (CLRU) were prescribing a more flexible approach to relationships: in their view, a term could appear under a number of "heads" (or preferred index terms) in different relationships; it is this view that has prevailed (Roberts 1984).

Unfortunately, as Nkwenty-Azeh reminds us, "there is as yet no comprehensive theory of interrelations—potential or manifested—between and among concepts in general or indeed of a particular discipline" (1994, 374). This might explain the absence of true guidance as to "the logic behind [thesaural] relationships" emphasized by Willetts (1975, 158), and as a consequence, the fact that the complex semantic networks of modern thesauri are not reliable, or even necessarily helpful, when it comes to specifying meaning.
The equivalence relationship

In the thesaurus, the paradigmatic relationship of equivalence is the result of the reduction process that is an integral part of language control. In any natural language, and even within the confines of the language of a specialty, it is not unusual to be offered a choice of several terms to express a concept. In a thesaurus, these terms are recognized as linguistic equivalents, and linked appropriately.

Equivalence can also exist beyond terms, at the conceptual level. Thesaurus development guidelines stipulate that "if two concepts cannot be consistently and reliably differentiated from one another . . . a term for one concept should be selected as the descriptor and a USE reference made from the other" (National Information Standards Organization 1994, 16). Where guidelines are strictly applied, there should not be, therefore, two (or more) terms in a thesaurus with similar or largely overlapping meanings, and the meaning of any descriptor should be easily perceived.

But guidelines also recommend that "when concepts can be distinguished in the thesaurus domain with sufficient precision to justify their separate representation as separate terms in a thesaurus, they should be individually defined [italics are mine] and retained as descriptors" (National Information Standards Organization 1994, 16). The decision of retaining as descriptors terms with at least partially overlapping meanings is then left to the thesaurus designer. A thesaurus designer will not necessarily make consistent decisions, causing the relationship of equivalence to not entirely succeed in specifying meaning, the designation of members of equivalence groups in thesauri becoming unpredictable. Willetts remarks that synonyms and quasi-synonyms tend to occur in either the equivalence or the associative cross-reference structures (1975, 179); this is confusing, and it reduces the validity of a potential definition by synonymy.
The hierarchical relationship

A thesaurus descriptor exists at a particular location within a logical arrangement of superordinate and subordinate terms representing concepts. In the popular alphabetical thesaurus display, a descriptor can therefore be shown with its immediate broader term(s) (BTs) and immediate narrower term(s) (NTs). In the classified display, the same descriptor can be shown with all other descriptors that are semantically broader and narrower, within a same class. Because it is evident that the ability to visualize a concept in a logical arrangement of concepts of the same nature should naturally help indexers to grasp its meaning, recommendations for standardization are strict where hierarchical relationships are concerned, recognizing the genus-species type of hierarchical connection as the most important one to be used in the structuring of a thesaurus\(^7\). The genus-species relation, also known as inclusion relation,

has the mathematical property of inheritance, in the classification literature called 'hierarchical force', whereby whatever is true of a given class (e.g. Animals) is also true of all classes subsumed by it (e.g. Warthogs, Deer, Gazelles, etc.) (Svenonius 1990, 97).

The establishment of legitimate hierarchies is not necessarily an easy process. Hierarchical links are founded on the prior recognition and construction of logical classifications or trees, but it is obvious that "such taxonomies are more readily and precisely compiled and agreed in scientific and technical fields than in the social sciences or social services" (Thomas 1989, 47); in the latter fields, hierarchy does not

\(^7\) The whole-part relationship is also recognized as a valid hierarchical relationship in current guidelines for thesaurus development. The use of whole-part relationships as hierarchical relationships is normally restricted, however, to four categories or classes of terms: terms representing systems and organs of the body, disciplines and fields of discourse, organizational, corporate, social or political structures, and geographic terms. Other instances of whole-part relationships appear as associative relationships.
appear to be of great importance (Rees-Potter 1992, 306). In thesauri describing scientific domains, concepts from the material entity and activity categories, easily classified, are most heavily used. But in social science thesauri, in the *Thesaurus of ERIC descriptors*, for example, the use of terms designating material entities tends to be low, and that of terms designating abstract entities very high (Willett's 1975, 171). Gilchrist recognizes that "generic relationships are . . . less easy to establish when they involve abstract problems" (1971, 25).

Hierarchical relationships, as expressed in thesauri, might in any case reveal little more about the meaning of a descriptor than what is often already known to the user, that is the larger class to which a concept belongs (e.g. FUNCTIONAL LITERACY is a type of LITERACY, and SPECIAL EDUCATION is a type of EDUCATION). If the meaning of the broad term is itself unknown or ambiguous, the significance of the explicit hierarchical link is greatly reduced. It is of interest to note that Mooers had discarded hierarchies, avoiding them altogether in his proposed descriptor system, but without explaining clearly why he was doing so (1985, 253).

The associative relationship

Thesaurus development guidelines recommend that an associative relationship (RT) be established between terms representing concepts judged to be related to such an extent that the link between them should be made explicit (National Information Standards Organization 1994, 19). Terms are often considered to be thus associated if it is found that "one of the terms is a necessary component in any definition or explanation of the other" (Aitchison and Gilchrist 1987, 45), or if common elements are present in their respective definitions (Soergel 1974, 108).

The associative relationship has acquired many different functions over time, with two of them at least having to do with meaning specification:
1. to **define the descriptor** [italics are mine] by creating a set of conceptual relationships in the mind of the user;

2. to alert the user to other descriptors that might be useful;

3. to clarify scope, and **define specificity of descriptors** [italics are mine] by putting them into context;

4. to supplement and complement the hierarchies;

5. to link together terms that have close conceptual relationships (Willetts 1975, 162).

Since no rules can "fix the limits of sound 'relatedness'" (Maniez 1988, 137), the associative relationship should be most difficult to perceive, and since its creation "depends wholly on the sympathies of the thesaurus compilers" (Willetts 1975, 162), it should be integrated into a thesaurus structure with care; yet, associative relationships are most liberally established, with the result that in many thesauri "there is a tendency for descriptors to be accompanied by long lists of heterogeneous RTs" (Willetts 1975, 162). Wall portrays such sets of related terms as amorphous collection[s] of (a) associated terms having no hierarchical relationships, (b) selected co-ordinate terms (that is, with the same broader term), (c) sometimes, broader terms not properly designated as such, (d) overlapping terms which really belong to variant hierarchical structures to that apparently favoured by the thesaurus (1980, 75).

Many of the associative relationships appearing in modern thesauri are the result of "empirical generalizations", whereby "by virtue of a sufficient number of past coocurrences, two words come to be regarded as associated" (Svenonius 1982, 131).

Svenonius sees a pressing need for more control over associative relationships to "avoid inconsistencies and subjective judgments" (1990, 99) when these links are
established, and to reduce the risk of overloading the thesaurus with valueless connections (Aitchison and Gilchrist 1987, 44). Associative relationships that are purely syntactical in nature, that do not take into account the characteristics of concepts (Fugmann 1974, 80), or that appear as "convenience" (Wall 1980, 88) rather than as true and truly useful relationships, place a descriptor in a rather foggy conceptual environment rather than indicate its meaning. The problem is more critical in social science thesauri, since "it is easier to judge the correct relationship between terms in the pure sciences and technology than in the social sciences and humanities" (Aitchison and Gilchrist 1987, 48). Of all the specialists who have produced guidelines and manuals to help with thesaurus design, Van Slype is the only one who will admit that associative relationships do not normally contribute to the specification of a descriptor's meaning (1987, 108).

The listing of "so-called related terms in thesauri has been so far firmly preserved in spite of the uncertainty of its usefulness" (Maniez 1988, 137). There is evidence that the availability of lists of related terms, which makes the thesaurus much more suggestive than prescriptive, actually impairs the ability of an indexer to consistently select the same and most appropriate descriptor to express an indexable concept. The second Slamecka and Jacoby's study of indexing consistency has confirmed that only invariable relations among terms, those that remain true in every situation, are helpful for consistency, because they are prescriptive. On the other hand, variable relationships, which do not apply in every situation and whose occurrence is unpredictable, have to be employed according to the indexers own judgment and are found "unlikely to improve indexer reliability to any considerable extent" (Slamecka 1963, 227).

Well before terminologists started to comment on the issue of meaning specification in thesauri, Mooers had expressed his doubts that a good perception of meaning in a controlled indexing language could come out of a "listing of a bunch of semi-related words" (1985, 259) to create some sort of context. McNaught later
confirmed that "contexts, while of some help, are notoriously difficult to find and control, and should only be seen as supplementary to a rigorous definition of the term which firmly places the term in [its] conceptual space" (1983, 90).

2.3.2.4 Definitions in thesauri

Seeing how confusing undefined terminology could be for an indexer, Mooers suggested the addition of definitions to index terms to make them into "descriptors", or terms with a distinct meaning determined from context of use. A descriptor would consist of two parts: a label, and a definition which would be "a carefully drawn verbal statement, based upon the scientific and intellectual nature of the concept being dealt with" (Mooers 1985, 259). Mooers was careful in specifying that the adjunction of a definition to a term did not mean that this term could not be used anymore with other meanings: it just restricted its use within a particular indexing system. Jansen also believed that, as supplementary information on a concept, a definition would be of great value, especially in cases where true relationships could not be identified and/or indicated easily (1970, 27). Mooers and Jansen's suggestions, however, were not given much consideration.

Because a thesaurus is a language tool which reflects reality (i.e. concepts that exist and that have been discussed in documents), it was indeed reasonable to think that it would not be so difficult to propose definitions for thesaurus descriptors. Thesaurus designers could lift definitions from the existing literature and determine which ones were most representative of the use of a term. Buchan saw that "beginning with a thesaurus structure one can be helped to write a definition [and] beginning with a definition one can better understand the hierarchy for a thesaurus term" (1989, 173). It is indeed a paradox that formal definitions do not appear systematically in a thesaurus since the structuring of a thesaurus is ultimately a defining, as well as an ordering process. Soergel, who subscribes to the general view
that "in thesaurus usage the meaning of a term is often made clear through the context of thesaurus structure", nevertheless recognizes that "for thesaurus building it may be necessary to have a full, formal definition" (1974, 145). How could one decide to create compound and complex terms without knowing that the resulting descriptors have their own definition, distinct from the ones attached to their components? How could one recognize synonymous terms without defining first the concepts that they represent? How could one relate terms in any way without looking at the essential characteristics of the concepts that they represent? How could one devise a faceted structure without identifying first the nature of the concepts represented by descriptors?

It seems impossible to explain how thesaurus development guidelines can avoid recommending the use of true definitions when they state that

RT references are required for sibling terms with overlapping meanings, such as 'ships' and 'boats', where each of the terms can be precisely defined (so they do not form an equivalence set), yet they are sometimes used loosely and almost interchangeably; the user interested in one should therefore be reminded of the other (National Information Standards Organization 1994, 19).

But even if associative relationships between such terms were established and displayed systematically (and given the difficulty of recognizing true relatedness, most likely they are not), how would the thesaurus user know which of those two available descriptors is appropriate in a particular indexing situation?

Existing guidelines for thesaurus development do not recommend their use; consequently, true definitions are rare in contemporary thesauri. The possibility of distinguishing scope notes and definitions, however, is acknowledged in guidelines and by thesaurus specialists. Aitchison and Gilchrist, for instance, state that "the
meaning of the term . . . is deliberately restricted to that most effective for the purposes of a particular thesaurus . . . by the addition of scope notes and definitions" (1987, 12); the authors admit that "limited definitions, and even expanded definitions, are sometimes needed to supplement the meaning conveyed by the thesaurus structure" (1987, 20), but their Thesaurus construction: a practical manual does not provide more specific directions. In the National Information Standards Organization Guidelines, the following appears, seemingly as an afterthought, in a discussion of thesaurus management software:

"the system should provide for the definition of fields other than those enumerated for term records, for purposes such as assigning codes from other systems to descriptors . . . or providing term definitions as well as scope notes (scope notes often differentiate between two descriptors for indexing purposes; definitions give the dictionary meaning)" (1994, 32-33).

It seems evident that little thought has been given to the issue: thesaurus designers would know that dictionary definitions will most likely be inappropriate in a thesaurus!

Despite the lack of directions from the Guidelines, some thesauri do include definitions either as an appendix or as part of their main display. The best known of these remains the NASA Thesaurus which has provided true definitions for many of its descriptors since 1985. The NASA Thesaurus includes a separate volume titled Definitions\(^8\), therefore making a clear distinction between the real definitions and the scope notes that continue to appear in the main thesaurus display. This "thesaurus dictionary" is an attempt at combining the different types of semantic information found in dictionaries and in thesauri for greater specification of descriptor meaning.

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\(^8\) In the 1994 edition of the NASA Thesaurus, which contains 17,500 terms, a total of 3,500 definitions are provided.
(Buchan 1989). Because the definition of a descriptor appears separately from the rest of the semantic information linked to this same descriptor, however, the definition is at best seen here as a supplementary, rather than as an essential means of explaining a thesaurus term's meaning.

No similar use of standardized definitions can currently be observed in social science thesauri even if definitions would appear essential there "to clarify imprecise terminology, which occurs more often in these subject areas" (Aitchison and Gilchrist 1987, 20).

Two interesting attempts at integrating definitions in social science thesauri have been reported in the literature. In 1976, Cornog and Landau created a glossary for use with the National Criminal Justice Thesaurus. In their view, it was only "through the ready availability of both a glossary and a thesaurus that a subject area such as criminal justice [could] be thoroughly explained lexicographically and semantically" (Cornog and Landau 1976, 139). The two instruments remained separate, and it was the thesaurus hierarchical structure which was there considered as the ancillary tool. Cornog and Landau strongly recommended an "investigation of the dual glossary thesaurus technique as a means of establishing effective vocabulary control" (1976, 139), a recommendation ignored by their fellow thesaurus designers and by the committees of specialists responsible for revising thesaurus guidelines.

Similarly, the great amount of theoretical and practical work done in the framework of the project of an integrated thesaurus for the social sciences does not appear to have had much influence over recent editions of thesaurus development guidelines. At the beginning of the eighties, information systems in the various disciplines of the social sciences were multiplying, and a thesaurus had become essential "for interconnection of information systems, services and centres using diverse (and often incompatible) indexing/retrieval languages" (Sager, Somers, and McNaught 1982a, 19). Project researchers put much emphasis on the defining
function in such a thesaurus, but failed to produce defining models and rules. The integrated thesaurus never came to exist; while information specialists quickly lost interest, a few terminologists continued to work within the framework established, and with a growing interest for the issue of meaning specification in indexing and retrieval thesauri.

2.3.3 Specifying meaning in thesauri: the Terminology perspective

Terminologists are the experts in matters relating to languages of specialty and languages for special purpose. They are naturally very much interested in thesauri, which they view as special languages for the communication of specialized information. Terminologists know that language standardization, a professional practice they claim as their own, is most definitely an advantage in the information transfer process. This brings one researcher to suggest that "efforts to standardize terminology and its meanings present a framework around which an indexer can do true quality indexing" (Buchan 1992, 82).

Terminologists create terminologies and computerized termbanks. These working tools are often associated with traditional information indexing and retrieval thesauri with which they share the critical function of facilitating the transfer of specialized information through verbal means.

Larivièree demonstrates that terms (the basic units in terminologies and termbanks) and descriptors (the basic units in thesauri) exhibit many of the same essential characteristics:

1. terms and descriptors are meant to represent univocally and unambiguously single concepts within a domain;
2. terms and descriptors are signs found in natural language rather than arbitrary codes or symbols;

3. terms and descriptors reflect language patterns established in a field of specialty (1989, 459).

Mustapha-Elhadi further notes that "the term which is used to designate a concept belonging to a certain branch of human activity is the same unit used to index documents within information and documentation systems" (1990, 100).

Maniez observes that within a domain, the semantic coverage and structure of a thesaurus can easily be superimposed on those of a terminology (1977, IV-44). Figure 2.1 illustrates that, with the exception of explicit links with other terms found in the entry vocabulary (i.e. BTs, NTs, and RTs), all discrete elements of semantic information provided in a thesaurus are also found in termbanks. While the key component of the termbank remains its definitions, the key component of the thesaurus has traditionally been its relational structure.
Figure 2.1 Termbank record and thesaurus record

Maniez (1977), Larivière (1989), and Mustapha-Elhadi (1990) conclude that terminologies and thesauri exhibit a significant number of similarities, and recommend research and applied work towards a unified product.

Terminologies provide fine details on the meaning of each entry term; traditional thesauri do not. Maniez believes that, when it comes to specifying meaning, terminologies and termbanks do a much better job than thesauri, because they are built around precise definitions (1977, IV-45). He further observes that the usefulness of terminologies to thesaurus users is unquestionably greater than that of thesauri to terminologists (Maniez 1977, IV-45). It is a fact that indexers regularly consult a terminology or a termbank when they are uncertain about the meaning that should be given to a descriptor. According to Riggs,
it will be helpful in the resolution of problems arising from the lack of consistency in the use of any given term in several thesauri to be able to consult a terminology bank containing definitions of the same terms. The . . . terminology bank will, therefore, provide an essential supplementary facility for the effective utilization of the descriptor bank (1981, 10).

Terminologists recognize that the main virtue of thesauri is their attempt at associating objects and ideas, primarily on bases of similarity, inclusion, and affinity, but consider as a major flaw the lack of contrastive definition within and among groups (McArthur 1974, 111). Terminologists are very critical of the way meaning is explained in a traditional thesaurus, where little distinction is made between description of a concept and scope of a descriptor.

Definition by synonymy, through a listing of intralinguistic or interlinguistic equivalents, is common practice in thesauri. The practice is decried by Maniez, who considers it a poor form of definition (1977, IV-46). Sager adds that "a concept cannot be defined by synonyms of a term as this would be tautologous" (1990, 41).

Definition by synthesis, through the expression of relationships between terms, is also of questionable usefulness. According to Sager,

there is no consensus about the importance of conceptual relationships in the clarification of the concept–term equation, independent of or supplementary to definitions. It is widely accepted that they are needed for determining conceptual fields but it is not established how much useful supplementary information they can provide (1990, 29).

Sager considers it "simplistic" anyway to believe that concepts can be adequately defined by only three types of relationships (generic, partitive, other) (1990, 29). Larivière realizes that, for thesaurus specialists, definitions and thesaural relations are
meant to play the same role with regards to explaining meaning, but maintains that even if relations can definitely help a user determine the meaning of a descriptor, they can never generate as precise a description as would a definition (1989, 460).

Dobvenko and Umanski compare the use of relationships for meaning specification to the characterization of a person through a description of the people this person is acquainted with rather than through a depiction of the person’s own features (1980, 10). The use of term relationships to specify meaning also appears clearly inadequate to Gouadec, who does not see how it is possible to define terms with undefined terms. In his opinion,

tout terme relevant du champs terminologique délimité et figurant dans un dossier doit lui-même faire l’objet d’une définition. On peut en effet difficilement concevoir que l’utilisateur d’un fichier soit obligé d’en consulter un second relatif au même champ terminologique pour bien comprendre ce qu’il est en train de lire. L’ensemble des définitions d’un fichier terminologique doit boucler sur lui-même et donc être auto-explicatif (Gouadec 1990, 164-165)9.

This supports Roberts’ conclusions that, in social science thesauri especially, it is strange to adopt such a method of meaning elucidation based upon the logical absurdity of defining a technical term with other undefined terms, themselves defined by other undefined terms—an explanatory regression that contributes little to the reduction of users’ uncertainty (1985, 60).

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9 "Every term which is part of the terminological system being described and which appears in a term record must itself be defined. It is indeed difficult to comprehend why the user of a termbank should have to consult a second termbank describing the same or a similar field to understand what is being read. The set of definitions in a termbank must be self-contained and self-explanatory" [my translation].
Maniez shows that trying to specify the meaning of two descriptors by establishing a link, even qualified, between one and the other (e.g. in the form FUNCTIONAL LITERACY BT LITERACY, LITERACY NT FUNCTIONAL LITERACY), is no different from defining a concept A by reference to a concept B, and the same concept B by reference to concept A: this circularity in definition, a typical practice of lexicography, is rejected by terminologists. Maniez wonders anyway how, when, and why the various relationships expressed in a thesaurus were assigned such an important role in explaining meaning. He believes that, even if they were always semantically correct, always justified, and totally reliable—which is not the case, as it happens—relationships should be seen only as a help in term selection rather than as a way of locating concepts in a conceptual space (Maniez 1977, IV-42).

The identification and display of conceptual relationships in a specialized vocabulary are not necessarily seen as useless by terminologists. Recognizing the "sad lack of overall structuring" (McNaught 1983, 90) of their own terminological data, terminologists have in fact been looking for ways to integrate such relations into their products, because

the definition is not alone in providing a link between term and concept but is supported by the declaration of a sufficient and appropriate set of conceptual relationships. The definition can therefore concentrate on the essential characteristics a concept has in common with others and which differentiate it from other concepts; by contrast the relationships indicate the type of link a concept has to other concepts in the system (Sager 1990, 51).

McNaught warns that it is relationships among concepts, and not relationships among terms, which must be considered (1983, 91).

Building on an idea first put forward by Wüster in 1971, Sager (1982) proposes a new standardized and prescriptive tool, under the designation
"terminological thesaurus", a term preferred to other existing labels such as "classified glossary", "classified vocabulary", "systematic glossary", and "systematic vocabulary". The modifier "terminological" is meant to distinguish the new tool from word lists exemplified by the Roget type of language devices, and from the conceptually structured lists of indexing and retrieval terms used in information transfer systems, that have a more limited scope and application, but in analogy to which the new designation is proposed (Sager 1982).

In the terminological thesaurus, definitions and conceptual relationships are assigned specific and complementary roles:

a definition with its greater linguistic range of means of expression can, and generally does, concentrate on more detailed features of a concept, its intention [sic], whereas the conceptual structure represented in a thesaurus shows the full extension of a term as well as its place within the broader conceptual environment of the overall knowledge structure. It further shows, more clearly than a definition, the other terms which are occurring in the conceptual field (Sager 1982, 212).

In slightly different terms, Nikitina also emphasizes this complementarity:

explanations or definitions aim at the semantic differentiation of distinct terms, while a systematic dictionary seeks to present a term as a constituent of a system, and to explicitize the systematic nature of the corresponding subject knowledge by means of the systematic nature of terminology (1992, 23).

Larivière strongly believes in the potential of the terminological thesaurus. In her opinion, this new tool can be created through a process of merging the respective contents of terminologies and thesauri. Terminologies and thesauri, once united, become a semantically richer tool, appealing and useful to a much wider audience of
language and information workers. Each tool, however, must be modified, in fact adopting features already found in the other: terminologies must integrate a thesaurus-like structure, while thesauri must integrate definitions (Larivière 1989, 461).

Considering more specifically the needs of indexers who are not necessarily field specialists, Larivière suggests that the availability of definitions in a thesaurus would more adequately guide the processes of indexing and information retrieval (1989, 461). The terminological thesaurus used as indexing aid would explain meaning more clearly, while presenting a domain-related conceptual and terminological system (Nikitina 1992, 24-25). Mustapha-Elhadi also believes that "the surest way to avoid confusion while indexing, and blanks in information retrieval, would be to create a kind of 'terminological thesaurus' such as envisioned by Larivière and Sager" (1990, 104).

Larivière (1997) has herself developed a terminological thesaurus in the area of professional and business documents designation and organization, and it is of interest to note that the term record in her thesaurus is similar in every aspect but one to that of a descriptor in a traditional thesaurus; in Larivière's "terminaire", term records contain a field for definition.

Mooers suspected that dictionary definitions were unlikely to be of much use in his descriptor system (1985, 253), and Buchan agreed that "not all definitions are suitable as thesaurus definitions" (1989, 174). Mustapha-Elhadi's proposed repertoire retains "the rigorous definitions of terminology while associating them to the varied structures of thesauri" (1990, 101).

The terminological definition, considered a most suitable candidate for the role of explaining meaning in a terminological thesaurus, would presumably be effective as well in an indexing and retrieval thesaurus. The writing of standardized terminological definitions should be facilitated by the fact that thesaurus descriptors have already been placed in a delimited conceptual space (Buchan 1989, 173; Larivière 1996, 410).
2.3.4 The terminological definition

Terms are not as arbitrary as words: they are created by a consensus of experts or by imposed standardization, and they belong to systems both more complex and simpler than that of the general lexicon. Terms cannot be defined by other terms the way words are defined by other words and periphrases; they must be defined by means of their referent properties (Condamines and Amsili 1993, 318).

The theory of definition belongs to the cognitive dimension of Terminology (Sager 1990, 13); the terminological definition links, explicitly, linguistic forms to their conceptual content, i.e. to their referents in the real world.

2.3.4.1 Nature and functions of the terminological definition

The terminological definition is "a linguistic description of a concept, based on the listing of a number of characteristics, which conveys the meaning of the concept" (Sager 1990, 39). In her own definition of the same object, Dahlberg describes not only the components but also the main function of the defining equation: "a definition is the equivalence between a definiendum ('what is to be defined?') and a definiens ('how is something to be defined?') for the purpose of delimiting the understanding of the definiendum in any communication case" (1981a, 17).

Contrary to lexicographers, whose task it is to record every sense of a given word for dictionary elaboration purposes, terminologists look at the defining task from an onomasiological perspective: it is not words that are defined, but rather concepts that are described (De Bessé 1990, 256-257). The object of a lexicographic definition is therefore the verbal representation, the word itself; the object of the terminological
definition is the concept, the abstract representation of the entity existing in the real world (Larivière 1996, 409)\textsuperscript{10}.

In the framework of a referent-oriented theory of the concept derived from Kant and Frege, Dahlberg views the concept as a unit of knowledge rather than as a unit of thought, a view now prevalent in Terminology. The referent-oriented theory of meaning, the very theory that Kim believed was needed in the domain of thesaurus design (1973, 151), allows us "to understand a concept as a carrier of elements/characteristics, gained from predications about its referent" (Dahlberg 1992, 66).

Figure 2.2 reproduces the concept triangle which shows the necessary constituents of any concept: its referent (object in the real world) (A), the statements about the referent (B), the verbal designation used to talk about the referent in communication (C).

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{concept_triangle.png}
\caption{The concept triangle (Dahlberg 1981a, 16)}
\end{figure}

\textsuperscript{10} A third type of definition, the encyclopedic definition, describes the real-world object itself, recalling everything that is known about this object.
Re-expressed as an equation based on the concept triangle, the terminological definition becomes: \( C = B \text{ of } A \).

While lexicographic definitions found in general language dictionaries use references to the common experience of all individuals, terminological definitions call upon the specialized experience of a restricted audience of individuals in a limited field of knowledge. Concepts described in terminological definitions exist on a higher, more theoretical and abstract, level of social consciousness; these concepts are "formed, understood, and used by only some members of any national or international community of scientists, technologists or technicians" (Drozd 1983, 94).

For Ogden and Richards, all real definitions are "essentially 'ad hoc'", relevant only to some purpose or situation, and applicable to a restricted field or universe of discourse (1946, 111). A terminological definition has little value outside of the specific semantic environment within which it has been prepared and is being used, and for any users other than the targeted ones. Sager emphasizes that a "terminological definition provides a unique identification of a concept only with reference to the conceptual system of which it forms part and classifies the concept within that system" (1990, 39). In Terminology, the number of possible definitions for a concept is therefore at least equal to the number of different domains and conceptual systems of which the concept is a part. And when the conceptual system changes, existing definitions must be analyzed and revised to ensure that they continue to reflect the conceptual organization of the domain within which they exist (Dahlberg 1981b, 246; Auger 1983, 105; Strehlow 1983, 20).

The terminological definition fills three fundamental needs:

1. initial fixation of the term–concept equation;

2. identification of a term via the verification of the existence of an independent definition;
3. explanation of the meaning of a concept for specialist users of term banks such as translators and subject specialists and possibly also laymen (Sager 1990, 45).

The main purpose of the definition is "to ensure that the term defined represents the same concept to all those who use it" for scientific communication (Ndi-Kimbi 1994, 331). Since, even within the language of a specialty, some terms do acquire a multiplicity of meanings, the definer's task is one "of clearly specifying the desired connotation and of making sure that only this connotation is called out" (Strehlow 1983, 19).

The terminological definition has a precise role to play in the creation and use of any language for special purpose: it delineates a concept either to the extent that it can be understood, or to the extent of the use of its designation in discourse. Dahlberg observes that "in the first case . . . a definition is meant to explain, or even to inform about the contents of a concept" while "in the second case . . . it is meant to prescribe the extension of the use of a term" (1989, 21). When it explains or informs, a definition has a cognitive/descriptive function. When it specifies a recommended use, it has a prescriptive/standardizing function.

The large number of terms designating concrete or abstract entities, products, processes, and perceived properties "which are less rigidly fixed in the knowledge structure and which rely on a broad consensus among users for the confines of special reference associated with them" (Sager 1983a, 131) must be properly defined. And obviously, where there has been a considerable amount of knowledge transfer and linguistic borrowing so that two conceptual fields show a great similarity, definition is essential.
2.3.4.2 The terminological definition as analytical definition

A concept can be defined properly in at least two ways. The intensional definition describes the content (i.e. the intension) of a concept. The extensional definition, through the enumeration of the individual species of an entity, increases our understanding of the nature of that entity.

The definition by intension, most commonly known as analytical definition and considered "the ideal definition" (Béjoint 1993, 19-20), has been established as "the most suitable starting point for the definition of technical terms" (Ndi-Kimbi 1994, 329).

The analytical definition uses the Aristotelian principles "of 'genus proximus' and 'differentia specifica' for its structure" (Dahlberg 1981a, 17). Ndi-Kimbi explains that "in a genus-species system, defining a term consists in stating the genus to which the concept belongs, together with the specific characteristics ('differentiae') that distinguish it from the other members of that genus" (1994, 329). The link to the genus serves to delimit "the external space surrounding the concept or its relative location in space with respect to one other concept" (Sager and Ndi-Kimbi 1995, 62).

The development of a well-formed analytical definition thus requires knowledge about the class(es) and/or category(ies) to which a concept belongs (Dahlberg 1981a, 21). Those basic classes are few and relatively well circumscribed: in any conceptual system, one usually finds fundamental groupings into entities, activities, properties, and relations. Sub-categorization of concepts, as well as the actual proportion of concepts appearing in any one of the basic groups, will vary with the field of knowledge being described. Contrary to philosophers, terminologists are not searching for a basic set of primitive categories applicable to all fields of knowledge: their approach to the defining work is entirely pragmatic, and in their view, "concepts classes are evolved separately for each subject field and reflected in special languages" (Sager and Kageura 1994/1995, 194). Concepts cannot be defined outside
of a complete and coherent system of concepts, and within that system, definitions will be interdependent.

The second requirement of the analytical definition, that it "must give the differentiating criteria or characteristics that separate the definiendum from other concepts comprised by the wider concepts or otherwise related to it" (Sager and Ndi-Kimbi 1995, 62), requires extensive knowledge of the referent since true statements about this object, its qualities, properties, functions, etc., will be considered its characteristics for definition purposes. Essential, or defining, characteristics "must be present in all cases of the referent of a concept" (Dahlberg 1981a, 19), and, not surprisingly, their number will tend be small (Sartori 1984, 42). By contrast, accidental or contingent characteristics are those which "a referent may acquire in one of its specializations" (Dahlberg 1981a, 19). Accidental characteristics are not normally used in analytical definitions.

Analytical definitions used in terminological systems need not be complete, and need not list all essential characteristics of a concept, as would be the case in an encyclopedic definition, for example. In a termbank, a definition is "only a part of the semantic specification contained in a term record and . . . there is therefore no need for it to be exhaustive and self-contained" (Sager 1990, 45). The pragmatic approach adopted by terminologists dictates that only those characteristics that will allow the reader to distinguish an entity from another, and then use a term in communication, are recalled in the definition (De Bessé 1983, 183). Terminologists use their knowledge of the potential users of a definition and of an entire specialized vocabulary to determine which of the essential characteristics of a concept will be sufficient in its definition; the pragmatic and useful definition is indeed characterized by a strong dependency on the use or the user of the definition (Strehlow 1983, 16).

When all concepts have been defined, a definitional system is created which must be coherent and self-explanatory (Gouadec 1990, 165). In a termbank, separate
term records "complement each other via the terminological relationships and the terms in definitions which are defined in other records" (Sager 1990, 45). Analytical definitions integrate terms defined elsewhere within the same definitional system with words and phrases of the ordinary language, the signification of which is presumed to be known (Dahlberg 1979). Because definitions are not complete, a basic level of understanding and education is expected of their reader (Sager 1990, 40), along with a considerable linguistic contribution: a larger basic vocabulary is required from the reader of a terminological definition than from the reader of a lexicographic definition (Béjoint 1993, 24).

2.3.4.3 Defining rules, models, and templates

The importance of the object "definition" in Terminology is undeniable. Yet, Drozd believes that the "concept of the definition used in present-day theory of Terminology does not belong to its 'strong' and reliable parts" (1983, 97). Béjoint is not impressed by terminological definitions that are never as precise and as rigorous as they claim to be (1993, 25), and De Bessé suggests that this might be due to a lack of "savoir-faire" on the part of their authors as well as to the absence of appropriate content and style conventions (1990, 259). Such conventions could lead to the well-formed definition envisioned by Strehlow (1983), a definition that is clear, concise and explicit. A definition is clear if it can be understood by an intelligent nonexpert... concise if the essence of the meaning is expressed in one sentence of reasonable length, and if there are no superfluous words... explicit if it provides—at least by implication—a way to distinguish the defined word from words of broadly similar meaning (Saxon 1988, 119).
Traditional defining rules derive from Aristotle's *Topics*. Ndi-Kimbi remarks that these rules "have reached the twentieth century with little change and were observed by lexicographers and encyclopedists alike" (1994, 327-328). It was therefore logical for terminologists to also rely on these often cited fundamental principles:

1. a definition must give the essence of that which is to be defined;
2. a definition must be 'per genus et differentiam';
3. a definition must be commensurate with that which is to be defined;
4. a definition must not, directly or indirectly, define the subject by itself;
5. a definition must not be in negative where it can be in positive terms;
6. a definition should not be expressed in obscure or figurative language (Ndi-Kimbi 1994, 329).

It is not these principles, however, that terminologists have used most often to provide needed directions in their work. Much more used have been listings of desirable qualities of a correct definition: brevity, clarity, simplicity, exact correspondence to the referent, adequacy of extension, and reciprocity (i.e. substitutability) of definiendum and definiens. Common mistakes in defining have been well publicized (in Gouadec 1990, for example), but tautology (using the definiendum in the definiens), circularity (defining term x by term y, and term y by term x), and negativity (emphasizing what a concept is not rather than what it is), remain remarkably frequent in contemporary definitions.

Traditional defining rules have not been sufficient to guarantee the production of consistently useful definitions. A major difficulty in writing analytical definitions
has always been to determine which of the essential characteristics of the defined concept were needed in its description, and the rules have been of little help in this area. Characteristics used in definitions have been selected arbitrarily, according to individual views (Rahmstorf 1993, 48). This is hardly surprising because

the choice of these other points of reference and the number of concepts to which reference is made in this process is not prescribed. It is assumed that the nearest concepts, i.e., those with which there is the closest interaction, will be most suitable; regarding the number of other concepts required for this exercise, there is the general condition of sufficiency and necessity, i.e., as many as necessary and as few as are sufficient for the definition within the context of the chosen field or subfield (Sager and Ndi-Kimbi 1995, 62).

The necessity of a norm for writing definitions has become a much discussed theme in the literature of Terminology (Dahlberg 1981a; Sager 1983a; Dahlberg 1989; Gouadec 1990; Ndi-Kimbi 1994; Sager and L'Homme 1994; Sager and Ndi-Kimbi 1995). A norm would lead to "matching defining patterns for concepts of the same class" (Ndi-Kimbi 1994, 347), and would facilitate as well as accelerate the production and revision of higher quality, more useful definitions (Gouadec 1990, 165-166). A norm would lead to precise defining models and to the design of templates calling for and organizing, always in the same order, the predetermined essential elements of a term definition (Gouadec 1990, 166). Various templates, showing a number of common fields, would presumably be needed as it has been shown that each concept class has its own preferred or most suitable pattern for definition (Sager and Ndi-Kimbi 1995, 65).

Research work towards the construction of defining models has increased its pace in recent years, pressed as so many other fields have been by technological innovations, a circumstance predicted by Dahlberg in 1981: "Il faut donc chercher à normaliser le travail de définition, à structurer les définitions de façon analogue afin
Technology is now available for the exploitation of existing definitions to create groupings of like concepts, design classification schemes, and facilitate the exchange of data and information (Bocorny Finatto 1995). Automatic processing remains limited at this time, however, because of weak defining patterns, wide variations in quality of contents, and unpredictability of form and order of constituting elements. If models were available, authoring packages for the writing of definitions could be developed; the use of a computer would then become an even greater asset in the work of the terminologist, permitting automatic prompting for needed defining elements, and exerting an unobtrusive control of the defining activity.

It is in this context that Sager and L'Homme have developed a defining model "in which items of information are separated and organized more rigorously than is usually the case in standard dictionaries" (1994, 352). The model is used to recombine and rewrite definitions found in terminological or other specialized dictionaries, allowing for a "systematisation of what already exists in one form or another" (Sager and L'Homme 1994, 359). A major objective of the model is to reduce "the free-text element in the defining phrase" (Sager and L'Homme 1994, 351), a primary source of inconsistencies, irregularities, incompleteness, and insufficiency of definition. The proposed model includes seven fields needed to receive information considered essential in the well-formed analytical definition:

1. a subject-field attribution (relating the definiendum to a specific field, or domain);

2. the concept class or category of the definiendum;

3. the defining concept, the definens, often referred to as the 'genus proximus';

11 "We must strive to standardize the work of defining, and structure all definitions in the same way, in preparation for automated processing and transfers" [my translation].
4. the concept class of the definiens;

5. the essential relationship of the definiendum to the definiens;

6. the essential characteristics which distinguish the definiendum from related concepts, i.e. the differentia;

7. any non essential characteristics which might be particularly interesting or useful to the user (Sager and L'Homme 1994, 355-356).

The model is accompanied by a restricted number of syntactic rules. The subject field attribution is needed to validate the definition

As convenient as this model appears to be, it does not offer much guidance as to the nature and criteria for selection of necessary and sufficient essential characteristics, a process which Dahlberg, among others, considers as "the main point in establishing concept definitions" (1983, 21). McNaught refers to the same process as a refinement of the definition by the bringing in of facets (1983, 94).

Ogden and Richards believed that "the routes by which we link [the] starting-points to our desired referents must be thoroughly familiar . . . they are those which we must know and unerringly recognize if we are to survive—Similarity, Causation, Space and Time" (1946, 127). Strehlow suggests the use of one or more of the news reporter's questions: who, what, when, where, why, and how? (1983, 20) as a way to construct an effective differentia. Dahlberg uses a similar basis in her proposal for a defining template, with a question/answer structure designed to reveal defining conceptual relationships (1989, 19). Although these proposals leave much opportunity for subjectivity and inconsistency in the selection of the defining characteristics of a

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12 Further details on the Sager and L'Homme model are provided in Section 3.5.3.2 of this thesis. This model was used in our own defining work.
concept, they are pointing in an interesting direction for the improvement of a promising defining methodology.

2.4 Thesaurus evaluation

As noted in previous sections of this thesis, the contents of thesauri and the guidelines for their development have not changed much over the past thirty years, and remarkably little research has been conducted in the area of thesaurus design. This may be due, at least in part, to the fact that information specialists have had no standard and proven methodology for measuring whether thesaurus contents were appropriate, and whether thesauri were doing effectively what they were meant to do.

2.4.1 Evaluating thesaurus contents

Lancaster recognizes the importance of the controlled vocabulary to the indexer, suggesting that "it should be organized and displayed in such a way that it gives the indexer positive assistance in the selection of the terms most appropriate to use in a particular situation" (1991, 38). But having said this, Lancaster has little to propose as to how this should actually be done, and how the process should be controlled and validated. His observation that "a thesaurus can be superficially evaluated merely by examining it" to determine, for example, if "terms that are unusual or ambiguous [are] explained by their context, by qualifiers, or by scope notes" (Lancaster 1986, 155), has contributed little to the development of useful measures of appropriateness of contents and of goodness of practice in thesaurus design. Soergel is equally vague; questions such as: "does the thesaurus include all concepts necessary for an adequate treatment of the subject field?", or "is the display of the thesaurus clear and helpful for finding the appropriate concepts in indexing or
search request information?" (1974, 9), call for subjective answers unlikely to be truly indicative of the suitability and quality of the content of a particular thesaurus.

The most important evaluative work concerned with thesaurus content remains the survey conducted by the Bureau Marcel Van Dijk during the mid-seventies, a little over ten years after the recognition of the thesaurus as an essential tool for the successful transfer of information. The purpose of the survey was to "provide thesaurus authors with a means of assessing the characteristics of their documentation language by comparing them with those of other thesauri" (Bureau Marcel Van Dijk 1976a, 37). A series of quantitative measures were proposed to describe and compare existing thesauri, and recommendations were made to supplement the guidelines for the development of new thesauri.

The following were among the measures suggested: the equivalence ratio (or number of non-descriptors to the total number of descriptors in the thesaurus), the enrichment ratio (or number of semantic relationships to the total number of descriptors in the thesaurus), the connectivity ratio (or number of descriptors related to at least one other term to the total number of descriptors in the thesaurus), and the precoordination ratio (or average number of significant words forming a descriptor) (Bureau Marcel Van Dijk 1976b)\(^{13}\).

\(^{13}\) The equivalence ratio is obtained by dividing the number of non-descriptors by the total number of descriptors in the thesaurus; values higher than 1 are recommended. The enrichment ratio is obtained by dividing the number of semantic relationships in the thesaurus by the total number of descriptors available; the measure "is directly linked to the precision and thoroughness of the indexing" (Bureau Marcel Van Dijk 1976b, 29), and recommended values are in the range of 2 to 5, a relatively low figure considering that semantic relationships constitute the main navigational tool in a thesaurus. The connectivity ratio is the ratio between the number of descriptors with at least one semantic relationship (equivalence, hierarchical or associative) and the total number of descriptors; it has a logical recommended value of 1, since in a thesaurus, each descriptor should be linked to at least one other term. The precoordination ratio is the average number of significant words forming a descriptor; a recommended value of 1.5 to 2 is given to the precoordination ratio; a high value (i.e. a high degree of precoordination of concepts and terms) has the power to benefit precision in searching but, by presenting indexers with too many choices, it increases the risk of inconsistency in term selection.
Of particular interest to us among the various quantitative measures proposed in the Bureau Marcel Van Dijk's survey is the definition ratio, which focuses on the meaning of thesaurus descriptors. The definition ratio represents the proportion of descriptors in a thesaurus whose meaning is considered to be sufficiently defined (by a qualifier, a scope note, a definition, an inclusion relation to a subject or facet, or a hierarchical relationship) to exclude any possible ambiguity. The definition ratio has a logical recommended value of 1; all terms in a thesaurus should be sufficiently defined because "it is obviously an advantage, as regards the precision of the indexing, for each descriptor to represent one concept only, and for this one accepted meaning to be defined in one way or another, in order to avoid ambiguity as far as possible" (Bureau Marcel Van Dijk 1976b, 33). Although interesting in theory, the measure is deficient in that it does not take into account the true value of the various elements of semantic information given with a descriptor. In the calculation of the definition ratio, all scope notes, for example, are considered as defining information, when in fact many such notes are not meant to define (see section 2.3.2.2 above). There is also no prioritization or even consideration of the relative importance of each element of semantic information: a true definition provided for a term should be worth more than the inclusion of this term into a class.

Such quantitative measures as those identified by the Bureau Marcel Van Dijk are relatively easy to obtain and thesaurus design specialists have offered them as a way to evaluate the quality of thesauri (Lancaster 1986; Van Slype 1987), without, however, providing much instruction as to how they should be interpreted and analyzed. But the measures remain superficial and all of them cannot be considered as equally serviceable. Lancaster sees some of the measures as ingenious (the enrichment and the connectivity ratios, for example), but considers others trivial (the reciprocity ratio, for example, which reflects the extent to which the BT, NT, and RT relationships are reciprocated). He emphasizes that the values suggested, derived by various counts on thesauri presumed to be "good", i.e. thesauri that conform to the guidelines, are totally arbitrary (Lancaster 1986, 157). The figures obtained reveal
little more than whether or not and how well a thesaurus designer has followed the instructions; the content of the guidelines, the usefulness of the instructions, and the validity of the recommendations are rarely questioned, and since the guidelines were themselves written on the basis of what was already done in thesaurus design, it is not surprising that the practice has not evolved and that the product has remained the same for so long.

The evaluation of the content of a thesaurus remains a very subjective process. It appears that little can be learned from the various ratios just described, because they are numbers that measure only conformity to a standard, establishing some level of quality in doing so, but revealing very little about thesaurus semantics. The principal investigator in the Bureau Marcel Van Dijk survey, Van Slype, recognizes the limitations of the study, in which thesauri were "judged in the light of characteristics on which no systematic and in-depth studies [had] yet been carried out nor recommendations made at an analytical level" (Bureau Marcel Van Dijk 1976a, 38).

It is probably more appropriate and efficient, in any case, to look at the thesaurus not only as an object but rather as an object with a purpose, as an instrument, and to assess its value under conditions of actual use.

2.4.2 Evaluating the thesaurus as indexing aid

The prospective uses or purposes of thesauri are not always clear and well understood, even if thesauri are viewed as an essential component of contemporary information transfer systems. There has been over the years "confusion as to whether a thesaurus should be a system for document representation or for document retrieval, and regarding how to measure its effectiveness for either approach" (Neufeld 1972, 141). Such different measures as indexer consistency and speed, ease of retrieval,
recall, relevance, and user satisfaction have all been applied at one time or another to determine whether the thesaurus was playing its role efficiently. Most investigations fell short of providing hard, objective, and reliable data.

The usefulness of thesauri has been evaluated most frequently from the output end of the information storage and retrieval system, from a searching rather than from an indexing standpoint. The evaluation of thesauri has been closely linked to the evaluation of the quality and pertinence of retrieval in information systems. The well-known quantitative measures of recall and precision, conceived in the framework of the Cranfield examinations of various index language devices (Cleverdon 1967), have been used not only to assess retrieval quality, but also, indirectly, to quantify correctness of indexing and thesaurus effectiveness.

Investigations of the usefulness of thesauri as indexing aids have not been frequent. We believe that this is a reflection of an underrating of the potential influence of the indexing language on the outcome of the indexing process. Reich and Biever claim that

although indexing depth influences the number and sometimes the choice of terms assigned to a document, it is not a function of the index language. How exhaustively a document is indexed is determined by the indexer, who decides on the number of terms necessary to characterize a document adequately, and is independent of vocabulary control (1991, 340).

But is it really? The indexer who is unsure of the meaning of available descriptors might be brought to attribute fewer or more index terms than would be necessary. Lancaster believes that "lack of subject knowledge may lead to overindexing" (1991, 79), the indexer assigning two terms when only one is needed or correct because of his or her inability to distinguish between them.
Reich and Biever also declare that

although selection of concepts for indexing is, to a large extent, related to indexing depth, it is also often a product of an indexer's perception of the significant elements in a document and, like indexing depth, is independent of vocabulary control (1991, 340).

But when the term needed to express an indexable concept does not seem to be available, the concept is very likely to be dropped, thus affecting retrospectively the outcome of the conceptual analysis which is the first stage of the indexing process. Experimental data obtained by Bertrand and Cellier supported the hypothesis of "a later translation impact on the subject analysis" (Bertrand and Cellier 1995, 470). The series of transformations 14 identified by Bertrand and Cellier confirm the considerable influence exerted by the indexing language, especially among novice indexers. The investigators observed that

the indexing activity of the novices was largely based on the data supplemented by the documentary language. The latter was used as a reference system. Its indexing terms were viewed as potential 'solutions'. The indexer's task consisted of deciding which of these solutions were the most relevant. This strategy could lead to the choice of an 'imprecise' indexing term to comprise a 'little of everything' (Bertrand and Cellier 1995, 470).

It is unfortunately not easier to measure the usefulness of a thesaurus in its function as indexing aid than it is to assess the raw quality of its content. There is again a striking lack of methodologies and of precedents to help with this task. The

14 These transformations are: 1. suppression of a concept which does not appear in the indexing language; 2. simplification; 3. generalization; 4. dissociation; 5. addition of a term; 6. precision; and 7. substitution or replacement of a word by a synonym. The authors note that the average number of impoverishment operations (1., 2., 3., 4.) effected at the translation stage are higher than that of enrichment operations (5., 6., 7.) (Bertrand and Cellier 1995, 464-465).
usefulness of the thesaurus as indexing aid is tied to the quality of indexing, itself difficult to measure with any precision.

2.4.2.1 Evaluating the thesaurus as indexing aid through interindexer consistency

Quality of indexing is frequently assessed by way of interindexer consistency surveys. It is now a widely accepted assumption that the higher the degree of agreement among indexers in their selection of index terms to represent the subject of a document, the better the indexing. And the thesaurus which allows consistency to increase will be considered appropriate and effective as an indexing aid.

The main objectives of interindexer consistency studies have been to identify and define the factors that affect consistency in order to reduce inconsistency, with a view to increasing not only indexing, but also retrieval, quality and effectiveness. Hooper (1966) outlined ten potential applications of indexing consistency studies, and the analysis of vocabulary controls was one of them. Hooper explained that consistency data could be used to identify redundant and poorly defined entries in a thesaurus, a classification scheme, or a dictionary. Lancaster interpreted this suggestion freely, and proposed that consistency studies be conducted "to detect problems in the use of a controlled vocabulary; for example, identification of terms or types of terms that are frequently used inconsistently because of ambiguities or overlapping" (1991, 83).

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15 The suggested applications of interindexer consistency studies were: 1. selection and training of indexers; 2. quality control of indexing; 3. analysis of vocabulary controls; 4. analysis of the "what to index" problem; 5. analysis of indexing time; 6. analysis of the effect of document length; 7. analysis of indexing rules; 8. assessment of the effectiveness of role indicators; 9. analysis of the effect of document type; 10. analysis of indexer patterns and traits (Hooper 1966).
Controlled vocabularies have indeed figured as a variable in many consistency studies designed to compare results obtained by indexers working with or without them (e.g. in the Slamecka and Jacoby investigations, in the Tinker study, in the Preschel and in the Tarr and Borko studies, etc.), or results obtained by indexers working with the same controlled vocabulary in different organizations (e.g. in the Funk and Reid study, in the Reich and Biever investigation, in the Bertrand and Cellier study, etc.) But we found in the literature only one report of a study in which the content of the controlled vocabulary was the independent variable considered. The second Slamecka and Jacoby study (Slamecka 1963) examined the effects on consistency of using as indexing aid three different types of controlled indexing languages; this study is of particular significance to our project, and it is described fully in section 2.4.2.2 below.

The unsophisticated methodology of indexing consistency studies has itself been much contested. Samples have generally been small, different formulas were used to calculate consistency ratios, investigators did not specify what they considered a total or partial term match, and experimental conditions, in many cases, were insufficiently controlled (Leonard 1977). In their respective reviews of previous interindexer consistency studies, both Leonard (1977) and Markey (1984) have commented on uncharacteristically wide variations in scores, from an extreme low of 0.04 up to an extreme high of 0.82, with the bulk of consistency scores in the range of 0.35 to 0.6. In these conditions, it has been difficult to compare the results obtained by the investigators, even when they had manipulated the same variables.

A majority of the estimated thirty-five interindexer consistency studies completed before 1980 were conducted under more or less controlled laboratory conditions, with several individuals being asked to index the same documents independently, at a set time, and in a set environment; post-1980 consistency tests have taken place in more natural settings, usually in the framework of overlap studies examining duplicate records found in large operational databases. The results obtained
after 1980 confirmed most of the findings of the earlier "artificial" studies that had been until then considered questionable.

The following observations, reported by both Leonard (1977) and Markey (1984) in their respective reviews of previous research in the area, have been made repeatedly by indexing consistency investigators, both before and after 1980:

1. consistency in concept selection (interindexer concept consistency) tends to be higher than consistency in term selection (interindexer terminology consistency);

2. consistency tends to be higher among indexers who are provided with a controlled indexing vocabulary;

3. consistency tends to be higher among indexers who are familiar with the structure of controlled vocabularies;

4. consistency tends to be higher among experienced indexers than among novice indexers;

5. consistency tends to be higher when shorter documents are indexed;

6. consistency tends to be higher when fewer index terms are used to describe the subject content of a document;

7. consistency among subject specialists and non subject specialists is comparable;

8. consistency does not seem to be affected by the amount of time on task.

Despite its shortcomings, a formula proposed by Hooper has become the standard for basic indexer-pair consistency calculations. Hooper’s indexer-pair consistency formula (i.e. the ratio of the number of term matches to the total number of unique terms assigned) reflects an entity view rather than a descriptor view of consistency. The entity view of indexing consistency considers the set of index terms
used to describe a single document, while the descriptor view analyzes patterns of use of a single descriptor across a number of documents (Soergel 1994, 594). The descriptor view of consistency has been adopted by the few researchers who tried to establish a measure of "goodness of indexing" (e.g. Zunde and Dexter in 1969, White and Griffith in 1987, and Chu and Ajiferuke in 1989). The entity view has been chosen by the larger number of researchers who worked on the premise that there was no one right, correct, or exact assignment of index terms to a document.

Zunde and Dexter consider that Hooper's formula is deficient in that it "completely disregards the difference between agreement on significant terms and agreement on insignificant terms" (1969b, 260). But Tarr and Borko recommend its use since "studies that gather data derived from indexer pairs [have] a number of usable data much greater than the actual number of indexers involved" (1974, 51). Since it is difficult to obtain large samples in experimental indexing situations, the strongest argument in favour of Hooper's formula for calculating consistency has been that the large body of data obtained through its use has allowed the "degree of probable sampling error [to be] kept to a manageable proportion" (Tarr and Borko 1974, 51).

Hooper's formula was not available before 1966, but it formalized a way of calculating consistency which was already popular among researchers in the area. Slamecka and Jacoby had used a similar equation in both their 1962 and 1963 investigations (Leonard 1977).

2.4.2.2 The Slamecka and Jacoby studies

Several references have already been made in this thesis to the findings of Slamecka and Jacoby concerning the relationship between indexing aids and indexing consistency (see sections 1.4.2, 1.4.3, 2.2.2.2 and 2.3.2.3). The consistency studies
designed and conducted by these two investigators are of particular interest to this project. The second study, reported by Slamecka in 1963, is the best documented attempt at assessing the usefulness of various types of indexing languages through standard interindexer consistency measurements, with the content and the structure of the indexing aid representing the independent variable, and indexers' reliability (i.e. consistency) representing the dependent variable.

Indexing aids were seen by Slamecka and Jacoby as an important category of controls in indexing, with the potential to increase the amount of agreement among indexers. But since the investigators suspected that all indexing aids were not equally useful in this function, they also included them in a category of factors, those relating to the indexing situation, responsible for disagreement in the choice of index terms (Slamecka 1963, 223).16

As part of a larger investigation which also included a base-zero test (i.e. indexing without vocabulary control), Slamecka and Jacoby analyzed the results obtained by three experienced indexers with subject competence in chemistry who were provided with different types of controlled vocabularies to index sets of chemical patents. The controlled vocabularies used by the indexers were: a concept-associative tool (namely the Chemical Engineering Thesaurus), an alphabetical subject authority list of terms, and a classificatory hierarchical scheme. It should be noted that in the Slamecka and Jacoby experiment the indexing aids differed not only in their structures, but also in their lexicons.

Slamecka and Jacoby used two measures to determine levels of consistency: depth of indexing (or number of terms assigned to each patent), and percentage of matching terms between any two indexers. The investigators found that the

16 The other factors are those inherent to the indexer and those inherent to the document (Slamecka 1963, 223).
alphabetical and hierarchical indexing aids significantly increased the percentage of matched terms, whereas the associative tool failed to improve the consistency level above the base-zero test (Slamecka 1963; Leonard 1977). Results showed an average consistency of 0.382 among subject authority list users, of 0.374 among users of the hierarchical tool, and of 0.083 only among thesaurus users. In a previous experiment, the investigators had established the base-zero consistency level at 0.091.

Slamecka and Jacoby concluded that "other factors being constant, a prescriptive indexing aid appears capable of reducing the unreliability of indexers by increasing the absolute number of matched terms per document", and suggested that a "not-too-extensive, rigidly applied prescriptive vocabulary may even reduce the difference in the depth of indexing which is due to indexing at varied levels of specificity" (Slamecka 1963, 224).

The suggestive type of indexing aid, among which the thesaurus was classified because it included variable associative relationships, appeared to have a very different effect on indexing outcomes. Recognizing that adequate cross-referencing was needed to guide the indexers through the indexing aid to ensure that "all subject entries appropriate to the document indexed" (Slamecka 1963, 226) would be identified, Slamecka and Jacoby demonstrated, however, that the inclusion of these variable semantic relationships which could be beneficial to completeness were obviously detrimental to consistency (Slamecka 1963, 226-227). The investigators believed that "relatively high consistency among indexers should be attainable through the use of indexing aids which displayed only invariable relationships among the vocabulary terms" (Slamecka 1963, 227).

Slamecka and Jacoby’s findings and conclusions greatly inspired this project, and especially our second research question (see section 1.5). In our study, interindexer consistency measurements are used to assess the usefulness to the indexer...
of specific elements of semantic content in a specialized thesaurus, namely standardized definitions and associative relationships among terms.
3

METHODOLOGY

3.1 Introduction

Previous research has confirmed that indexers who are provided with a controlled indexing language tend to be more consistent in their selection of terms that will represent in concise form the subject of a particular document. Indexing aids of a semantic nature, such as indexing and retrieval thesauri, are presented as an important variable in observed variations in inter indexer consistency (Zunde and Dexter 1969a). The rather low consistency ratios obtained in most inter indexer consistency studies conducted in recent years suggest that large and complex thesauri, especially in disciplines of the social sciences, might not provide sufficient or entirely appropriate semantic information about descriptors, and might not be prescriptive enough, to raise levels of terminological consistency among indexers.

The general purpose of this project was to explore the issue of providing indexers using a thesaurus with a different type of semantic information about individual descriptors. The focus of the study was on the potential usefulness of standardized definitions in the thesaurus used as indexing aid.

The project's general objectives were:
1. to create and to integrate into a traditional thesaurus structure a different type of semantic information, namely a set of standardized definitions;

2. to assess the usefulness to the indexer of this new type of semantic information, by way of calculating and comparing interindexer consistency measurements.

A two-phase project was designed to reach these objectives. The first phase of the project involved the development of a prototype thesaurus including definitions written specifically for our purpose with the help of a defining model and of defining rules derived from the theory and practices of Terminology. Section 3.5 in this chapter reports on the process of creating this prototype thesaurus describing part of the field of adult literacy.

In the second phase of the project, the prototype thesaurus was used as indexing aid in a controlled indexing experiment. Three different versions of the thesaurus were used by novice non specialist indexers to describe a sample collection of pertinent secondary documents in the field of adult literacy. Each version of the thesaurus differed from the other two by the type and the overall amount of semantic information provided to specify the meaning of each descriptor. Previous studies have compared consistency achieved by indexers working with controlled indexing languages which differed not only at the structural level, but also at the lexical level; in this project, the same lexicon was available to all indexers. Section 3.6 describes the indexing experiment, conducted in controlled conditions similar to those applied in previous indexing consistency studies.

Under observation in this project were the consistency of indexers in their selection of a complete set of descriptors for each document in the sample collection, and their consistency in identifying the main, or most important, descriptor for each one of these documents. Section 3.7 explains how the data obtained from the indexing
experiment were prepared for analysis. The statistical methodology chosen for significance testing is introduced in section 3.8.

3.2 Operational definitions

In the context of this project, the following concepts are to be interpreted as:

*Augmented thesaurus*: controlled list of postable index terms, providing a standardized definition for each descriptor, and displaying equivalence, hierarchical, and associative relationships among terms.

*Definition*: verbal description of a concept, based on the listing of a number of its essential characteristics, which conveys the meaning of a concept with reference to the conceptual system of which it forms part.

*Descriptor (or subject descriptor)*: single word or multiword term selected to represent a specific concept in a thesaurus and in indexed documents.

*Informative abstract*: concise representation of the content of a source document, in the form of a self-contained text presenting key points, results, conclusions, recommendations, etc. resulting from basic and applied research and development.

*Interindexer terminological consistency*: quantitative measure of the degree to which two or more indexers agree in their selection and assignment of index terms to represent indexable concepts in a document.

*Non specialist indexers*: indexers with little or no knowledge about the subjects of documents they have to index.
Novice indexers: individuals with minimal or no practical subject indexing experience.

Standard thesaurus (or control thesaurus): controlled list of postable index terms, displaying equivalence, hierarchical, and associative relationships among terms.

Standardized definition: definition written in accordance with specific lexico-semantic and morpho-syntactic rules, whose form and content conform to a preestablished model.

Stripped thesaurus: controlled list of postable index terms, providing a standardized definition for each descriptor, and displaying equivalence but not hierarchical or associative relationships among terms.

Terminological definition: definition written by terminologists with the dual purposes of fixing the meaning of a concept within the conceptual system of a specialty, and of facilitating communication among specialists by prescribing the use of the term which represents this concept in the language of the specialty.

3.3 Research questions

Looking more closely at the behaviour of novice non specialist indexers, this research project was designed and conducted with the specific aim of providing an answer to the following research questions:

1. Does the availability of standardized definitions in a thesaurus of descriptors, as an addition to the conventional display of semantic relationships generally provided in such a tool, lead to an increase in consistency among novice non specialist indexers?
2. Does the availability of standardized definitions in a thesaurus of descriptors lead to acceptable levels of consistency among novice non specialist indexers who do not have access to the conventional display of semantic relationships normally provided in such a tool?

3.4 Research hypotheses

In this project, standardized terminological definitions were added systematically to a traditional thesaurus in an attempt to make this thesaurus more prescriptive. The use of a more prescriptive thesaurus could be expected to raise levels of terminological consistency among indexers (Slamecka 1963).

The study is based on three sets of research hypotheses. The first set of hypotheses focuses on the number of descriptors used to represent the subject content of a particular document. The smaller the number of descriptors used, the higher the consistency is expected to be. The hypotheses relevant to the number of descriptors used are:

H1. On average, novice non specialist indexers working with an augmented thesaurus will use a smaller number of descriptors to represent the subject of a document than novice non specialist indexers working with a standard thesaurus.

H2. On average, novice non specialist indexers working with a stripped thesaurus will use a smaller number of descriptors to represent the subject of a document than novice non specialist indexers working with a standard thesaurus.
The second set of hypotheses focuses on terminological consistency among indexers in their selection of a complete set of descriptors for a particular document. These hypotheses are:

H3. On average, novice non specialist indexers working with an augmented thesaurus will achieve higher levels of interindexer terminological consistency than novice non specialist indexers working with a standard thesaurus.

H4. On average, novice non specialist indexers working with a stripped thesaurus will achieve levels of interindexer terminological consistency at least equal to those of novice non specialist indexers working with a standard thesaurus.

The third set of hypotheses focuses on terminological consistency among indexers in their identification of a main (or principal) descriptor for a particular document. The hypotheses relevant to terminological consistency in main descriptor selection are:

H5. On average, novice non specialist indexers working with an augmented thesaurus will achieve higher levels of interindexer terminological consistency in their selection of a main descriptor for a document than novice non specialist indexers working with a standard thesaurus.

H6. On average, novice non specialist indexers working with a stripped thesaurus will achieve levels of interindexer terminological consistency in their selection of a main descriptor for a document at least equal to those of novice non specialist indexers working with a standard thesaurus.

Consistency among indexers in their selection of descriptors to represent the subject content of documents is the only dependent variable considered in this study.
The indexing experiment was designed in such a way as to avoid any judgment of correctness in term assignment. Indexing quality, indexing effectiveness, and indexing skills of participants were not assessed at any time and in any way.

3.5 Developing the Core Literacy Thesaurus

The first phase of this research project involved the creation of a prototype thesaurus in which at least one standardized definition would be provided for each descriptor. Rather than building a completely new tool, we chose to use an existing thesaurus as a source for the prototype indexing aid, making this an exercise in thesaurus augmentation rather than a much more complex thesaurus construction project.

The prototype was to be a small thesaurus describing the core of a discipline. While a shorter list of postable index terms is expected to lead to an increase in consistency among indexers (Tarr and Borko 1974, 50), this positive effect is greatly diminished when these terms refer to specific concepts, all very close in meaning. In the prototype thesaurus, most descriptors would be highly specific, and overlapping meanings were likely to be detrimental to terminological consistency. In such a context, the provision of clear additional semantic information in the form of definitions could help indexers decide which one of many available descriptors should be used to represent a particular concept.
3.5.1 The source thesaurus

The English version of the bilingual *Canadian Literacy Thesaurus / Thésaurus canadien d’alphabétisation*, was our source for the creation of a prototype thesaurus of core descriptors in the field of adult literacy theory and practice.

The *Canadian Literacy Thesaurus* was created as a publicly funded project on the occasion of the International Literacy Year (1990). The thesaurus was developed by thesaurus specialists with the assistance of advisory committees of representatives from the various communities of potential users (i.e. librarians, teachers, literacy researchers, literacy workers, etc.) in the two major Canadian linguistic groups. The first edition of the thesaurus was published in 1992, supplements were prepared in 1993 and in 1994, and a second edition of the tool has been available since 1996. The *Canadian Literacy Thesaurus* was originally developed and subsequently updated in accordance with the *Guidelines for the establishment and the development of monolingual thesauri* (ISO 2788-1986), and with the *Guidelines for the establishment and the development of multilingual thesauri* (ISO 5964-1985). The thesaurus is widely used in Canada and elsewhere for the organization and dissemination of information in a field of research and practice characterized by ill-defined and shifting conceptual boundaries, and by a fluctuating terminology. Users are found in traditional libraries, but also in community information centres, and in all types of literacy-related organizations and institutions. Given the traditional constituency of the labour force in community-based and community-oriented organizations, it is estimated that a significant proportion of users of this thesaurus are volunteer indexers, without formal training in subject analysis and controlled vocabulary applications. At this time, all users work with a print version of the thesaurus; an electronic file is used for updating purposes only.

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1 The thesaurus was used with permission from The Canadian Literacy Thesaurus Coalition / Coalition du thésaurus canadien d’alphabétisation, Toronto, Canada.
A total of 1,890 terms are found in the English version of the 1996 edition of the *Canadian Literacy Thesaurus*. These terms belong to one of eleven broad categories of terms that had been identified through needs assessment reviews, prior to the start of the thesaurus development project, as being appropriate for such a tool. The field of adult literacy appears at first glance to have little special terminology of its own. A considerable number of terms found in the *Canadian Literacy Thesaurus* are indeed borrowed from the fields of education, sociology, and psychology, and they also appear in controlled indexing languages describing these disciplines.

The *Canadian Literacy Thesaurus* describes a narrow field of social research and practice where concepts and terms are naturally highly specific. Specific concepts are often represented by multiword terms, and as could be expected, the thesaurus lexicon contains a large number of compound terms and phrases that include the word "literacy". Thesaurus users are called upon to differentiate between sets of descriptors seemingly referring to the same concept, or at least to concepts that are very close in meaning. The following series of closely related descriptors, for example, appear in the *Canadian Literacy Thesaurus*:

- LITERACY ASSOCIATIONS
- LITERACY COALITIONS
- LITERACY NETWORKS
- LITERACY ORGANIZATIONS
- LITERACY CONSULTANTS
- LITERACY COORDINATORS
- LITERACY FACILITATORS
- LITERACY INSTRUCTORS

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2 These categories are: Literacy, numeracy, and adult basic education; People; Cognitive and learning processes; Curriculum; Education: philosophy, system, administration, and facilities; Environment; Guidance and counselling; Individual characteristics and behaviour; Instructional materials and methodologies; Language, communication, and information skills; Planning, programming, and evaluation.
Despite an obvious need for clarification of meaning and specification of differences, 398 definitions only are provided in the current edition of the *Canadian Literacy Thesaurus*; they are coded DF, and they are distinct from the seventy scope notes (SN) indicating how descriptors should be used for indexing and for searching purposes. These definitions, integrated into the thesaurus at the time of its development strictly on the basis of their immediate availability, were not written in accordance with any defining guidelines. It is remarkable indeed that not all descriptors referring to concepts that appear to be truly unique to the field of adult literacy (e.g. LITERACY CONSULTANTS, WORKPLACE WRITING, etc.), and few of the terms that seem ambiguous (e.g. LITERACY GUIDES, MASS LITERACY CAMPAIGNS, READING WORKSHOPS, etc.) have been given a definition.

### 3.5.2 Selecting core descriptors

Following the completion of updating work in the summer of 1994, all English language descriptor records then appearing in the *Canadian Literacy Thesaurus* database were downloaded to a working file in such a way as to allow for easy identification and extraction of descriptor records referring to core adult literacy concepts. These records would be used in the development of our prototype thesaurus, the *Core Literacy Thesaurus*. 
In the field of adult literacy as described in the *Canadian Literacy Thesaurus*, core concepts are:

- new literacy-related concepts, first proposed by researchers and specialists, and subsequently accepted in the community at large (e.g. aboriginal language literacy, refrancisation, workplace literacy programs);

- "traditional" concepts existing in related fields, such as education and sociology, that have acquired a different meaning in their transfer to a new conceptual system (e.g. learners, new readers, nonreaders).

As we did not at the time have the benefit of clear definitions for most source terms, it appeared difficult to identify with any consistency and certainty which of the descriptors appearing in the *Canadian Literacy Thesaurus* represented core literacy concepts, and which had been included with their traditional meaning on the basis of their being needed to provide access to literacy-related information. We decided to rely on the original categorization of the thesaurus descriptors, and then on the terminology itself, to build the prototype thesaurus lexicon; obviously missing core concepts could be added following preliminary processing of the first set of descriptor records.

We first extracted from the source file all descriptor records that had been assigned to the following two categories: "Literacy, numeracy, and adult basic education", and "People". One hundred and forty pertinent descriptors were identified through this operation.

To complete the *Core Literacy Thesaurus* lexicon, we then searched the source file for all those descriptors that included certain words or parts of words. All descriptors containing the words "literacy" (e.g. ADOLESCENT LITERACY, LITERACY ASSESSMENT), "learner" (e.g. POEMS [LEARNER WRITTEN], and
"numeracy" (e.g. NUMERACY INSTRUCTION), in any position, were transferred to the Core Literacy Thesaurus file. Another group of pertinent descriptors was identified by way of a simple scan of the descriptor field in the source file for the following chains of characters, all linked morphologically to the designation of critical processes (e.g. reading) and entities (e.g. vocabulary) traditionally associated with literacy: *handwrit*, *read*, *spell*, *tutor*, *vocab*, *word*, and *writ*. After elimination of duplicates, the newly created Core Literacy Thesaurus file contained 319 records.

Following a first review of the prototype thesaurus lexicon, we observed that a few core concepts appeared not to be represented. All descriptors containing the word "refrancisation" were added, as well as most terms belonging to the "instruction" paradigm. Several specific descriptors were judged essential and were integrated into the lexicon (e.g. CLOZE PROCEDURE, LEGIBILITY, PRINT CULTURE, etc.) Seven very broad descriptors were finally included to anchor hierarchies; they were: ABILITY, ASSESSMENT, INSTRUCTION, PROGRAMS, PROJECTS, SKILLS, and TESTS.

At that point, a careful review of the Core Literacy Thesaurus lexicon confirmed that, with the exception of the seven broad terms enumerated above, all descriptors retained did indeed represent core concepts in the field that was being described.

When the second edition of the source thesaurus became available in 1996, all new descriptors (i.e. descriptors added after 1994) were examined. Seven of them were integrated into the Core Literacy Thesaurus.

We generally kept intact the form of each descriptor selected to appear in the prototype thesaurus. In twenty-one cases only, changes were made to the form of the
original descriptor to facilitate its integration into the structure of the *Core Literacy Thesaurus*.

All semantic relationships linking terms were transferred with the descriptor from the source to the prototype thesaurus file. These relationships were assumed to be valid and to have been established correctly.

The descriptor records appearing in the prototype thesaurus were then reformatted in preparation for the integration of definitions and for the testing phase of this project. French equivalents, date of record creation, and existing definitions downloaded from the source file were deleted. Semantic links to terms that did not appear in the prototype thesaurus were also taken out of individual term records. New semantic relationships were created for the few terms that were now orphans in the prototype thesaurus. A few associative relationships were added to enrich the thesaural structure. USE references were generated between synonyms, quasi-

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3 The following terms were changed: ABORIGINAL LITERACY to ABORIGINAL LITERACY PROGRAMS; BASIC EDUCATION CENTRES to ADULT BASIC EDUCATION CENTRES; CLEAR LANGUAGE to CLEAR WRITING; FAMILY LITERACY to FAMILY LITERACY INSTRUCTION; GENRE LITERACY to GENRE LITERACY INSTRUCTION; IMMIGRANT LITERACY to IMMIGRANT LITERACY PROGRAMS; LEARNING MATERIALS to INSTRUCTIONAL MATERIALS; INTEGRATED INSTRUCTION to INTEGRATED LITERACY INSTRUCTION; INTEGRATED TUTORING to INTEGRATED LITERACY TUTORING; INTERGENERATIONAL LITERACY to INTERGENERATIONAL LITERACY INSTRUCTION; JOURNALS [STUDENT WRITTEN] to JOURNALS [LEARNER WRITTEN]; LETTERS [STUDENT WRITTEN] to LETTERS [LEARNER WRITTEN]; MUNICIPAL LITERACY ASSOCIATIONS to LOCAL LITERACY ASSOCIATIONS; MUNICIPAL LITERACY CAMPAIGNS to LOCAL LITERACY CAMPAIGNS; MUNICIPAL LITERACY COUNCILS to LOCAL LITERACY COUNCILS; MUNICIPAL LITERACY ORGANIZATIONS to LOCAL LITERACY ORGANIZATIONS; MUNICIPAL LITERACY PROGRAMS to LOCAL LITERACY PROGRAMS; POETRY [STUDENT WRITTEN] to POEMS [LEARNER WRITTEN]; SHORT STORIES [STUDENT WRITTEN] to SHORT STORIES [LEARNER WRITTEN]; STORIES [STUDENT WRITTEN] to STORIES [LEARNER WRITTEN]; WORD GAMES to VOCABULARY GAMES.

4 Seventy-four records transferred from the source file to the *Core Literacy Thesaurus* file contained a definition. These definitions were later reused as source definitions for the prototype thesaurus descriptors.
synonyms and descriptors, and a simple sort operation relocated the now independent non-descriptor records to their appropriate place in the alphabetical thesaurus display.

Figure 3.1 illustrates two source descriptor records, before reformatting. Figure 3.2 shows the same records, now ready for integration into the Core Literacy Thesaurus.

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**ISN 883**
READING RATE
VITESSE DE LECTURE
DF An individual's speed in reading with adequate comprehension, normally expressed in number of words per minute
CL Language, communication, and information skills
UF Reading pace
Reading speed
DT 1992-01-18

**ISN 57**
READING SKILLS
HABILETÉS DE LECTURE
CL Language, communication, and information skills
UF Fluent reading
Reading fluency
Reading proficiency
BT SKILLS
RT LANGUAGE SKILLS
READING ABILITY
DT 1991-11-01

Figure 3.1 Source descriptor records
(as downloaded from the Canadian Literacy Thesaurus database)
Fluent reading
   USE READING SKILLS

Reading fluency
   USE READING SKILLS

Reading pace
   USE READING RATE

Reading proficiency
   USE READING SKILLS

READING RATE (883)
   CL Language and communication skills
   UF Reading pace
      Reading speed
   RT READING SKILLS

READING SKILLS (57)
   CL Language and communication skills
   UF Fluent reading
      Reading fluency
      Reading proficiency
   BT SKILLS
   RT FLUENT READERS
      READING ABILITY
      READING EFFICIENCY
      READING RATE

Reading speed
   USE READING RATE

Figure 3.2 Descriptor records
   (after reformatting for integration into the Core Literacy Thesaurus)

The Core Literacy Thesaurus thus created contained 367 descriptors and 243 non-descriptors, for a total of 610 terms. Thirty-five descriptors only were single words expressing generic concepts (e.g. HANDWRITING, LITERACY, READING); all other descriptors were compound terms resulting from the precoordination of two or more concepts (e.g. HANDWRITING SKILLS, LITERACY POVERTY RELATIONSHIPS, READING EFFICIENCY).
Accessibility and connectivity ratios were calculated as a way of evaluating the richness of the Core Literacy Thesaurus structure, which itself would be an important source of semantic information for participants in our later experiment. The accessibility ratio, obtained by dividing the number of semantic relationships in the thesaurus by the total number of descriptors available, is 2.296. The Core Literacy Thesaurus thus fares relatively well, considering an ideal accessibility ratio found somewhere between 2 and 5 (Bureau Marcel Van Dijk 1976b, 31). The connectivity figure, obtained by dividing the number of descriptors linked to at least one other thesaurus term by the total number of descriptors available, is 0.986, very close to the ideal figure of 1 previously suggested by the Bureau Marcel Van Dijk (1976b, 32); in the Core Literacy Thesaurus, five descriptors only are not linked to any other thesaurus term. Even when we exclude those terms that are only linked to a non-descriptor (eight descriptors in the prototype thesaurus), the connectivity ratio of 0.964 remains very high.

3.5.3 Defining descriptors

The next operation in the development of the indexing aid was the preparation of standardized definitions for all descriptors selected to appear in the Core Literacy Thesaurus.

In the language of a specialty, definitions are needed to facilitate communication among field specialists, and communication between specialists and the general public. In this context, the general purpose of a definition is twofold: "a) to delineate a concept either to the extent that it can be understood or b) to the extent of the use of its designation in discourse" (Dahlberg 1989, 21). The useful definition not only explains, but it also prescribes. The analytical definition is the most common form of definition used for these purposes (see section 2.3.4.2).
In the analytical definition, the concept being described (i.e. the definiendum) is referred to the broad class of concepts to which it belongs, and some of its essential characteristics are presented. The analytical definition offers an incomplete description, since it recalls in the definiens (i.e. the defining phrase) only those essential characteristics that are necessary to distinguish the definiendum from similar concepts in the same class.

Terminologists adopt the form and style of the analytical definition in their own terminological definitions. Contrary to basic analytical definitions, however, terminological definitions are essentially user-oriented: the content of the terminological definition, as well as its style, are determined by its prospective users. Terminologists collect existing definitions, analyze them, and restructure and reword them to better respond to their users' communication needs; this is no easy task given that readers of terminological definitions belong to two groups who could hardly be more different in backgrounds and requirements: the field specialists seeking confirmation, and the non specialists seeking basic information.

In our project, the users of the definitions were to be non specialist indexers asked to identify and select the most appropriate descriptors to represent indexable concepts. Since in the *Core Literacy Thesaurus* there was much overlap between descriptors, the essential function of the definitions in the thesaurus would be to provide sufficient semantic information on the concept represented by a descriptor to make it possible for indexers to distinguish this descriptor from others that appeared to refer to the same or to closely related concepts. This could help indexers determine whether a descriptor was appropriate in a particular indexing situation. The aim of our defining exercise was not, therefore, to write the ultimate definitions for the concepts represented in the *Core Literacy Thesaurus*; our standardized definitions were not meant to prescribe the use of these verbal forms in any context other than that of our own indexing experiment.
Terminologists recommend that each and every term in a terminological system be accompanied by a definition, even if its signification is perceived as being well-known and totally agreed upon by users of the language of the specialty (Gouadec 1990, 163). In the prototype thesaurus, every descriptor would be defined, regardless of the amount of semantic information provided in the rest of its record through semantic relationships, and whether or not the descriptor was used in this new context with a general and presumably known signification or with a restricted adult literacy-oriented meaning. It would also be possible for a descriptor to be defined more than once, when the same verbal designation clearly referred, in context, to different concepts.

Having turned to Terminology to guide us in the preparation of standardized definitions, we followed the steps that terminologists recommend and follow themselves in their work. These steps are:

1. collecting and recording existing definitions;

2. rewriting in a standard format and style the source definitions, according to specific defining rules and with the help of a defining model;

3. validating the definitions.

3.5.3.1 Collecting and recording existing definitions

When terminologists face the task of specifying the meaning of a term, they look first at existing definitions of the term itself and/or of its constituent parts. Sager advises that "it is preferable to take over a definition from existing sources or to ask a subject specialist to provide one" (1983b, 177), than to immediately propose a new definiens which might add to the ambiguity rather than relieve it. Dahlberg believes that
tout travail concret de définition doit s'orienter en premier lieu à partir de ce qui est donné et de ce qui est disponible, c'est-à-dire à partir des dénominations existantes des notions générales et à partir des définitions qui se trouvent dans les dictionnaires spécialisés, les lexiques et les encyclopédies (1981b, 254)\(^5\),

and Jastrab sees the process of reusing existing definitions as a guarantee against the subjectivity which might affect the terminologist's work (1983, 473).

The sources

Ideally, the terminological definition is the synthesis of a number of definitions and descriptions extracted from appropriate specialized sources or obtained from field specialists. Appropriate sources include:

— research work on a specialized field;
— terminological standards;
— files of terminological data systems;
— terminological vocabularies, dictionaries, encyclopaedias;
— textbooks and manuals;
— thesauri, classification systems, etc.;
— primary literature in the field (articles, conference proceedings, etc.);
— contributions by institutions, scholars and other specialists (Vasarhelyi 1980, 8).

Definitions for the 367 descriptors in the Core Literacy Thesaurus were sought in six different types of sources. We established that only English language sources

\(^5\) "All concrete defining work must be guided by what is given and available, by existing denominations for general concepts, and by descriptions found in specialized dictionaries, lexicons and encyclopedias" [my translation].
would be consulted, and that sources published within the last fifteen years would be given priority.

The six types of sources used in this project were:

1. specialized dictionaries and encyclopedias;
2. controlled indexing languages and thesauri;
3. textbooks and manuals;
4. government documents;
5. other sources, including conference proceedings, journal articles, etc.;
6. field specialists.

The list of all specialized published sources used in this defining project appears in Appendix 1 of this thesis. We were fortunate in being given free access to an extensive collection of reference and primary materials in the fields of adult literacy and adult basic education\(^6\), but literacy documents proved only moderately helpful in providing usable source definitions. Our search for definitions was most successful in documents used by education specialists.

We gained direct access to literacy specialists at a meeting of the Canadian Literacy Thesaurus advisory committee for the English language, which met in the spring of 1995 to begin work on the second edition of the thesaurus. Collaboration was requested from these specialists in the field, non librarians for the most part, who had also been asked by the editor of the thesaurus to submit descriptions and explanations of terms that had been singled out by thesaurus users as being

\(^6\) We are referring here to the collection housed at Alpha Ontario, the literacy and language training resource centre, located in Toronto, Canada.
inappropriate in context, unclear, ambiguous, or apparently useless. Their comments, explanations and definitions were made available to us, and they became another source of definitional elements.

The process

All descriptors were first searched, in full form, in several appropriate sources. When one or more definitions were found, they were recorded on a form designed for this purpose, with a clear indication of where they came from; the form is reproduced in Appendix 2 of this thesis. Not surprisingly, we found rather easily many appropriate definitions for the thirty-five generic terms in our corpus, but few descriptions or explanations for the much greater number of compound descriptors.

Synonyms or semantic equivalents of the terms chosen as descriptors in the prototype thesaurus were also searched, even if we had already found definitions of the descriptors. To obtain useful data on the meaning of LEISURE READING, for example, we also searched for explanations of "recreational reading", an equivalent term appearing in our thesaurus as non-descriptor. To determine how CLEAR WRITING could be defined, we looked for descriptions of the concepts of "clear language", "plain writing", and "plain language", since these concepts are not well differentiated in the professional literature. When one or more definitions for synonymous terms were found, they were recorded with a clear indication that the definitions were actually those of different terms.

Our third lookup was for terms that did not figure as non-descriptors in the Core Literacy Thesaurus, but nevertheless appeared to be close semantic relatives of our descriptors. While LITERACY INSTRUCTION did not appear in sources as a valid term, "literacy education" did, and we assumed that a definition of the former could be reconstructed using characteristics and relationships used to describe the
latter. When one or more definitions of these related terms were found, they were recorded with a clear identification of the term defined, and with notes on the potential usefulness of the defining elements thus obtained.

As an extension of the previous search, we further looked for definitions of terms not directly related to our descriptors, but presenting with them obvious similarities in form and function. A definition of "mass education" was recorded, for example, as a potential model for defining MASS LITERACY CAMPAIGNS. Definitions of "community centres", "information centres", and "skills centres" were collected when our quest for a specific definition of LITERACY CENTRES proved fruitless.

At this point, we were still without sufficient, or sometimes without any, usable elements of definition for a large number of precoordinated descriptors. Descriptors for which no source definition had yet been recorded were factored into their constituent terms (e.g. LITERACY WORKSHOPS became literacy + workshops, ABORIGINAL LITERACY PROGRAMS, became Aboriginal + literacy programs, etc.), and definitions for some or all of the constituent terms were then searched in appropriate sources.

Definitions were not sought, however, for those constituent terms that were themselves part of the Core Literacy Thesaurus lexicon. In the case of all compound descriptors beginning with, for example, the word "literacy" (e.g. LITERACY COLLECTIONS, LITERACY COMMITTEES, LITERACY LEVELS, LITERACY POLICY, LITERACY SURVEYS, etc.), a definition of the second term only was required (from above examples: "collections", "committees", "levels", "policy", "surveys", etc.); the presence of the term "literacy" in the prototype thesaurus ensured that a definition was already available, or would eventually become available for the concept it represented. The above examples show quite clearly that many of the words or terms for which we now needed definitions were very general in nature,
and did not have, on their own, a specific meaning in the fields of adult literacy or even that of education. Appropriate definitions for these terms were sometimes sought in general language dictionaries.

In other cases, care was taken to search specialized sources for accurate contextual meanings. INTEGRATED LITERACY TUTORING, for example, was factored into integrated + literacy tutoring; since the concept of "integration" has acquired a particular meaning in the field of education, however, defining elements for the qualifier "integrated" were searched only in education-related sources.

In the various phases of our search for source definitions, whether it be for full descriptors, for structurally similar terms, or for constituent elements, supplementary definitions (i.e. new definitions of a term for which one or more definitions were already available) were recorded when they appeared to differ significantly from the previous ones in content and/or style, or when they presented clearly a particularly interesting conceptual characteristic. Prior to recording a definition, a judgment was made on its potential usefulness to our purpose. Many found definitions were not recorded because they were not appropriate in a literacy context, were incomplete or unclear, or were so badly written as to be meaningless.

Comprehensive sources, such as dictionaries of education, were always searched first, and they proved rich in descriptions and explanations of the more general concepts. Highly specialized sources (e.g. a textbook on reading instruction) were used last, in an attempt to find defining elements for very specific concepts. The latter sources were difficult to use, unless of course they provided a glossary of terms or graphically emphasized definitions given within the text.

We stopped searching for source definitions when our records showed that we had obtained definitional elements for about 95% of all descriptors in our corpus. We considered that we had definitional elements if:
1. one or more source definitions for the descriptor or for one or more of its constituent elements had been recorded; or

2. the term was exactly structured as another one found in the Core Literacy Thesaurus for which we did have definitional elements (e.g. we did not search for usable definitions for the series of compound descriptors beginning with the term "numeracy", as they could all be defined on the model of the similar series of compound descriptors beginning with "literacy").

In preparation for the upcoming process of writing standardized definitions, the Core Literacy Thesaurus descriptors were divided into four groups, described below with examples:

1. those descriptors for which one or more appropriate definitions were available and needed only to be standardized as to form and style;

   e.g. ACTIVE VOCABULARY

   source def. 1: stock of words used by an individual in speech and writing

   source def. 2: the words that a child or adult is able to use in speech or writing, not just recognize and understand

   source def. 3: the number of different words a person uses in speaking and writing

2. those descriptors for which one or more useful definitions were available;

   e.g. FAMILY LITERACY PROGRAMS

   source def. 1: programs which teach literacy skills simultaneously to parents and their children
source def. 2: the purpose of family literacy programs has been to support parents in promoting the school achievement of their children

source def. 3: help increase adult literacy levels, broaden reading skills for children, and foster good reading habits for all family members

source def. 4: programs that encourage the development of a supportive atmosphere for teaching and learning at home, improve communication skills and encourage parents to read to their children

3. those descriptors for which definitional elements were available, but where substantial reconstruction work was needed;

e.g. FLUENT READERS

source def. 1: readers

source def. 2: Fluency: the ability to speak, write, or perform smoothly, easily, and readily

source def. 3: Fluency: capability of carrying out any kind of function easily and smoothly

source def. 4: Fluent reading: reflects the reader’s clear understanding of the vocabulary used, the topic, the author’s purpose, and the text structure, and is evidenced by correct intonation and an absence of interruptions

4. the few descriptors for which no definition or definitional elements had been recorded at that point (e.g. ADOLESCENT LITERACY, COLLECTIVE WRITING, SPONTANEOUS WRITING, etc.)
3.5.3.2 Standardizing definitions

Although the source definitions were not formally evaluated in terms of stylistic correctness or compliance with terminological defining standards, it was easy to observe that many definitions found in well-known and respected reference sources exhibited some of the major content and style problems described and decried by terminologists (see section 2.3.4.3). Specialized terms not defined elsewhere in the source were frequently found in the defining phrases. Circularity in definition was rampant: in the *International dictionary of adult and continuing education* (London: Routledge, 1990), for example, a "skill" was defined as an "ability", and an "ability" was defined as a "skill"; in the same source, as well as in the *Dictionary of reading and related terms* (Newark, DE: International Reading Association, 1982), the "learner" was: one who learns.

Terminologists have long recognized the need to standardize definitions in content as well as in form and style. Standardization is a critical step in the making of clear, concise, and explicit definitions. Defining rules, carried over from Aristotle's prescriptions, have not been sufficient to guarantee the production of consistently useful definitions. The search for defining models to ensure that concepts of the same nature were defined according to the same pattern, for defining templates calling for and organizing essential defining elements, and for clear defining rules, has been a preoccupation of many terminologists in recent years (see section 2.3.4.3).

The model

In the framework of this project, we needed a defining model flexible enough to facilitate the structuring of well-formed definitions for both entity (e.g. committees, programs, vocabulary) and activity type concepts (e.g. instruction, reading, refrancisation). The model, which would be used to synthesize defining elements
found in the many source definitions available for most of our descriptors, was required to:

1. be applicable to social sciences concepts;

2. allow for control of semantic content, form, and style of definitions;

   The model chosen would not only specify what information was required in a definition, but would also provide rules as to how this information was to be presented, in what order, with what words or expressions, etc.

3. allow for great specificity in definition;

   Given the narrow scope of the prototype thesaurus, most descriptors in our corpus were very specific, and often extremely close semantic relatives of one another, with much overlapping of meanings; the model chosen would allow for clear presentation of fine distinctions between terms seemingly referring to the same concept.

4. be usable by non terminologists;

   Given that an objective of our research project was to offer a defining model which could be used by thesaurus developers to standardize definitions, the model chosen had to be self-explanatory, and usable without extensive training in Terminology.

A defining model designed by Sager and L'Homme (1994) appeared to meet the above requirements, and provided us with most of what was necessary to create the flexible template needed to produce standardized definitions for the 367 terms in our corpus. The Sager and L'Homme model, already described briefly in section 2.3.4.3 of this thesis, was originally designed to facilitate the processes of restructuring and rewriting definitions on the basis of the information items contained in seven data fields:
According to the Sager and L'Homme model, the *Core Literacy Thesaurus* descriptor WOMEN'S LITERACY PROGRAMS would be defined as follows:

women's literacy programs

(1) in literacy
(2) an entity
(3) literacy programs
(4) an entity
(5) a type of
(6) designed for women of all ages and backgrounds
(6) offered to women of all ages and backgrounds

df = in literacy, literacy programs designed for and offered to women of all ages and backgrounds

The above example illustrates that, although all fields but one (i.e. field (7)) would always contain defining data, these data do not necessarily appear in the standardized definition. Some fields serve as validators of information provided elsewhere. In the example, field (1) provides a context, specifying that the definition is valid in the field of literacy, and is not necessarily valid in any other discipline or field of knowledge. Field (5) indicates that a true genus-species relationship exists between the definiendum "women's literacy programs" and its genus proximus "literacy programs"; and since in a true genus-species relationship the related concepts are of necessity of the same nature, the respective contents of fields (2) and
(4) provide a supplemental element of validation of the relationship. The specificity of "women's literacy programs" is established in field (6).

Given the requirements of the well-formed analytical definition that only those essential characteristics needed to distinguish the concept being defined from related concepts in the same class be given to the reader, the information provided in field (6) of the Sager and L'Homme model is of critical importance. The creators of the model believe that this particular data field, contrary to all others, "is as yet not considered to be amenable to a codification according to a restricted set of features" (Sager and L'Homme 1994, 366). Sager and L'Homme list a series of types of semantic attributes (e.g. characteristics of composition, characteristics of property, characteristics of origin, etc.) that could be used as a basis for systematizing the presentation of the differentia, but leave the model open as to actual selection of pertinent semantic features, order of priority, and order of presentation.

The defining model used in our project could be seen, on the one hand, as an expansion of the Sager and L'Homme original model, in that it not only suggests multiple occurrences of field (6), but it also specifies the nature of the information which will appear in each one of these occurrences, while determining orders of priority and of presentation. On the other hand, it can also be seen as a reduction of the original model in that it limits to a maximum number of seven the types of characteristics that may be used to differentiate concepts. In doing so, it does appear less flexible than the parent model; we believe, however, that the restricted flexibility makes the model easier to use for non terminologists, and is ultimately beneficial to the process of standardization.

The selection of types of characteristics to be included in our defining model was made on the basis of what was contained in the hundreds of source definitions collected during the previous phase of this project. The seven types of characteristics retained, similar in form to some of the functional characteristics enumerated by
Dahlberg (1989, 19), were judged appropriate and sufficient to describe with precision, and to distinguish from one another, all concepts represented in the Core Literacy Thesaurus.

The seven types of essential characteristics retained for use in our model were:

- eChar1: [nature: being ..., having ..., doing ...]
- eChar2: [purpose/function]
- eChar3: [means/instrumentation]
- eChar4: [origin]
- eChar5: [destination]
- eChar6: [place]
- eChar7: [time]

Figure 3.3 shows the expansion of field (6), as well as the rest of the elements needed in our standardized definitions, in the form of a defining template especially designed for this project.

```
Term:
"Source definition(s)"
(1) Domain:
(2) Concept class:
(3) Genus:
(4) Genus class:
(5) C/G:

(6) eChar1: [nature: being ..., having ..., doing ...]
(6) eChar2: [purpose/function]
(6) eChar3: [means/instrumentation]
(6) eChar4: [origin]
(6) eChar5: [destination]
(6) eChar6: [place]
(6) eChar7: [time]

(7) iCl1:
```

Figure 3.3 Defining template
In our model, the "nature" characteristic (eChar1) would be used to describe the composition, properties, and qualities of entity type concepts. The "purpose/function" characteristic (eChar2) would contain an answer to the question "why?", and would be used for both entity and activity type concepts. The "means/instrumentation" data (eChar3) would constitute an answer to the question "how?" in the definition of activity concepts. Essential characteristics 4 and 5 would answer the questions "by whom?" and "for whom?" in the definitions of both entity and activity type concepts. Essential characteristics of place and time (6 and 7) would be used only if the rest of the description did not provide sufficient information to distinguish the concept being defined from its closest relatives.

As can be seen in figure 3.3, the rest of the Sager and L’Homme model (i.e. fields (1) to (5), and field (7)) was applied as prescribed by its originators.

The rules

Defining rules were needed to ensure that all definitions produced for integration into our prototype thesaurus would be of equal quality, equally informative, and hopefully easy to read and understand. A first set of rules was to relate to the substance of the definition (the lexico-semantic rules), and a second set would be concerned with the form of the definition and with its ultimate presentation (the morpho-syntactic rules). Most of the rules, derived from preexisting recommendations in the field of Terminology, were established prior to the beginning of the definition restructuring process. Other rules were created and/or refined while we worked with actual source definitions.
- lexico-semantic rules:

A popular defining technique in closed terminological systems is the "building blocks" technique, whereby terms that are themselves defined within the system are reused as often as appropriate in definitions of other terms in the same system (Dahlberg 1981b; Béjoint 1993). When a term defined elsewhere within the same terminological system is used in a definition, it becomes an entailed term, and it must be marked as such. The marking notifies users that "the word can not be understood in one of its ordinary language senses" (Riggs 1982, 18), and guides them to a record where its precise meaning in context is specified. The use of entailed terms, an essential practice of Terminology, emphasizes the interdependency of definitions in a terminological system. In a thesaurus of descriptors, entailed terms in definitions would allow indexers to move around the thesaural structure with the assurance that terms related in this way necessarily share one or more essential characteristics.

Our first defining rule was:

r1. include at least one entailed term in each standardized definition

A basic rule of defining in Terminology is that "the definiens should not include any expression that occurs in the definiendum" (Ndi-Kimbi 1994, 329), a rule obviously established to curtail the practice of reusing the same term, or a morphological variant of the term, in its own definition (as in: learner df = one who learns). Exception is made in the case of compound terms "where the nucleus is generally repeated as the genus or the superordinate concept" (Ndi-Kimbi 1994, 330). In such cases, all essential characteristics used to describe the genus are implicit in the definition of its hyponyms. There is no need then to enumerate all the essential characteristics of the subordinate concept being described; only those few characteristics that make the subordinate concept different from its parent are required in its definition. Definitions of even the most specific terms in a corpus can therefore
be kept short, and a compact and efficient organization of semantic information can be achieved (Calzolari 1988).

Our second and third defining rules were:

r2. do not reuse a term, any of its morphological variants, or any of its components, in the definition of the concept it represents, except where a component of this term expresses the true genus proximus of the concept described (e.g. "literacy programs" in "women’s literacy programs")

r3. when the concept appearing as genus proximus in a definition is itself defined elsewhere in the thesaurus, the term which expresses it is marked as an entailed term, and none of the essential characteristics appearing in any one of the occurrences of field (6) in the definition of the superordinate concept should appear in any one of the occurrences of field (6) in the definition of the subordinate concept

All terminological systems exhibit a certain amount of "residual ambiguity" (Strehlow 1983, 20) despite efforts made to specify the meaning of each one of their components. This residual ambiguity normally results in terms being given more than one definition, all accurate and valid in context. When ambiguity persists around a concept and its definition, however, the usefulness of the term which represents it in other definitions is greatly reduced; the entailment of such a term should be avoided, as it could needlessly introduce ambiguity in the description of other concepts.

In our corpus, we knew that a few concepts, and among them the basic concepts of "literacy" and "numeracy", would have to be defined according to different perspectives, that they would likely be given more than one definition, and that they would not be disambiguated completely. Accordingly, our fourth and fifth defining rules were:
r4. the concepts of "literacy" and "numeracy" are not to be used as genus proximus in the definition of other concepts

r5. when a term used in the definition of another concept is accompanied by more than one definition in the thesaurus, a clear indication of the meaning carried over to the new definition must be given (e.g. ... provided to learners (2) by ...)

The genus of a concept is not always represented by a verbal form in the terminological system within which the defining work is being done. When this happens, definitions can be problematic (Béjoint 1993, 22) and unclear unless the genus proximus designates a category rather than a specific concept. The categorial concepts are considered axiomatic, i.e. not requiring definition (Sager and Ndi-Kimbi 1995, 63), and they occupy a place at the top of many conceptual hierarchies.

In our corpus, we expected to face a relatively large number of such occurrences, and three more rules were established in relation to the choice of genus proximus:

r6. when the appropriate genus proximus of a concept is not itself represented in the corpus but is expressed by a generic term which has a single, clear, and widely accepted meaning (e.g. schools, libraries, etc.), this term can be used to anchor the definition of the subordinate concept

r7. when the appropriate genus proximus of a concept is not itself represented in the corpus, and when it is not possible to use a generic term with a widely accepted meaning to anchor the definition, a short definition of any term used as genus proximus will be given in field (6)eChar1 and will appear in full in the standardized definition of the subordinate concept (see figure 3.5 for an example of such occurrence)

r8. when the appropriate genus proximus of a concept is not itself represented in the corpus, and when it is not possible to use a generic term with or without a widely
accepted meaning in the definition, categorial terms such as "process", "individuals", "facilities", etc. should be used to anchor the definition of the subordinate concept.

Synonyms of a definiendum must not appear in the definiens. In a thesaural context, the use in the defining phrase of any term established as equivalent to the one being defined should obviously also be avoided.

The next three lexico-semantic rules were:

r9. do not use a synonym of the definiendum in the definiens
r10. do not use intralinguistic or interlinguistic equivalents of a descriptor in its definition
r11. do not use terms appearing in the thesaurus as non-descriptors in any definition

The availability of a metalanguage for definition would be a welcome addition to the defining models and rules already developed by terminologists and other language specialists. Such metalanguage would consist of a limited stock of well-defined words (verbs, nouns, adverbs, connectives, etc.) which could be used systematically to represent general defining concepts and to express relationships, leading to a definite increase in precision and clarity of definitions (Jastrab 1983; Lariviè re 1996).

In the absence of such a metalanguage, however, rules 12 and 13 were written as a reminder of the importance of each word appearing in our definitions that was not directly connected to the language of the specialty described in the prototype thesaurus.

r12. limit the number of different words used in the definitions
r13. use the same words or phrases to represent the same concepts and to express the same relationships

- morpho-syntactic rules:

The well-formed definition is clear, adequate, concise, and simple. While the objectives of clarity and adequacy will likely be attained with the help of content-oriented or semantic rules, brevity and simplicity are governed by syntactic rules.

There is a consensus among terminologists that a definition must be given in one grammatically correct sentence, in sharp contrast with the descriptive development of encyclopedic definitions (Ndi-Kimbi 1994, 334). In the terminological definition, no word should be used that does not have an essential role to play in the defining phrase: the use of initial articles, nonessential adverbs and qualifiers, etc., is therefore to be avoided.

The following syntactic rules were established:

r14. definitions consist of one sentence only

r15. definitions consist of one complete and grammatically correct sentence (but see r16.)

r16. initial articles are not used in definitions

To make the defining sentences easier to read and understand, complex syntax must be avoided and simple grammatical rules applied.

r17. verbs should be in the present tense (e.g. is, does, uses, etc.)

r18. verbs should be in the active voice

r19. negative forms and negative indicators should be avoided
- **typographical rule:**

A typographical rule concerning the marking of entailed terms was established:

r20. **italics are used to mark entailed terms in definitions**

A summary of the defining rules used in this project is given in figures 3.4a, 3.4b, and 3.4c.
<table>
<thead>
<tr>
<th>Rule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>r1.</td>
<td>Include at least one entailed term in each standardized definition</td>
</tr>
<tr>
<td>r2.</td>
<td>Do not reuse a term, any of its morphological variants, or any of its components, in the definition of the concept it represents, except where a component of this term expresses the true genus proximus of the concept described (e.g. &quot;literacy programs&quot; in &quot;women's literacy programs&quot;)</td>
</tr>
<tr>
<td>r3.</td>
<td>When the concept appearing as genus proximus in a definition is itself defined elsewhere in the thesaurus, the term which expresses it is marked as an entailed term, and none of the essential characteristics appearing in any one of the occurrences of field (6) in the definition of the superordinate concept should appear in any one of the occurrences of field (6) in the definition of the subordinate concept</td>
</tr>
<tr>
<td>r4.</td>
<td>The concepts of &quot;literacy&quot; and &quot;numeracy&quot; are not to be used as genus proximus in the definition of other concepts</td>
</tr>
<tr>
<td>r5.</td>
<td>When a term used in the definition of another concept is accompanied by more than one definition in the thesaurus, a clear indication of the meaning carried over to the new definition must be given</td>
</tr>
<tr>
<td>r6.</td>
<td>When the appropriate genus proximus of a concept is not itself represented in the corpus but is expressed by a generic term which has a single, clear, and widely accepted meaning (e.g. schools, libraries, etc.), this term can be used to anchor the definition of the subordinate concept</td>
</tr>
<tr>
<td>r7.</td>
<td>When the appropriate genus proximus of a concept is not itself represented in the corpus, and when it is not possible to use a generic term with a widely accepted meaning to anchor the definition, a short definition of any term used as genus proximus will be given in field (6)eChar1 and will appear in full in the standardized definition of the subordinate concept (see figure 3.5 for an example of such occurrence)</td>
</tr>
<tr>
<td>r8.</td>
<td>When the appropriate genus proximus of a concept is not itself represented in the corpus, and when it is not possible to use a generic term with or without a widely accepted meaning in the definition, categorial terms such as &quot;process&quot;, &quot;individuals&quot;, &quot;facilities&quot;, etc. should be used to anchor the definition of the subordinate concept</td>
</tr>
<tr>
<td>r9.</td>
<td>Do not use a synonym of the definiendum in the definiens</td>
</tr>
<tr>
<td>r10.</td>
<td>Do not use intralinguistic or interlinguistic equivalents of a descriptor in its definition</td>
</tr>
<tr>
<td>r11.</td>
<td>Do not use terms appearing in the thesaurus as non-descriptors in any definition</td>
</tr>
<tr>
<td>r12.</td>
<td>Limit the number of different words used in the definitions</td>
</tr>
<tr>
<td>r13.</td>
<td>Use the same words or phrases to represent the same concepts and to express the same relationships</td>
</tr>
</tbody>
</table>

Figure 3.4a Defining rules (lexico-semantic)
The application

The defining template and rules were applied to the tasks of rewriting, restructuring, or generating terminologically correct definitions for the 367 descriptors in our prototype thesaurus. In this section, we provide selected examples illustrating how source definitions were modified to fit our model and purpose. Working documents relating to these examples are shown in Appendix 3 of this thesis.

The four groups of descriptors established earlier (as described in section 3.5.3.1) were processed in turn. Work on the first group of descriptors, those for which one or more appropriate source definitions had been recorded, was completed rather easily since most of the defining elements required were immediately available and needed only to be standardized as to form and style. The restructuring of source definitions in this first group of descriptors enabled us to verify that our defining template was suited to the task, and that the defining rules did indeed solve or even prevent difficulties.
Following are three examples of descriptors belonging to this first group of terms.

Example 1. ACTIVE VOCABULARY

Three source definitions were available for the concept represented by this descriptor. They were:

source def. 1: stock of words used by an individual in speech and writing

source def. 2: the words that a child or adult is able to use in speech or writing, not just recognize and understand

source def. 3: the number of different words a person uses in speaking and writing

The distinguishing characteristics of this abstract entity were easy to identify, given the presence in all three source definitions of the idea of "use in speech" and "use in writing". The concept of "active vocabulary" needed to be linked, however, to that of "vocabulary", its appropriate genus proximus, which also appeared in the prototype thesaurus. The proper relationship between the definiendum and its genus proximus was identified as a partitive relationship and expressed as: "a subset of". The concept was then differentiated by its purpose/function characteristic (field (6)eChar2 in our model). The notion of "writing" was replaced in the standardized definition by that of "written communication", an activity concept which would itself be defined in the Core Literacy Thesaurus. The resulting standardized definition of ACTIVE VOCABULARY was:

\[ \text{df} = \text{subset of the vocabulary of a language, made of those words and idiomatic expressions that an individual actually uses in oral and written communication} \]
Example 2. LIBRARY LITERACY PROGRAMS

A single source definition, found in the first edition of the *Canadian Literacy Thesaurus*, was available:

source def. 1: programs designed, administered, and staffed by a library

A necessary modification of the genus proximus was made: "programs" was replaced by the more specific "literacy programs", a concept which would be precisely defined in our corpus. The distinguishing characteristics were inscribed in the origin field of our model ((6)eChar4). Exceptionally, a non essential characteristic was added to the description of this concept. The resulting standardized definition of LIBRARY LITERACY PROGRAMS was:

\[ df = \text{literacy programs designed, administered, and staffed by libraries, and usually conducted in library settings} \]

Example 3. READING HABITS

In this case, our two source definitions obviously referred to quite different concepts:

source def. 1: use of reading as a regular activity

source def. 2: a repetitive act in reading, as in continuing to read the same kind of material or in persisting in a particular way of reading

The second source definition, judged more appropriate to our context, was used as the basis for a standardized definition. The genus proximus "habits" was correctly described in the source definition, but slight changes were made to the
second part of the defining phrase, which extended the explanation by providing examples. READING HABITS was defined as:

\[ df = \text{repetitive acts or behaviour patterns in reading, e.g. continuing to read the same type of materials, the constant use of a particular technique, etc.} \]

The second group of descriptors established earlier included those terms for which one or more useful source definitions were available. Following are two examples of descriptors that belonged to this group.

**Example 1. FAMILY LITERACY PROGRAMS**

None of the four source definitions found for this concept could be considered entirely appropriate, but each one of them provided one or more elements of semantic information that could be reused in the standardized definition.

source def. 1: programs which teach literacy skills simultaneously to parents and their children

source def. 2: the purpose of family literacy programs has been to support parents in promoting the school achievement of their children

source def. 3: help increase adult literacy levels, broaden reading skills for children, and foster good reading habits for all family members

source def. 4: programs that encourage the development of a supportive atmosphere for teaching and learning at home, improve communication skills and encourage parents to read to their children

The genus proximus, provided in source definitions 1 and 4 needed to be specified: it was replaced, once again, by the more appropriate "literacy programs". Source definition 1 provided a first differentiating characteristic: a destination (field (6)eChar5 in our model). A synthesis of source definitions 2, 3 and 4 was then made
to arrive at a clearer description of purpose/function (field (6)eChar2 in our model).
The resulting standardized definition of FAMILY LITERACY PROGRAMS was:

\[ df = \textit{literacy programs} \text{ designed for and offered to parents and their young children, with the objectives of raising \textit{parental literacy levels}, broadening the children’s exposure to \textit{written language}, and fostering good \textit{reading habits} in all family members.} \]

The above example illustrates the conscious effort made to integrate as many appropriate entailed terms as possible into standardized definitions. The definition of FAMILY LITERACY PROGRAMS also shows clearly two methods of marking entailed terms. Entailed terms were normally printed in italics (according to our defining rule r20.) In a few cases however, two distinct thesaurus descriptors appeared as a phrase in a definition: in the above example, "parental literacy levels" is a combination of the Core Literacy Thesaurus descriptors PARENTAL LITERACY and LITERACY LEVELS. The first descriptor appears in italics, and the second descriptor has been underlined.

Example 2. CONTENT AREA READING

Three definitions of "content area reading" and one definition of "content reading" had been found.

source def. 1: instructional materials in such subject areas as social studies, mathematics, sciences, and English

source def. 2: reading exercises focusing on a specific subject area such as child care, travel, women’s health, etc.

source def. 3: textbook reading done in various content areas such as science, social studies, etc.

source def. 4: Content reading: reading in subject matter area, such as history, science, mathematics, etc. usually for study purposes
Source definitions 1, 3 and 4 above were not really useful as they defined the concept in a broader educational sense, the "area" component of the term to be understood as "curriculum subject area". Source definition 2, found in the Canadian Literacy Thesaurus, provided a more suitable description of content areas, but was deficient in that it defined what was essentially an activity concept ("reading") as an entity ("exercises"). Furthermore, this source definition did not put any emphasis on the fact that, in literacy, all content area reading would be based on the interests of the learners rather than on the requirements of a program. The standardized definition of CONTENT AREA READING, therefore, ended up looking very different from all four source definitions.

\[ df = \text{reading on subject matter of common interest to learners} \] (e.g. child care, travel, women's health)

The third group of descriptors, the largest one, contained those terms for which useful defining elements were available only in definitions of broader or of related terms. A standardized definition for these descriptors was reconstructed using some or all of these elements. Following are two examples of descriptors that belonged to this third group.

**Example 1. FLUENT READERS**

A standardized definition for this concept was created by combining our definition of "readers" with two definitions of "fluency" (a property concept) and one definition of "fluent reading" (an activity concept).

source def. 1: readers

source def. 2: Fluency: the ability to speak, write, or perform smoothly, easily, and readily
source def. 3: Fluency: capability of carrying out any kind of function easily and smoothly

g source def. 4: Fluent reading: reflects the reader's clear understanding of the vocabulary used, the topic, the author's purpose, and the text structure, and is evidenced by correct intonation and an absence of interruptions

The adverbs "smoothly, easily, and readily" were judged essential to the definition of the concept. These adverbs, however, could only qualify an activity type concept. We decided to use the verb "read" in our definition, although it violated rule r2. concerning the use in the defining phrase of the definiendum, or of any of its variants or components. Since it was not possible anymore to use readers as genus proximus (the definition would then have been "readers who read ..."), we switched to a category term ("individuals"). The definition was then expanded to include entailed terms representing concepts closely linked to that of "fluency". The standardized definition for FLUENT READERS was:

df = individuals who read smoothly, easily, and readily, and who apply their reading skills for maximum reading efficiency

Example 2. LITERACY CENTRES

To reconstruct a well-formed definition for the concept of "literacy centres", we used definitions of terms representing concepts that would logically share many essential characteristics with this one.

source def. 1: Centres: facilities serving as a focal point for activities or services

source def. 2: Information centres: facilities or programs that provide a variety of information services
source def. 3: Community centres: facilities at which social, educational, recreational and other activities are held for the benefit of the community

Source definition 1 supplied the structure of a standardized definition for our concept. Although the correct genus proximus would be "centres", the slightly more specific and less ambiguous "physical facilities" was used in the reconstructed definition. Source definitions 2 and 3 were then used as models for the necessary specification of the description. "Information services" became "literacy services" (an entailed term), and "social activities" became "literacy related activities", with examples provided as a way of including more entailed terms in the resulting definition, since the inclusive concept of literacy activities did not appear in our corpus. The standardized definition of LITERACY CENTRES was:

\[ df = \text{physical facilities at which a variety of literacy services are provided, and where literacy related activities such as literacy classes and literacy workshops take place} \]

The fourth and last group of descriptors contained the very few terms for which no source definition was available, even after a specific call to literacy specialists for some potentially useful elements of semantic information. With the help of general language dictionaries and definitions of terms already written for our corpus, it was possible, however, to produce standardized definitions for these descriptors. Both COLLECTIVE WRITING and SPONTANEOUS WRITING, for example, were defined as types of writing, and we created their differentia by looking at definitions of the adjectives "collective" and "spontaneous" in Webster's Third New International Dictionary of the English Language, unabridged (Chicago, IL : Encyclopædia Britannica, 1971). From a general language definition of "collective" (\( df = \text{designating or of any enterprise in which people work together as a group} \)) came
COLLECTIVE WRITING df = *writing* of a text by a group of individuals, with all individuals contributing ideas, *vocabulary*, etc.

From a general language definition of "spontaneous" (df = moved by a natural feeling or impulse, without constraint, effort, or forethought) came

SPONTANEOUS WRITING df = *writing* which arises from a natural impulse in an individual, with little or no planning and no external constraints

The product

A total of 383 standardized definitions were written for integration into the *Core Literacy Thesaurus*. The definitions appear as Appendix 4 in this thesis.

There were eleven cases of multiple definitions. The descriptor LITERACY was defined according to three different perspectives. In the absolute, literacy was first presented as the "ability of an individual to read and write". Literacy specialists, however, usually prefer to gauge this ability on the basis of an individual's own needs or of a particular society's requirements. Literacy was therefore also defined in our corpus as the "ability of an individual to read and write at the level required to fulfil his or her own self-determined objectives as family and community member, citizen, and worker", and finally as the "ability of an individual to read and write at the level established as the standard in the society in which he or she lives". The closely related descriptors ILLITERACY, LITERATES, NUMERACY, and NUMERATES were defined according to the same perspectives, and were also given three different definitions.

The descriptor LEARNERS was defined twice since, in literacy theory and practice, the concept of learner has two different meanings: it is used to designate generally anyone who is engaged in acquiring new skills, attitudes or knowledge, but
it is also used in reference to the individual engaged specifically in acquiring and/or developing literacy skills.

ABORIGINAL LITERACY PROGRAMS, LITERACY HEALTH RELATIONSHIPS, LITERACY POVERTY RELATIONSHIPS, LITERACY COLLECTIONS and HANDWRITING are the other descriptors that were given two definitions, as it was quite clear that each one of them represented more than one concept in our context. The case of HANDWRITING is particularly interesting: the concept was first defined as an activity ("the production of visual symbols, letters or numbers, by hand ..."), and then as an entity ("an individual's distinctive style and manner of producing by hand visual symbols, letters or numbers").

Table 3.1 summarizes the results of the defining process.

<table>
<thead>
<tr>
<th>Table 3.1</th>
<th>Number of terms and definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of terms defined</td>
<td>367</td>
</tr>
<tr>
<td>number of definitions written</td>
<td>383</td>
</tr>
<tr>
<td>number of terms with multiple definitions</td>
<td>11</td>
</tr>
<tr>
<td>number of terms with two definitions</td>
<td>6</td>
</tr>
<tr>
<td>number of terms with three definitions</td>
<td>5</td>
</tr>
</tbody>
</table>

All definitions are valid in the domain of adult literacy theory and practice. This specification is implicit in all standardized definitions.

In order to increase consistency in defining patterns, structure, and terminology, all concepts represented in the prototype thesaurus were assigned to a category. Five categories of concepts were thus identified and used to structure our corpus. These categories were purely functional; they allowed us to compare and to
validate the standardized definitions written for all descriptors referring to, for instance, activities. The categories and the number of concepts found in each category are shown in table 3.2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material entity animate (MEA)</td>
<td>Fluent readers</td>
<td>46</td>
</tr>
<tr>
<td>Material entity inanimate (MEI)</td>
<td>Literacy centres</td>
<td>33</td>
</tr>
<tr>
<td>Abstract entity (AE)</td>
<td>Active vocabulary</td>
<td>191</td>
</tr>
<tr>
<td>Individual entity</td>
<td>World Literacy Day</td>
<td>2</td>
</tr>
<tr>
<td>Activity concepts (AC)</td>
<td>Content area reading</td>
<td>96</td>
</tr>
</tbody>
</table>

* One concept, HANDWRITING, appears in two different categories.

Entities are defined by Sager and Kageura as those concepts "obtained from the abstraction of items of our experience and reflection perceived as having a separate existence in time and place" (1994/1995, 198). In our corpus, entity concepts were further divided into four distinct sub-categories. Material entities, those concepts representing objects with a physical substance, were classified as animate (or MEA) when they referred to persons or groups of persons, and as inanimate (or MEI) when they referred to things and places. Non-material or abstract entities (AE) referred to those concepts not derived from physical objects or directly observable physical phenomena. Individual entity concepts, usually designated by proper names, denoted unique, discrete entities.

Activities, those concepts "obtained from abstraction of separately identifiable processes, operations, or events carried out by entities" (Sager and Kageura 1994/1995, 198-199), are dependent concepts: "they variously require actants and other roles, i.e. they presuppose relationships to other concepts which become linguistically evident in propositions" (Sager and Kageura 1994/1995, 204). In our
model, such relationships were normally expressed as essential characteristics of origin and destination ((6)eChar4 and (6)eChar5). In this project, no further distinctions were made between various types of activities.

The identification of the correct genus proximus, and the expression of this generic concept in verbal form in the standardized definition of a descriptor, both presented an interesting challenge. The genus proximus was also part of the conceptual and terminological system represented by our prototype thesaurus for fifty-five percent (55%) of the concepts for which at least one genus was identified. We also encountered concepts without a genus, one concept with more than one logical genus, and numerous concepts with a genus proximus taken from outside of our corpus. Tables 3.3 and 3.4 provide information on the component genus proximus of our standardized definitions.

Table 3.3
Use of genus proximus in the definitions

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of concepts for which at least one genus proximus was identified</td>
<td>354</td>
</tr>
<tr>
<td>number of concepts for which more than one genus proximus was identified</td>
<td>1</td>
</tr>
<tr>
<td>number of concepts for which no genus proximus was identified</td>
<td>13</td>
</tr>
</tbody>
</table>

Not surprisingly, no genus proximus appears in the definitions of such broad concepts as "ability", "legibility", "literacy", "programs", and "skills", which themselves anchor long hierarchies of subordinate concepts. All descriptors without a genus belong to the abstract and to the individual entity categories.7

7 The other descriptors without a genus proximus are: HANDWRITING (as an entity), ILLITERACY, INTERNATIONAL LITERACY YEAR 1990, NUMERACY, PROJECTS, READABILITY, TESTS, WORLD LITERACY DAY.
Table 3.4
Source of genus proximus in the definitions

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of concepts for which at least one genus proximus was identified</td>
<td>354</td>
</tr>
<tr>
<td>number of concepts with a genus proximus also part of the corpus</td>
<td>196</td>
</tr>
<tr>
<td>number of concepts with a genus proximus not part of the corpus</td>
<td>158</td>
</tr>
<tr>
<td>number of concepts with a genus proximus representing a category (e.g. individuals, adults, etc.)</td>
<td>30</td>
</tr>
</tbody>
</table>

More than eighty different broad concepts that were not part of the conceptual and terminological system described in our prototype thesaurus were also used in the standardized definitions. These concepts belong to all categories of concepts: animate material entities (e.g. councils, groups, organizations, etc.), inanimate material entities (e.g. certificates, classes, manuals, etc.), abstract entities (e.g. anxiety, difficulties, habits, etc.), and activities (e.g. comprehension, development, promotion, recognition, etc.) Most of the concepts represented in this out of corpus group are very general (e.g. disabilities, materials, networks, etc.), and some are themselves in a superordinate/subordinate relationship (e.g. groups/support groups, services/support services). It must be noted that when the genus proximus was chosen outside of the conceptual and terminological system represented by our prototype thesaurus, it is a short definition of this concept, rather than the verbal form expressing it, which appears in the definition of its subordinate. The standardized definition of LITERACY POLICY, for example, reads "set of governing principles which serve as guidelines.

---

8 They are: activities, adult education, aids, anxiety, associations, awards, campaigns, centres, certificates, classes, coalitions, collections, committees, comprehension, councils, culture, curriculum, development, difficulties, diplomas, disabilities, educational movement, efficiency, employment, enjoyment, events, exercises, formulas, groups, guides, habits, imaginative texts, individual rights, instruments, interpersonal relationships, language, language variation, levels, manuals, materials, methods, models, movement, needs, networks, opinions, organizations, partnerships, philosophy, policy, primers [texts], profiles, progress, promotion, prose narratives, rate, rates, readiness, recognition, relationships, reports, requirements, research, resource centres, resources, retention, services, standards, statistics, strategies, styles, support groups, support services, surveys, textbooks, themes, theory, training, words, workshops, written documents, written records.
or rules for decision-making and official action in *literacy programming, literacy promotion, etc.*"

In most cases, superordinate and subordinate concepts were in a true genus-species relationship. This relationship was consistently expressed by the linking phrase "a type of" in field (5) of our defining model. The phrase is implicit within the definitions themselves when nothing precedes the identification of the genus proximus. Library literacy programs, for example, represent a definite type of literacy programs; the standardized definition of LIBRARY LITERACY PROGRAMS thus reads "*literacy programs designed, administered, and staffed by libraries*, rather than "a type of *literacy programs ..."."

There were few instances of other types of links between the concept being defined and its genus proximus. Only partitive relationships, expressed as "a subset of", were relatively frequent. ACTIVE VOCABULARY, for example, is defined as "a subset of the *vocabulary* of a language ...".

The essential characteristics selected to distinguish between concepts in our corpus proved appropriate. Table 3.5 shows how often data appear in each separate occurrence of field (6) in our defining model.

<table>
<thead>
<tr>
<th>Table 3.5</th>
<th>Use of field (6) of the defining model</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6) eChar1 nature</td>
<td>255</td>
</tr>
<tr>
<td>(6) eChar2 purpose/function</td>
<td>204</td>
</tr>
<tr>
<td>(6) eChar3 means/instrumentation</td>
<td>77</td>
</tr>
<tr>
<td>(6) eChar4 origin</td>
<td>56</td>
</tr>
<tr>
<td>(6) eChar5 destination</td>
<td>68</td>
</tr>
<tr>
<td>(6) eChar6 place</td>
<td>31</td>
</tr>
<tr>
<td>(6) eChar7 time</td>
<td>19</td>
</tr>
</tbody>
</table>
As expected, (6)eChar1 was the most often used of all the subfields created in field (6) of our model. Subfield (6)eChar1 was used to describe the composition of the definiendum (e.g. "made of those words and idiomatic expressions"), or to qualify the genus proximus of the concept being defined (e.g. "highly personal form of ... "). Subfield (6)eChar1 was also used to restrict the context of validity of a definition: (e.g. "in reading instruction ... "). It is finally in subfield (6)eChar1 that a brief definition of the genus proximus was provided when that genus was not itself defined elsewhere in our corpus: this occurrence is illustrated in figure 3.5.

<table>
<thead>
<tr>
<th>TERM/CONCEPT:</th>
<th>Reading difficulties</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOURCE DEFINITION:</td>
<td></td>
</tr>
<tr>
<td>1) problems in reading caused either by disabilities associated with psychological processes, or by such factors as physical or sensory handicaps, cultural background, low ability, etc.</td>
<td></td>
</tr>
<tr>
<td>2) Problems encountered in the process of reading due to environmental, cultural, socioeconomic or emotional factors</td>
<td></td>
</tr>
<tr>
<td>3) A deficiency in a student who finds reading abnormally laborious and unpleasant</td>
<td></td>
</tr>
<tr>
<td>(1) DOMAIN</td>
<td>Literacy</td>
</tr>
<tr>
<td>(2) C CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(3) GENUS</td>
<td>[difficulties]</td>
</tr>
<tr>
<td>(4) G CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(5) C/G</td>
<td>a type of</td>
</tr>
<tr>
<td>(6) eCHAR1</td>
<td>delays and problems in the acquisition, development, and use of reading skills, due to physical or mental disability or to external factors such as socioeconomic or cultural background</td>
</tr>
<tr>
<td>(6) eCHAR4</td>
<td>experienced by an individual</td>
</tr>
</tbody>
</table>

STANDARDIZED DEFINITION:
= delays and problems experienced by an individual in the acquisition, development, and use of reading skills, due to physical or mental disability, or to external factors such as socioeconomic or cultural background

Figure 3.5 Use of subfield (6)eChar1 to define the genus proximus
Subfield (6)eChar2 was also used very frequently, with purposes and functions introduced consistently by such clear expressions as "aimed at", "with the purpose of", "responsible for", "used to", and "to". The means and instrumentation characteristic ((6)eChar3) was announced by the terms "using", "with", "through", etc. Origin ((6)eChar4) and destination ((6)eChar5) were needed almost equally often in the differentia; they were introduced by the prepositions "by" and "for" respectively. Place and time characteristics ((6)eChar6 and (6)eChar7) were seldom used; they are easily recognizable in the standardized definitions through such indicators as "in", "at", "before", "after", "during", etc.

Rule r1. in our model stipulated that one entailed term at least should appear in every definition. Table 3.6 shows that the rule was consistently applied; there are only nineteen definitions without entailed terms in our terminological system⁹, and close to sixty percent (60%) of all definitions written contain more than one entailed term.

Table 3.6
Use of entailed terms in the definitions

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of definitions with at least one entailed term</td>
<td>364</td>
</tr>
<tr>
<td>Number of definitions with more than one entailed term</td>
<td>208</td>
</tr>
<tr>
<td>Number of definitions with no entailed term</td>
<td>19</td>
</tr>
</tbody>
</table>

⁹ They are: HANDWRITING (2 distinct definitions), ILLITERACY (3 distinct definitions), INTERNATIONAL LITERACY YEAR 1990, NUMERACY SKILLS, ORAL WRITTEN LANGUAGE RELATIONSHIPS, ORAL WRITTEN LANGUAGE VARIATION, PROGRAMS, READING MATERIALS, READING RATE, REREADING, SKILLS, SPELLING, VOCABULARY, WORD ATTACK SKILLS, WORLD LITERACY DAY, and WRITTEN LANGUAGE.
Our defining model, template and rules were extremely useful and generally easy to use in the process of standardizing source definitions.

3.5.3.3 Validating the standardized definitions

Given the importance of the terminological definition in the scientific communication process, and because the terminological definition has the potential to influence the evolution of natural and specialized languages, terminologists recommend that any proposed definition be submitted to the approval of field specialists for verification and validation (Gouadec 1990, 165).

Since the range of applicability of the standardized definitions written in the framework of our project was much more restricted, our definitions did not go through such an extensive verification process. Most of our source definitions had been found in reference sources where they were assumed to have been validated, or had been suggested by the specialists who formed the advisory committee working on the preparation of the second edition of the Canadian Literacy Thesaurus. Since our work consisted in restructuring existing definitions rather than in proposing new ones, the use of such source definitions constituted a basic form of validation.

The complete list of standardized definitions was submitted to the current editor of the Canadian Literacy Thesaurus for review, prior to the integration of the definitions into the prototype thesaurus. This specialist was asked to evaluate the congruence of the proposed definition with her understanding of the concept, and to comment on the form and style of the definitions, as well as on the wording used to name concepts and relationships. Minor adjustments were made to the definitions on the basis of her comments and suggestions.
3.6 Using the *Core Literacy Thesaurus* for indexing

The second phase of our research project involved the use of the newly developed prototype thesaurus as indexing aid, during a controlled indexing experiment.

3.6.1 Producing test versions of the *Core Literacy Thesaurus*

The prototype thesaurus file created by extraction of 367 pertinent descriptor records from the *Canadian Literacy Thesaurus* database was used to produce the three versions of the *Core Literacy Thesaurus* that were needed in the planned indexing experiment.

The prototype thesaurus file itself became the standard or control version of the *Core Literacy Thesaurus*. In this standard version of the thesaurus, the semantic information provided with each descriptor consisted of some or all of the following: the identification of the category to which the descriptor belonged (CL), a note indicating how the descriptor should be used (SN), a list of its synonyms and quasi-synonyms (UF), and a list of its broader, narrower and otherwise associated descriptors (BT, NT, RT). In the standard version of the prototype thesaurus, the category identification was the only element found in every descriptor record.

Figure 3.6 illustrates a sample descriptor record from the standard version of the thesaurus. Test version C of the *Core Literacy Thesaurus* appears, in full, as Appendix 5 of this thesis.
LITERACY PROGRAMS (220)

CL Planning, programming and evaluation
SN Use only for a general discussion of several types of literacy programs; if possible use a more specific term (Family literacy programs, etc.)
UF Adult literacy programs
BT PROGRAMS
NT ABORIGINAL LITERACY PROGRAMS
   AFTER SCHOOL LITERACY PROGRAMS
   BILINGUAL LITERACY PROGRAMS
   CAMPUS LITERACY PROGRAMS
   CHURCH LITERACY PROGRAMS
   (…)
RT LITERACY INSTRUCTION
   LITERACY PROGRAMMING
   NUMERACY PROGRAMS
   POSTLITERACY PROGRAMS
   PRELITERACY PROGRAMS

Figure 3.6 Sample descriptor record: standard thesaurus (test version C)

The prototype thesaurus file was then copied and renamed. The standardized definitions were integrated to create the augmented thesaurus. The definitions appeared near the top of the term records, following the identification of the category to which the descriptor belonged (CL), and preceding the note indicating how the descriptor should be used (SN). When two or more definitions were added to a single record, the indicator DF was repeated to announce each one of them.

In the augmented version of the prototype thesaurus (test version A), the semantic information provided with each descriptor thus consisted of some or all of the following: the identification of the category to which the descriptor belonged (CL), its standardized definition (DF), a note indicating how the descriptor should be used (SN), a list of its synonyms and quasi-synonyms (UF), and a list of its broader, narrower and otherwise associated descriptors (BT, NT, RT). In the augmented thesaurus, the category identification and the standardized definition were found in
every record, but the other elements of semantic information were not necessarily available for every descriptor.

Figure 3.7 illustrates a sample descriptor record from the augmented version of the thesaurus. Sample pages from test version A of the *Core Literacy Thesaurus* are shown in Appendix 6 of this thesis.

```
LITERACY PROGRAMS (220)
CL Planning, programming and evaluation
DF planned systematic sequences of instructional activities directed towards the acquisition and/or development of literacy skills, designed for and offered to individuals who are beyond mandatory schooling age
SN Use only for a general discussion of several types of literacy programs; if possible use a more specific term (Family literacy programs, etc.)
UF Adult literacy programs
BT PROGRAMS
NT ABORIGINAL LITERACY PROGRAMS
   AFTER SCHOOL LITERACY PROGRAMS
   BILINGUAL LITERACY PROGRAMS
   CAMPUS LITERACY PROGRAMS
   CHURCH LITERACY PROGRAMS
   (...) 
RT LITERACY INSTRUCTION
   LITERACY PROGRAMMING
   NUMERACY PROGRAMS
   POSTLITERACY PROGRAMS
   PRELITERACY PROGRAMS

Figure 3.7 Sample descriptor record: augmented thesaurus (test version A)
```

The augmented thesaurus file was in turn used to create the third and last test version of the prototype thesaurus, the stripped thesaurus. The file was first copied and given a new name. Hierarchical and associative relationships were then deleted from all descriptor records.
In the stripped version (test version S) of the prototype thesaurus, the semantic information provided with each descriptor consisted of some or all of the following: the identification of the category to which the descriptor belonged (CL), its standardized definition (DF), a note indicating how the descriptor should be used (SN), and a list of its synonyms and quasi-synonyms (UF). In the stripped thesaurus, the category identification and the definition were found in every record, but the other elements of semantic information were not necessarily available for every descriptor.

Figure 3.8 illustrates a sample record from the stripped thesaurus. Sample pages from test version S of the *Core Literacy Thesaurus* are shown in Appendix 7 of this thesis.

<table>
<thead>
<tr>
<th>LITERACY PROGRAMS (220)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CL</strong> Planning, programming and evaluation</td>
</tr>
<tr>
<td><strong>DF</strong> Planned systematic sequences of instructional activities directed towards the acquisition and/or development of <em>literacy skills</em>, designed for and offered to individuals who are beyond mandatory schooling age</td>
</tr>
<tr>
<td><strong>SN</strong> Use only for a general discussion of several types of literacy programs; if possible use a more specific term (Family literacy programs, etc.)</td>
</tr>
<tr>
<td><strong>UF</strong> Adult literacy programs</td>
</tr>
</tbody>
</table>

Figure 3.8 Sample descriptor record: stripped thesaurus (test version S)

Formatting codes were reintroduced in all three files, and master copies of the three test versions (i.e. control, augmented, and stripped) of the *Core Literacy Thesaurus* were produced.
3.6.2 The sample collection

Length, vocabulary and style, general readability of the text, specificity and redundancy of new information offered, have been identified as important factors likely to affect the outcome of document indexing (Zunde and Dexter 1969a, 314). Our sample collection, i.e. the complete set of documents that each participant in the study would be asked to index, was assembled with a view to minimizing the effect of these factors on overall interindexer consistency.

3.6.2.1 Type of documents

In the framework of this study, it was deemed appropriate to use informative abstracts rather than full texts in the indexing experiment. The use of abstracts offered indeed numerous advantages. In the informative abstract, key subjects and/or concepts have been identified by the abstractor, and those concepts are normally the ones that need to be indexed. The use of abstracts rather than full texts in this experiment was a way of reducing the possibility that any observed inconsistency in a pair of indexers would reflect a difference in selection of indexable concepts rather than a difference in choice of index terms. The use of abstracts also contributed to controlling the effects on indexing consistency of such document-related factors as length, level and difficulty of the language, and readability of the text. On a more pragmatic level, the use of abstracts seemed well-suited to a timed experiment conducted with novice indexers: abstracts would be easier to deal with in such a short period of time as that which would be available to complete the task. The use of abstracts allowed us to increase slightly the number of documents that would be indexed, and therefore to obtain more data for consistency comparison and analysis.
3.6.2.2 Size of the sample collection

In his own experiment, Leonard (1975) determined that a total of ten was the maximum number of documents he could ask his test participants to index in one controlled work session; his estimate of two to two and a half hours to complete the indexing of the whole sample collection proved accurate. Based on these findings, and because we were dealing with non specialist novice indexers, we judged it realistic to expect that our participants would be able to index a total of twelve informative abstracts, using the Core Literacy Thesaurus as indexing vocabulary, within two hours. The restricted number of indexable documents would minimize the effects of fatigue and of motivation on the outcome of the indexing operation. And, although undeniably small, this sample collection would still provide sufficient data for later statistical analysis of differences in consistency levels, given the fact that each document would be indexed by many indexers, thus providing us with a large number of indexer-pair consistency results.

3.6.2.3 Selecting indexable documents

The suitability, desirability, and/or necessity of assigning to a document one or more core descriptors appearing in our prototype thesaurus were used as criteria to select from a large bibliographic database a subset of relevant indexable secondary documents (i.e. informative abstracts) for this project.

To identify such documents, a targeted search was conducted in the Educational Resources Information Center database \(^{10}\) (the ERIC database), a source relatively rich in materials dealing with literacy. The search was restricted to documents integrated into the database in the year 1990. 1990 was the International

\(^{10}\) Knight-Ridder Information Ondisc 1996.
Literacy Year, and during that commemorative period, a larger than usual number of documents relating to all aspects of literacy theory and work were published. It was also in 1990 that work began on the development of the *Canadian Literacy Thesaurus*, and many documents made available that year were used as sources for thesaurus terminology.

There are 30,851 records encoded with a 1990 publication date in the ERIC database. Wide sweeping searches were run on this subset with controlled ERIC descriptors identical to descriptors found in the *Core Literacy Thesaurus*. We intentionally searched the database with a large number of search terms, whose meanings often overlapped, to identify as many potentially pertinent documents as possible. These search terms are shown below with the number of records they retrieved. Asterisks indicate truncation in cases where many compound descriptors beginning with a certain word were used in the search.

```
ADULT BASIC EDUCATION       448 records
LITERACY *                   1,824 records
READING                      358 records
READING *                    2,212 records
WRITING                      313 records
WRITING *                    1,184 records
HANDWRITING OR SPELLING OR VOCABULARY 397 records
```

All documents retrieved were assumed to have been correctly indexed by the descriptor(s) used in the search strategy. We did not evaluate the appropriateness of the overall set of index terms assigned to a particular document by ERIC indexers, and this set of index terms was not otherwise used in our own project.

The subset of records thus retrieved obviously contained a very large number of duplicates since most of the pertinent documents had been assigned more than one of the descriptors used in the search. When the duplicates had been eliminated, the
size of the subset was reduced by more than two thirds, but 1,473 potentially pertinent records were still available.

The following two criteria were used to eliminate abstracts from the subset.

1. length of abstract and nature of primary document;

The subset contained a large number of records bearing abstracts that could hardly be considered as being more than indicative. Indicative abstracts would not provide sufficient information for indexing purposes. All records with numbers prefixed by the code EJ (e.g. EJ306742), that were less likely to contain an informative abstract since they referred to journal articles and generally short primary source documents, were taken out of the sample. Only those records with a number prefixed by ED (e.g. ED321593), most of which appeared to contain longer abstracts of reports or document digests, were kept.

The number of abstracts in the sample collection then totalled 125.

2. topicality;

Each one of the remaining 125 abstracts was examined closely from a topical viewpoint. Not unexpectedly, many abstracts referred to documents mostly concerned with literacy in children, reading instruction in children, etc., rather than with adult literacy philosophy, theory and practices. At this point, forty-eight abstracts were judged relevant to our purpose, and usable in our experiment.

The forty-eight records were arranged in record number order, and sixteen records were chosen at random from this set. Starting with the third record (the number three was chosen by an uninvolved party), every third abstract was kept for the final sample collection. The sixteen abstracts retained were inspected again to
ensure that they contained a sufficient amount of relevant descriptive subject
information which could be indexed with Core Literacy Thesaurus descriptors. One
abstract was taken out of the sample, as it referred to a mostly biographical
document, and appeared on closer examination to provide little subject information
beyond the name of the biographee.

The first twelve of the remaining abstracts formed the sample collection to be
used during the indexing experiment. These abstracts were on average 17 lines and
213 words long. Abstract thirteen was used as example in the preliminary and formal
information packages later given to participants. Abstracts fourteen and fifteen were
not used. The sample collection is reproduced in Appendix 8 of this thesis.

Some elements of bibliographic information were taken out of the records that
would be used in the indexing experiment. Because space would be at a premium on
the indexing worksheet on which the full abstract was to be printed, names of authors
and publishing details were deleted. Descriptors assigned by ERIC indexers to the
original documents were also stripped from the records, but place and name
identifiers were kept.

To perform their task, the participants in the indexing experiment would then
get relevant subject information from the titles of the original documents, and from
the informative abstracts, reproduced without any editing. We assumed that the
combined availability of those two rich sources of topical information would make it
easier for participants in our study to determine what needed to be indexed, thus
allowing us to interpret differences in consistency as being more of a terminological
rather than of a conceptual nature.
3.6.3 Recruiting participants

Participants in a controlled, laboratory-type, interindexer consistency study are usually asked to index a predetermined number of preselected documents, in a specific setting, and normally in a limited amount of time. They will often be provided with various types of indexing aids and with more or less detailed instructions to guide them in their task.

In a controlled experiment as in real life, a number of pragmatic factors will affect an indexer's performance. Educational background, personality, personal history, aptitude for task, motivation for task, fatigue, beliefs, and attitude toward a particular document are some important factors that have been identified by Zunde and Dexter (1969a, 313). These very personal variables can never be totally controlled in an indexing experiment, and they have to be taken into account in the analysis of results. The influence of such variables on the outcome of the indexing process can be reduced by careful screening of educational background and experience of participants, and by testing conditions designed to minimize the potential negative effects of motivation for task, fatigue, beliefs, and attitudes.

Our study was designed to be conducted with novice non-specialist indexers. This allowed us to be confident that all members of our sample population were equal, in knowledge and experience, at the beginning of the indexing session. Furthermore, since it has been observed that novice indexers are more likely than experienced indexers to rely heavily on the controlled vocabulary provided to them when they index (Bertrand and Cellier 1995, 470), the use of novice indexers in our experiment gave more weight to our belief that any significant differences in consistency among groups of indexers could be related to the amount of semantic information available in the test versions of the prototype thesaurus.
Chu and O'Brien characterize novice indexers as individuals who "would have received some introduction to the task of subject analysis, but would not have had sufficient experience to bias their performance" (1993, 441). Most students registered in the masters and doctoral programs at the Faculty of Information Studies (FIS), University of Toronto, qualified as novice indexers, and the FIS student population was targeted for participation in this study. In the long history of interindexer consistency studies conducted under laboratory conditions, library school students have been called upon to participate on a very regular basis (e.g. in the Lilley study in 1954; in the Harris, Rayward and Svenonius' investigation in 1966; in the Preschel's inquiry in 1972; in the Tarr and Borko study in 1974; in Leonard's doctoral work in 1975; in the Chu and O'Brien's experiment in 1993; in the Bertrand and Cellier's investigation in 1995).

FIS students, because of University of Toronto language requirements, could all be considered fluent in the English language. Language proficiency undoubtedly affects the outcome of the indexing process, as a factor playing a major role in reading comprehension. If the first language of the indexer is the same as the original language of the indexed document, chances of misinterpretation are greatly reduced.

A general call for participation went out to the whole population of FIS students in the Fall of 1996. Every masters (270) and doctoral student (12) received a letter from the investigator presenting the project, explaining briefly the task involved, and soliciting participation in a scheduled two and a half hour long indexing session (see Appendix 9 in this thesis). The letter sent to masters students specified that they could volunteer if they had completed a minimum of four courses at FIS; given the fact that the indexing task would have to be completed within a restricted amount of time, it was considered preferable for the participants to have at least a notion of what subject analysis, indexing, and descriptor assignment were about. There was no requirement of the sort, however, for doctoral students. Copies of the letters were also given to professors in the hope that they would encourage their students to
participate. Three reminders were posted on the FIS electronic message board during the following week.

Students were asked to express their interest in participating in the experiment, and to indicate which one of two suggested time periods was more convenient, in an e-message to the investigator. All expressions of interest were acknowledged quickly, and volunteers were notified that they would soon receive more information on the planned indexing session.

Twenty-six individuals volunteered. They were all invited to take part in the indexing session. Participants would be asked to fill in a profile form at the session (see 3.6.4 below), and would be eliminated only after the fact if they revealed themselves as having too much experience to qualify as novice indexers or too much knowledge of the field described in the indexing aid to be considered non specialists.

As FIS students, all volunteers were considered to have a basic knowledge of the subject indexing process. Participants having completed FIS courses where indexing is at the core of learning activities would be regarded as having a minimum of indexing experience, but still qualified as novice indexers. Participants with extensive database or periodical indexing experience with or without a thesaurus, and participants with previous degrees or recent working experience in the fields of adult basic education or adult literacy would obviously have to be excluded. Field knowledge acquired through media such as newspapers, educational broadcasts, government reports, etc., was not considered a sufficient criterion for exclusion.

3.6.4 Data collection instruments

The data collection instruments consisted of the test versions C, A, and S of the prototype Core Literacy Thesaurus, the indexing worksheet, the preliminary
information package for participants, the formal instructions to the participants, and the participant profile form.

3.6.4.1 Test versions C, A, and S of the prototype Core Literacy Thesaurus

Ten copies of each one of the three test versions of the prototype thesaurus were produced. A coded title page was added to each copy. The title page clearly identified the indexing aid as being a control, augmented, or stripped version of the thesaurus. A unique three character code, consisting of one of the capital letters C, A or S, separated by a dash (-) from a number in the range of 1 to 10, was printed at the bottom of each title page. The ten copies of the control version of the Core Literacy Thesaurus were coded C-1, C-2, C-3, etc.; the ten copies of the augmented version of the thesaurus were coded A-1, A-2, A-3, and so on.

Ten sets of three indexing aids, each set containing one copy of each one of the three versions of the prototype thesaurus (i.e. one control, one augmented, and one stripped) were formed. Within each set, the three indexing aids were arranged in random fashion; in the first set for example, the order was C, A, S; in the second set, the order was S, C, A, and so on.

3.6.4.2 The indexing worksheet (data collection form)

The indexing worksheet (shown in Appendix 10 of this thesis) was designed with a view to facilitating the task of the indexers during the data collection process, as well as the compilation of results in the later stage of preparing data for analysis. The indexing worksheet was divided into two sections: 1) a preprinted section which contained identifying information as well as the complete text of the document to be indexed (i.e. the informative abstract), and 2) a working area for the indexer.
Each indexing worksheet was numbered; the worksheet numbers, ranging from 1 to 12, corresponded to the rank of the indexable document in the sample collection. At the top of the worksheet, space was left to fill in the participant identification number, corresponding to the code appearing on the test version of the thesaurus the participant would receive at the start of the indexing session. And since there was a possibility that we would run more than one session, with no guarantee that all sessions would run equally smoothly and without any interference, we judged it useful to know at which session the worksheet had been completed in case we had to take an external factor into account in our analysis of data; space was thus left at the top of the worksheet for session identification.

The full text of the indexable document appeared below the identifying information. The actual number of the record which contained the abstract in the ERIC database (EDxxxxxx), the full title of the original document (as given in the ERIC record), the complete, unedited informative abstract downloaded from the ERIC database, and any identifiers provided in the ERIC record, were printed on the worksheet. Abstracts and identifiers were clearly labelled.

The working area of the data collection form was itself divided into two separate sections. The first section, marked "Mandatory descriptors", was to receive the first four descriptors chosen to describe the subject of the indexed document and their respective descriptor numbers. Four lines were preprinted, with a clear indication that the first line was to be used to record the main descriptor selected. Four more lines, numbered 5., 6., 7., and 8., were preprinted in the lower section of the working area, which was to receive up to four supplementary descriptors.

Thirty copies of the complete package of twelve worksheets (i.e. one worksheet for each document in the sample collection) were produced for use in the experiment. Within each package, the twelve worksheets were arranged in random order.
3.6.4.3 The preliminary information package for participants

The preliminary information package, to be distributed to volunteers prior to the indexing session, contained two pages of descriptive notes on the sample collection of indexable documents, on the indexing vocabulary that was to be used to index these documents, on the indexing task itself, and on the indexing worksheet. This preliminary instruction sheet is shown in Appendix 11 of this thesis.

The package also contained the complete alphabetical list of all 610 terms found in the Core Literacy Thesaurus lexicon; descriptors (i.e. valid index terms) were shown in upper case and boldfaced letters, followed by their descriptor number in parentheses, and non-descriptors appeared in lower case regular type letters. Sample term records (a non-descriptor record and a descriptor record) from the Core Literacy Thesaurus were also provided. The sample descriptor record, extracted from the augmented version of the prototype thesaurus (see Appendix 6 of this thesis), contained the maximum number of different elements of semantic information that might be available to participants during the indexing session.

Finally, the preliminary information package contained indexing worksheets reproducing an abstract which had not been retained for use during the indexing experiment. The same indexing worksheet was first shown blank, and then filled in manually by the investigator as an example of what was expected from the participants. These worksheets are reproduced in Appendix 10 of this thesis.

Thirty copies of the preliminary information package were produced.
3.6.4.4 The formal instructions to the participants

A formal instruction package was prepared for distribution at the start of the indexing session. It consisted of:

1. two pages of specific instructions describing the task and the instruments (i.e. the thesaurus and the indexing worksheets) provided to the indexers; these instructions are reproduced in Appendix 12 of this thesis;

2. a sample thesaurus page, showing actual descriptors, but not actual records, from the Core Literacy Thesaurus: standardized definitions (DF) were provided in some records but not in others, something that could not happen in either one of the three test versions of the prototype thesaurus; the sample page is also shown in Appendix 12 of the thesis;

3. a sample descriptor record, extracted from the augmented version of the Core Literacy Thesaurus (test version A), and therefore showing the maximum amount of semantic information which might be provided with a descriptor; this sample term record is shown in Appendix 6 of the thesis;

4. a sample indexing worksheet, left blank (shown in Appendix 10);

5. the same sample indexing worksheet, this time filled in manually by the investigator as an example of what was expected of the participants (also shown in Appendix 10).

The sample descriptor record and the indexing worksheets were the same as those provided in the preliminary information package.
Thirty copies of the formal instruction package were produced.

3.6.4.5 The participant profile form

A simple profile form, shown in Appendix 13, was designed to gather basic information from each participant in the indexing session. This information was used to verify that our test groups could in fact be considered as being identical at the start of the experiment.

Participants were asked to provide information on:

1. their current enrollment status at FIS:

Participants were required to indicate whether they were enrolled in the masters or doctoral program.

2. courses completed or currently taken at FIS:

Only participants registered in the masters program were required to provide this information. A list of the five courses in the FIS program that have a clear subject organization and access orientation was given, and participants were asked to put a check mark next to all courses they had completed or were currently taking.

3. experience in indexing:

All participants were required to declare whether they had prior experience in back-of-the-book, periodical or database indexing, and were asked to provide a brief description of their experience. A note on the form indicated that class assignments were not to be considered as significant indexing experience.
4. experience with thesauri:

All participants were required to declare whether they had prior experience in thesaurus design or thesaurus use, and were asked to provide a brief description of their experience. Class assignments did not count as significant thesaurus design or thesaurus use experience.

5. knowledge and/or experience in the domains of adult literacy or adult basic education:

All participants were asked to declare whether they had any prior knowledge and/or experience relating to the fields of adult literacy and adult basic education, and whether any such knowledge and/or experience had been acquired through academic or research activities, or through work experience.

Space was left on the profile form for the identification of the participant and of the indexing session during which the form had been filled.

Thirty copies of the participant profile form were produced.

3.6.5 Data collection procedures

In conformity with University of Toronto requirements regarding ethical conduct in research, official clearance for this experiment was requested and obtained from the University Office of Research Services. The letter of authorization is reproduced in Appendix 14 of this thesis, along with the approved consent form which had to be read and signed by all participants in the indexing session.
3.6.5.1 Setting up dates and times

In our call for participants, we had asked interested individuals to indicate which of two suggested dates and times was most convenient to them. Since volunteers expressed their preference for one or the other of these two sessions in almost equal numbers, we officially set up these dates and times for the indexing sessions. The two sessions took place within a period of four days: a number of participants completed the task on a Thursday afternoon, and a second group came in the following Monday morning. For our purpose, we considered these two sessions as one, and although we knew which worksheets had been used on the first day, and which had been completed on the second day, we later compiled the results without making any distinction between those two sets.

3.6.5.2 Preliminary information to participants

The twenty-six students who had expressed interest in participating in the experiment were provided with the preliminary information package (described in section 3.6.4.3 above) three days before the indexing session in which they had chosen to participate. The package was put into the students' mailboxes at FIS, and an electronic message went out to each one of them to let them know of the availability of the information. Students were asked to take twenty to thirty minutes prior to the indexing session to familiarize themselves with the task, with the Core Literacy Thesaurus lexicon, and with the worksheet. They were invited to contact the investigator if they had any difficulty with the material, or any question.
3.6.5.3 The indexing session

Number and characteristics of participants

Twenty-five of the twenty-six students who had expressed their interest in the project took part in the indexing session. Nine volunteers only participated on the first day, several people having asked at the last minute to participate in the "second" session instead. On the second day, sixteen volunteers were present.

Using the information provided on the participants' profile forms, we were able to draw a clear picture of our sample population. Participant characteristics are summarized in table 3.7.

Table 3.7
General characteristics of participants

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters program</td>
<td></td>
</tr>
<tr>
<td>LIS1320</td>
<td>17</td>
</tr>
<tr>
<td>LIS2142</td>
<td>-</td>
</tr>
<tr>
<td>LIS2143</td>
<td>-</td>
</tr>
<tr>
<td>LIS2144</td>
<td>9</td>
</tr>
<tr>
<td>LIS2171</td>
<td>11</td>
</tr>
<tr>
<td>Doctoral program</td>
<td></td>
</tr>
<tr>
<td>Indexing experience</td>
<td>3</td>
</tr>
<tr>
<td>Back-of-the-book</td>
<td>2</td>
</tr>
<tr>
<td>Periodicals</td>
<td>1</td>
</tr>
<tr>
<td>Database</td>
<td>2</td>
</tr>
<tr>
<td>Thesaurus experience</td>
<td>2</td>
</tr>
<tr>
<td>Design</td>
<td>-</td>
</tr>
<tr>
<td>Use</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge in Adult Literacy</td>
<td>1</td>
</tr>
<tr>
<td>Academic/Research</td>
<td>1</td>
</tr>
<tr>
<td>Work</td>
<td>-</td>
</tr>
</tbody>
</table>
Of the twenty-five students who participated in the experiment, seventeen were at the masters and eight were at the doctoral level. As could be expected, all masters students had completed LIS1320, the mandatory introductory course in bibliographic control offered to all FIS students in the first year of their program. Nine students had completed LIS2144 (Subject approach to information), and eleven had taken LIS2171 (Major subject headings and classification systems). None of the students had taken either Classification theory (LIS2142) or Advanced classification (LIS2143).

Three participants declared indexing experience, in back-of-the-book (2), periodical (1) or database indexing (2), but the nature and amount of experience described was considered insufficient to exclude these individuals from our sample population of novice indexers.

We looked carefully at the profiles of the two participants who had declared experience with thesauri. Since the first person declaring experience with thesauri had not reported any indexing experience, we concluded that the experience had not been with a thesaurus used as indexing aid. The second participant specified that the thesaurus used had been the Library of Congress Subject Headings (LCSH). We judged that previous (and apparently not extensive) experience with LCSH was not likely to exert a strong influence on the outcome of the indexing process in this very different context, and with a very different type of indexing aid.

One participant declared a slight knowledge of the field of adult literacy, acquired during a course in ESL (English second language) teaching for adults and children. This amount of knowledge was not judged sufficient for exclusion from our sample population of non specialist indexers.

None of the participants in the indexing session had to be excluded from the sample population. Although we are aware that many other individual factors could affect indexing outcomes, and more specifically consistency, we feel confident that all
members of our sample population did indeed qualify as non-specialist novice indexers at the start of the experiment.

The test groups

Our sample population for this study was divided into three distinct test groups. All participants who used the standard version (test version C) of the Core Literacy Thesaurus formed test group C. Participants who used the augmented version (test version A) of the thesaurus formed test group A. Participants who used the stripped version (test version S) of the thesaurus formed test group S.

The thesauri, previously arranged according to a random pattern (see 3.6.4.1 above) were distributed to participants at the start of the indexing session. The nine copies of the thesaurus distributed at the first session were, in this order: A-1, S-1, S-2, C-2, A-2, S-3, C-3, A-3, and S-4; the sixteen copies distributed at the second session were, in this order: C-1, A-4, C-4, S-5, C-5, A-5, S-6, C-6, A-6, S-7, C-7, A-7, C-8, S-8, A-8, and S-9.

The three test groups, thus formed randomly, were assumed to be equivalent at the start of the indexing session. Eight indexers formed each of test group C and test group A, and nine indexers formed test group S. Using the characteristics already set out in table 3.7, table 3.8 shows the characteristics of participants in each one of the three test groups.
Table 3.8
General characteristics of participants in each test group

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>GROUP C n=8</th>
<th>GROUP A n=8</th>
<th>GROUP S n=9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters program</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>LIS1320</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>LIS2142</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LIS2143</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LIS2144</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>LIS2171</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Doctoral program</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Indexing experience</td>
<td>-</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Periodicals</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Database</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Thesaurus experience</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Design</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Use</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge in Adult Literacy</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Academic/Research</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Work</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

With one exception only, all individuals who had declared any type of experience or prior knowledge found themselves, by chance, in test group S, the largest one of our test groups. Since we had judged that the experience declared in all cases was insufficient to affect indexing outcomes in this new context, we did not consider that the global consistency results obtained by test group S would be significantly biased.

The rank of each indexer in a test group (indexer 1, 2, 3, etc.) was determined simply by the number which appeared on the thesaurus given to this indexer. Since the set of descriptors assigned by an indexer would be compared with sets of descriptors assigned by every other indexer in the same test group (e.g. in group C,
indexer 1 with indexer 2, indexer 1 with indexer 3, etc.), it was not necessary to randomize the ranking of individual indexers within a group.

Description of the sessions

Both indexing sessions took place in the same environment and in identical conditions. All participants worked in the same classroom at the Faculty of Information Studies: noise, temperature, and lighting conditions were the same on both days, and the potential effects of these environmental factors on indexing outcomes for the two sessions were considered equivalent.

As they walked into the classroom, participants were given a consent form to sign prior to the experiment (see Appendix 14), and were invited to sit anywhere they liked. They were asked to hand in the preliminary information package received three days earlier, and were given instead the more formal instructions that they would use in the course of the experiment.

When all participants were present, the investigator reviewed the content of the formal instruction package, went over the detailed instructions with participants, and answered questions.

The participants were given clear directions as to type, exhaustivity, and specificity of the indexing they were required to perform during the working session.

1. Type of indexing

Participants were instructed to perform entity-oriented indexing (Soergel 1985, 230), the most appropriate type of indexing in the context of a laboratory experiment such as this one. Indexers were instructed to focus on the topicality of the document
itself, on its obvious aboutness, and on interesting information which would be considered as such wherever the document was used. Our participants, lacking both indexing experience and knowledge of adult literacy concepts and terminology, were likely to feel more comfortable with the entity-oriented than with the request-oriented type of indexing; the former results in a "neutral" description of the informational contents of a document, while the latter aims at a description of the potential uses of the information contained in a document (Soergel 1985).

2. Exhaustivity of indexing and number of descriptors required

Participants were instructed to index core subjects only, leaving out peripheral information.

Not unlike what would happen in a real indexing situation\textsuperscript{11}, participants were required to assign a minimum of four and a maximum of eight descriptors to each one of the twelve sample documents. The first four descriptors selected to represent the content of a document were designated as "mandatory", and were described as those descriptors that would be used if the indexing policy limited to four the number of index terms that could be assigned. The next four descriptors were designated as "supplementary". Participants were strongly encouraged to provide, where appropriate, more than the required minimum of four descriptors.

The minimum of four descriptors was judged sufficient to guarantee a certain amount of inconsistency in indexing and variations in indexer-pair results. The

\textsuperscript{11} Previous investigations of contemporary database indexing have shown that the average number of descriptors assigned to an indexed document is eight, and this number is considered appropriate as a measure of exhaustivity of indexing (Chu and Ajiferuke 1989, 18). This relatively small number of index terms can be explained by a combination of economic factors (database producers must reduce the cost of human-based indexing), and of technological factors (many access points are now being made available through search engines that allow for refined and more discriminate searching).
maximum of eight was not high enough that we would see the normal increase in consistency that Lancaster attributes to the "saturation" effect: in a controlled vocabulary, there are only so many terms that can apply to a document, and if a large enough number of descriptors is allowed, very high consistency levels will eventually be reached (1991, 63).

Participants were also required to identify the most important descriptor in the set of index terms they had decided to assign to a document. The main descriptor was described as the controlled term which would be used to classify the document, or to put the document in the most appropriate folder in a vertical file, for example. This principal descriptor was to be transcribed in the appropriate slot on the indexing worksheet. The other descriptors did not have to be ranked. Mandatory and supplementary descriptors would all describe core indexable information in the sample document, and at the data analysis stage, all descriptors assigned to a document would be considered as a set.

3. Specificity of indexing

Participants were instructed to use the most specific descriptors available in the thesaurus to express and represent a concept, and to avoid using very broad descriptors such as LITERACY or even LITERACY PROGRAMS. Upward indexing, the simultaneous use of a specific descriptor and of a related generic term, its own broader term (BT) for example, was strongly discouraged.

Participants were asked to print clearly on each worksheet the complete verbal form of every descriptor selected, as well as the number appearing next to the descriptor in the prototype thesaurus. The indexers were reminded that they were at all times to work individually, no consultation with colleagues being permitted. There
would be no revision by the investigator, and no feedback offered to participants during the indexing session.

Participants were finally advised that they had two hours (120 minutes) to index the sample collection, and that they were free to leave when they had completed the task, leaving in a designated box the thesaurus they had used for indexing, the complete set of twelve worksheets, and the participant profile sheet.

Following the briefing session, which lasted twenty minutes, each participant received a thesaurus, a set of twelve indexing worksheets, and a participant profile form. Each set of indexing worksheets had previously been arranged in random order (see 3.6.4.2), but participants were free to put them back into sequential order if they so desired.

The thesauri and the worksheets were distributed to the participants by a third party. This individual, who was in attendance during the briefing session, distributed the data collection instruments, verified that everybody had all necessary working documents, and collected the signed consent forms before leaving.

**Time on task**

All participants but three completed the task within the allotted period of two hours. Three indexers asked for, and were granted, ten more minutes to complete the assignment. Table 3.9 shows that, on average, indexers in test group C took 112.5 minutes to complete the task, indexers in test group A took 111 minutes, and indexers in test group S, 106 minutes only. One of the three indexers who had asked for extra time to work on the assignment was found in each group.
### Table 3.9
Time on task (in minutes)

<table>
<thead>
<tr>
<th>Indexer</th>
<th>GROUP C</th>
<th>GROUP A</th>
<th>GROUP S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>115</td>
<td>105</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>105</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>100</td>
<td>130</td>
</tr>
<tr>
<td>4</td>
<td>120</td>
<td>120</td>
<td>115</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>90</td>
<td>115</td>
</tr>
<tr>
<td>6</td>
<td>115</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>7</td>
<td>110</td>
<td>120</td>
<td>115</td>
</tr>
<tr>
<td>8</td>
<td>130</td>
<td>130</td>
<td>90</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>-</td>
<td>115</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>112.5</td>
<td>111</td>
<td>106</td>
</tr>
</tbody>
</table>

3.7 Preparing data for analysis

At the end of the indexing session, a total of 300 indexing worksheets had been returned. Three worksheets were blank, one participant having been unable to index all twelve documents in the sample collection. A filled out indexing worksheet was also later rejected because a descriptor had been used twice, by mistake presumably, leaving only three descriptors for this particular document. This left us with 296 usable forms as source of data for our consistency analysis.

3.7.1 Definition of a "term match"

Previous indexing consistency studies have been criticized for the fact that the investigators did not define clearly what constituted a term match (Leonard 1977, 7; Markey 1984, 156).
In our computation of interindexer terminological consistency ratios, perfect match only was considered. The fact that all our participants were using the same controlled entry vocabulary of descriptors and non-descriptors obviously facilitated our determination of what constituted a perfect match. A match occurred when the same descriptor had been used by two indexers in a pair. Evident spelling and typographical mistakes were ignored.

The possibility of more serious transcription errors, such as the omission of a whole word from a descriptor, had to be considered independently. In a specialized thesaurus describing a restricted field of knowledge, it is common for two or more descriptors to use many identical words, in the lead or in another position (e.g. COMMUNITY LITERACY, COMMUNITY LITERACY PROGRAMS, COMMUNITY LITERACY PROJECTS, COMMUNITY PROGRAMS, COMMUNITY PROJECTS, LITERACY PROGRAMS, LITERACY PROJECTS, etc.) A tired or distracted indexer might leave out a critical word, recording one descriptor when in fact another one had been chosen. In our study, errors of this type would lead to the wrong conclusion that there was no match when, in reality, there was one.

In a real indexing situation, chances of catching this type of error at the postindexing editing and revising stage are excellent. Participants in our study, however, did not have indexing experience, and were not likely to have much time for revision and self-correction. This is why participants were asked to confirm their term selection by recording not only the descriptors in their full verbal form, but also the unique numbers appearing in parentheses next to them in the Core Literacy Thesaurus. When the results were coded, we verified that the verbal form of the descriptor and its number coincided; where there was no correspondence, the

---

12 These numbers are actual record numbers in the source Canadian Literacy Thesaurus database; the numeric sequence corresponds to the order in which these records were created in the database, and not to the alphabetical order, or to any other characteristic of the entry vocabulary.
descriptor number was given precedence over the verbal form, which was then considered to have been transcribed incorrectly.

3.7.2 Source data coding: all descriptors assigned

Three coding sheets were prepared for each one of the twelve documents in our sample collection. The coding sheets listed all unique descriptors used in a test group (identified as C, A, or S), indicating which ones of these descriptors had been assigned by indexer 1 in the group, indexer 2 in the group, ... indexer n in the group. The total number of uses of every descriptor, the total number of descriptors used by each indexer (a number between 4 and 8), the total number of descriptors assigned by the group as a whole (obtained by adding the number of descriptors assigned by each indexer in the group, or by adding the number of uses of each descriptor), and the total number of unique terms assigned by the group as a whole (obtained by counting the terms listed) were also recorded.

A distinction was made in coding between the use of a term as "main" or as "other" descriptor. When a term had been selected as main descriptor by an indexer, an upper case "X", rather than a lower case "x", indicated its use.

Sample coding sheets are shown in Appendix 15 of this thesis. When read vertically, i.e. when the content of column 1 is compared with the content of column 2, with the content of column 3, etc., the source tables thus established reveal levels of consistency in pairs of indexers in a group.\(^\text{13}\)

\(^{13}\) It must be noted also that, when read horizontally, the tables offer a way to rank terms according to frequency of use (e.g. term A was chosen 5 times, term B was chosen 6 times, etc.; term A was chosen twice as main descriptor, so was term B, etc.) Although this type of data was not needed in an entity-oriented consistency model, it was recorded for eventual further use.
3.7.3 Source data coding: main descriptors only

A second set of thirty-six source data sheets, listing this time only those terms that had been selected as main descriptor by at least one indexer in a group, was also produced. Samples from this second series of source data sheets appear in Appendix 16.

3.7.4 Number of descriptors assigned

The average number of descriptors assigned by members of a group to each document in the sample collection was obtained by dividing the total number of descriptors assigned in the group by the number of indexers having provided index terms for this document.

Table 4.2, in Chapter 4, shows the average number of descriptors used in each test group to describe the subject content of each document in the sample collection. Results are expressed in the form of a number in the range of 4 to 8.

3.7.5 Measuring consistency

Inter indexer consistency is normally expressed as a ratio, in the form of percentages (e.g. 50%), or decimal fractions (e.g. 0.5). Entity-based consistency measurements are obtained by dividing the number of descriptors assigned to a document by both indexers in a pair, by the total number of descriptors assigned to the document by these two indexers (Soergel 1994, 594). If two indexers in a pair assign to a document a total of ten unique descriptors, and if six of these ten descriptors have been assigned by both indexers in the pair, while the four remaining terms have been used by only one of the two indexers, their consistency is 0.6 (or
60%). If the two indexers have not used any of the same descriptors, their consistency is 0; if the two indexers have used exactly the same set of terms to describe the content of a document, their consistency is 1.

3.7.5.1 Indexer-pair consistency: all descriptors assigned

Hooper's indexer-pair consistency formula was used to calculate the consistency of every pair of indexers within each one of our three test groups. Hooper's formula has been used repeatedly in the various indexing consistency studies conducted within the past thirty years (see section 2.4.2.1).

Consistency in assignment of all descriptors for every pair of indexers in each one of our three test groups was calculated as:

\[
IP_{xy} = \frac{a}{a + m + n}
\]

where:

- \(IP_{xy}\) = consistency among indexers \(x\) and \(y\) in a pair
- \(a\) = number of descriptors used by both indexers \(x\) and \(y\) in a pair
- \(m\) = number of descriptors used only by indexer \(x\) in a pair
- \(n\) = number of descriptors used only by indexer \(y\) in a pair

In the calculation of indexer-pair consistency in assignment of all descriptors to a document, the fact that a term had been designated as main descriptor by one or by both of the indexers in the pair was not taken into consideration.
Results obtained through the above calculations were expressed as decimal fractions, to the third decimal place. Tables showing individual indexer-pair consistency results are provided in Appendix 17 of this thesis.

3.7.5.2 Group consistency: all descriptors assigned

Group consistency in the indexing of each document in our sample collection was calculated as:

\[ GC_x = \frac{IP_1 + IP_2 + IP_3 + \ldots + IP_n}{n} \]

where:

- \( GC_x \) = consistency of group \( x \)
- \( IP_1 \) = in group \( x \), first indexer-pair consistency result (normally consistency of indexer 1 with indexer 2)
- \( IP_2 \) = in group \( x \), second indexer-pair consistency result (e.g. consistency of indexer 1 with indexer 3)
- \( IP_3 \) = in group \( x \), third indexer-pair consistency result (e.g. consistency of indexer 1 with indexer 4)
- \( IP_n \) = in group \( x \), last indexer-pair consistency result
- \( n \) = in group \( x \), number of indexer-pair consistency results available

Results obtained through the above calculations were expressed as decimal fractions, to the third decimal place. A group consistency summary table appears in Chapter 4 (table 4.5).
3.7.5.3 **Indexer-pair consistency: main descriptors only**

A second set of calculations was made, and a second set of results obtained, this time considering only main descriptors selected by each indexer in all three test groups.

No formula was required to calculate consistency in main descriptor selection for pairs of indexers in each one of our three test groups. Because only one main term was selected by the indexers, the consistency of a pair of indexers could be either 1 or 0; if both indexers in a pair had selected the same main descriptor, the result was 1, and the result was 0 if they had selected different main descriptors.

Tables showing indexer-pair consistency results in the selection of main descriptors appear as Appendix 18 of this thesis.

3.7.5.4 **Group consistency: main descriptors only**

Group consistency in main descriptor selection was calculated as:

\[
GC_x = \frac{IP_1 + IP_2 + IP_3 + \ldots + IP_n}{n}
\]

where:

- \(GC_x\) = consistency of group \(x\) in main descriptor selection
- \(IP_1\) = in group \(x\), first indexer-pair consistency result for main descriptor selection (normally consistency of indexer 1 with indexer 2)
- \(IP_2\) = in group \(x\), second indexer-pair consistency result for main descriptor selection (e.g. consistency of indexer 1 with indexer 3)
\[ IP_3 = \text{in group } x, \text{ third indexer-pair consistency result for main descriptor selection (e.g. consistency of indexer 1 with indexer 4)} \]

\[ IP_n = \text{in group } x, \text{ last indexer-pair consistency result for main descriptor selection} \]

\[ n = \text{in group } x, \text{ number of indexer-pair consistency results for main descriptor selection available} \]

Results obtained through the above calculations were expressed as decimal fractions, to the third decimal place. A group consistency summary table, for main descriptor selection only, appears in Chapter 4 (table 4.8).

### 3.8 Statistical analysis

One-tailed paired \( t \) tests, based on differences in group consistency in number of terms used to describe a document and in descriptor assignment, were run to test for statistical significance. The use of this statistical test is recommended when sets of matched or paired scores are compared. It is also recognized as being efficient even if only a relatively small number of cases are available for analysis.

Results of the statistical analysis are presented in Chapter 4.
RESULTS OF THE INDEXING EXPERIMENT

4.1 Introduction

In a controlled environment, twenty-five novice non-specialist indexers, randomly assigned to one of three test groups, were asked to index twelve abstracts, using one of three versions of the prototype *Core Literacy Thesaurus*. The control version of the thesaurus, used by test group C, did not contain any formal definitions; the augmented and the stripped versions of the same instrument, used respectively by test group A and test group S, provided a standardized definition for every descriptor.

In this chapter, the results of the indexing experiment are presented. In section 4.2, we look at the average number of descriptors assigned to each document in our sample collection by each one of the test groups. In section 4.3, we consider group consistency in assignment of complete sets of descriptors, and in 4.4, group consistency in main descriptor selection. Section 4.5 contains an important comment on the particularities of the statistical analysis, and a summary of this analysis is provided in 4.6.

Group results only were used in the statistical analysis. Results achieved by test group A and by test group S were compared in turn with those obtained by the control group C. Results of test groups A and S were not compared since the purpose
of our study was not to identify a "best" indexing aid, but rather to compare the performance of modified tools to that of a traditional thesaurus in indexing.

Six hypotheses were tested. The first four hypotheses related to the assignment of complete sets of descriptors to represent the subject content of documents. The last two hypotheses related more specifically to the selection of main descriptors for these same documents.

Paired t tests were conducted for statistical analysis of results. The t test is recommended when two sets of matched or paired scores are compared, and it is efficient when a relatively small number of cases are available for analysis. Since we were interested only in positive effects on the dependent variable, one-tailed tests were used. All hypotheses were tested at the 5% significance level.

In this study, the test groups, as well as the sample collection, were quite small. The pairing of indexers within each group, however, allowed us to gather a considerable number of results representing as many separate observations, and thus to feel confident that the group consistency figures used for the analysis had validity.

Group consistency figures were obtained by averaging indexer-pair results for each document indexed by the participants in this study. The number of indexer-pair results for each document is equivalent to the product of the number of indexers in a group (n) by this number minus 1 (i.e. n (n - 1)); the result of a comparison of an indexer with him/herself is excluded from the pair count.

Table 4.1 shows the total number of indexer-pairs, and consequently the number of consistency results, that were available for each document, given the size of the test groups; there were eight indexers in group C, eight indexers in group A, and nine indexers in group S. In table 4.1, as in all other tables in this chapter, the tests groups are consistently identified simply as C, A, and S.
A total of 2,152 pair-results were available for analysis. As seen in table 4.1, the number of observations was held constant within each group in all but four cases. In group C, one indexer did not provide the minimum number of descriptors required for document #9; the work of this indexer on this particular document was discarded entirely, and the number of observations available in this case was considerably reduced, since each individual in a group of eight indexers contributes fourteen separate observations (i.e. \((n - 1) + (n - 1)\)). In group A, one indexer left three documents unindexed; the number of pair consistency results available for each of these documents was also reduced.

### 4.2 Number of descriptors assigned

In this section, we report on the average number of descriptors used by our test groups to represent the subject content of each document in the sample collection,
and we present the statistical analysis of the data in relation to the set of two research hypotheses relating to this issue.

4.2.1 Average number of descriptors used to represent the subject of documents

Participants in the experiment were asked to assign a minimum of four and a maximum of eight descriptors to each document in the sample collection. When the number of descriptors allowed is not controlled or is semi-controlled1, as was the case in this study, the total number of descriptors assigned to a document by an indexer is an important factor in the calculation of indexer-pair consistency with Hooper’s formula. The total number of descriptors assigned to each document by participants in this experiment appeared on the term coding sheets, a sample of which is provided in Appendix 15.

Table 4.2 shows the average number of descriptors assigned to each document in the sample by each test group. The average number of descriptors used by each test group was obtained by dividing the total number of terms assigned to a document in the group by the number of indexers who had provided index terms for this particular document.

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1 When the number of descriptors allowed is not controlled, there is no minimum and no maximum established, and the indexer has total freedom in deciding how many index terms will be used. When the number of descriptors allowed is controlled, the minimum and maximum are the same number, and the indexer has no freedom. When the number of descriptors allowed is semi-controlled, a minimum and a maximum are established, and a certain degree of freedom is left to the indexer.
Table 4.2
Average number of descriptors used by each test group

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change</td>
<td>5.38</td>
<td>6.00</td>
<td>4.56</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book</td>
<td>5.25</td>
<td>5.75</td>
<td>5.56</td>
</tr>
<tr>
<td>#3 Literacy in the workplace</td>
<td>4.75</td>
<td>5.57</td>
<td>4.88</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy</td>
<td>6.25</td>
<td>5.75</td>
<td>5.11</td>
</tr>
<tr>
<td>#5 Working with beginners</td>
<td>4.75</td>
<td>5.71</td>
<td>4.78</td>
</tr>
<tr>
<td>#6 Older displaced workers write</td>
<td>4.75</td>
<td>5.00</td>
<td>4.56</td>
</tr>
<tr>
<td>#7 Different strokes for different</td>
<td>4.63</td>
<td>6.25</td>
<td>4.44</td>
</tr>
<tr>
<td>#8 From parent to child</td>
<td>4.86</td>
<td>5.13</td>
<td>4.67</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the</td>
<td>5.14</td>
<td>4.75</td>
<td>4.22</td>
</tr>
<tr>
<td>#10 Fresno County library</td>
<td>5.38</td>
<td>5.75</td>
<td>5.33</td>
</tr>
<tr>
<td>#11 Developing native language</td>
<td>5.00</td>
<td>5.50</td>
<td>4.56</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong</td>
<td>5.13</td>
<td>5.38</td>
<td>4.67</td>
</tr>
</tbody>
</table>

As seen in table 4.2, most results stand well below 6, and are therefore closer to the minimum number of descriptors required (i.e. four) than to the upper limit allowed (i.e. eight).

4.2.2 Differences in number of descriptors used: augmented vs. control

The first research hypothesis relating to the number of descriptors used to represent the subject content of a document was:

H1. On average, novice non specialist indexers working with an augmented thesaurus will use a smaller number of descriptors to represent the subject of a document than novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers. Indexers working with the augmented thesaurus (A) had access to a
standardized definition for each descriptor, as well as to the conventional display of equivalence, hierarchical, and associative relationships generally provided in thesauri. Indexers working with the standard thesaurus (C) had access only to the display of relationships generally provided in this instrument.

The dependent variable was the average number of descriptors used to represent the subject content of a particular document.

Table 4.3 shows differences in the average number of descriptors assigned to each document in the sample collection by groups A and C. Negative differences indicate cases where indexers in group A used, on average, fewer descriptors than indexers in group C to represent the subject content of a document. Positive differences mark cases where indexers in group A used more terms than indexers in group C.

Table 4.3
Differences in average number of descriptors used by group A and group C

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>A-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>5.38</td>
<td>6.00</td>
<td>0.62</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book</td>
<td>5.25</td>
<td>5.75</td>
<td>0.50</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>4.75</td>
<td>5.57</td>
<td>0.82</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy ...</td>
<td>6.25</td>
<td>5.75</td>
<td>-0.50</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>4.75</td>
<td>5.71</td>
<td>0.96</td>
</tr>
<tr>
<td>#6 Older displaced workers write ...</td>
<td>4.75</td>
<td>5.00</td>
<td>0.25</td>
</tr>
<tr>
<td>#7 Different strokes for different ...</td>
<td>4.63</td>
<td>6.25</td>
<td>1.62</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>4.86</td>
<td>5.13</td>
<td>0.27</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the ...</td>
<td>5.14</td>
<td>4.75</td>
<td>-0.39</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>5.38</td>
<td>5.75</td>
<td>0.37</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>5.00</td>
<td>5.50</td>
<td>0.50</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>5.13</td>
<td>5.38</td>
<td>0.25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.439</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>STANDARD DEVIATION</th>
<th>0.56611</th>
</tr>
</thead>
</table>
As seen in table 4.3, indexers in group A assigned fewer descriptors than indexers in group C in only two of twelve cases.

To test the null hypothesis $A \geq C$ vs. the alternative $A < C$, we performed a paired $t$ test based on the differences $A - C$ shown in table 4.3. If $A$ was consistently smaller than $C$, we would get large negative differences, which in turn would give rise to a large negative $t$-statistic value, far from 0. Only if this value was negative and far enough from 0 would we reject the null hypothesis in favour of the alternative, where far enough from 0 was judged relative to a $t$-distribution with 11 degrees of freedom.

As reported in table 4.3, however, the mean difference of $A - C$ was 0.439; from this positive difference, indicating that on average $A$ was bigger than $C$, we knew already that we could not get a statistically significant result for the alternative $A < C$. The mean of 0.439 and the standard deviation of 0.56611 gave rise to a $t$-statistic value of 2.6873.

To reject the null hypothesis in favour of the alternative at the 5% significance level, we needed a $t$-statistic smaller than -1.7959. The observed $t$-statistic 2.6873 has a $p$ value of 0.9894. The null hypothesis, therefore, was not rejected.

The first research hypothesis (H1) was not supported: we did not find evidence that novice non specialist indexers working with an augmented thesaurus used fewer descriptors than novice non specialist indexers working with a standard thesaurus to represent the subject of a particular document.
4.2.3 Differences in number of descriptors used: stripped vs. control

The second research hypothesis relating to the number of descriptors used to represent the subject content of a document was:

H2. On average, novice non specialist indexers working with a stripped thesaurus will use a smaller number of descriptors to represent the subject of a document than novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers. Indexers working with the stripped thesaurus (S) had access to a standardized definition for each descriptor, and to a display of relationships of equivalence linking synonymous terms; they did not have access to the conventional display of hierarchical and associative relationships generally provided with descriptors in thesauri. Indexers working with the standard thesaurus (C) had access only to the display of relationships generally provided in this instrument.

The dependent variable was the average number of descriptors used to represent the subject content of a particular document.

Table 4.4 shows differences in the average number of descriptors assigned to each document in the sample collection by groups S and C. Negative differences indicate cases where indexers in group S used, on average, fewer descriptors than indexers in group C to represent the subject content of a document. Positive differences mark cases where indexers in group S used more terms than indexers in group C.
In nine cases out of twelve, indexers in group S did indeed assign fewer descriptors than indexers in group C.

Hypothesis H2 was tested in the same way as hypothesis H1 (see 4.2.2).

The reported mean of -0.3275 and the standard deviation of 0.44325 gave rise to a t-statistic value of -2.5595. This t-statistic has a p value of 0.0133. The null hypothesis was, therefore, rejected at the 5% significance level.

The second research hypothesis (H2) was supported: we found evidence that, on average, novice non specialist indexers working with a stripped thesaurus used fewer descriptors than novice non specialist indexers working with a standard thesaurus to represent the subject of a particular document.
4.3 Consistency in assignment of complete sets of descriptors ("all")

In this section, we report on the consistency of each one of our test groups in assignment of complete sets of descriptors, and we present the statistical analysis of the data in relation to the set of two research hypotheses relating to this issue.

4.3.1 Group consistency in assignment of complete sets of descriptors

Group consistency results for each one of the twelve documents in our sample collection were obtained by averaging the indexer-pair consistency ratios calculated for these documents. Indexer-pair consistency results are provided in Appendix 17 of this thesis.

Table 4.5 presents the group consistency results for each one of the twelve documents in the sample collection. The consistency results are expressed as decimal numbers, with a minimum value of 0 and a maximum value of 1.

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>0.264</td>
<td>0.308</td>
<td>0.190</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book...</td>
<td>0.123</td>
<td>0.162</td>
<td>0.064</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>0.186</td>
<td>0.253</td>
<td>0.215</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy ...</td>
<td>0.118</td>
<td>0.202</td>
<td>0.152</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>0.178</td>
<td>0.044</td>
<td>0.125</td>
</tr>
<tr>
<td>#6 Older displaced workers write ...</td>
<td>0.183</td>
<td>0.165</td>
<td>0.158</td>
</tr>
<tr>
<td>#7 Different strokes for different folks.</td>
<td>0.132</td>
<td>0.111</td>
<td>0.100</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>0.301</td>
<td>0.322</td>
<td>0.220</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the proc...</td>
<td>0.323</td>
<td>0.181</td>
<td>0.189</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>0.403</td>
<td>0.330</td>
<td>0.212</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>0.237</td>
<td>0.213</td>
<td>0.279</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>0.193</td>
<td>0.137</td>
<td>0.098</td>
</tr>
</tbody>
</table>
Not surprisingly, given the relatively large number of observations used in calculating the average indexing consistency of a group, no cases of total group inconsistency (0) or of complete group consistency (1) were recorded.

4.3.2 Differences in group consistency: augmented vs. control

The first research hypothesis relating to consistency in assignment of a complete set of descriptors to a document was:

H3. On average, novice non specialist indexers working with an augmented thesaurus will achieve higher levels of interindexer terminological consistency than novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers. Indexers working with the augmented thesaurus (A) had access to a standardized definition for each descriptor, as well as to the conventional display of equivalence, hierarchical, and associative relationships generally provided in thesauri. Indexers working with the standard thesaurus (C) had access only to the display of relationships generally provided in this instrument.

The dependent variable was the consistency of indexers in assignment of a complete set of descriptors to a document.

Table 4.6 shows differences in the consistency of groups A and C in their assignment of complete sets of descriptors to the sample documents. Positive differences mark cases where indexers in group A were more consistent than indexers.

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2 The same data are presented in graphic form in figure 5.1 in Chapter 5 of the thesis.
in group C in their representation of the subject of a particular document. Negative differences indicate cases where indexers in group A were less consistent than indexers in group C.

Table 4.6
Differences in consistency between group A and group C: all descriptors assigned

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>A-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>0.264</td>
<td>0.308</td>
<td>0.044</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book...</td>
<td>0.123</td>
<td>0.162</td>
<td>0.039</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>0.186</td>
<td>0.253</td>
<td>0.067</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy ...</td>
<td>0.118</td>
<td>0.202</td>
<td>0.084</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>0.178</td>
<td>0.044</td>
<td>-0.134</td>
</tr>
<tr>
<td>#6 Older displaced workers write ...</td>
<td>0.183</td>
<td>0.165</td>
<td>-0.018</td>
</tr>
<tr>
<td>#7 Different strokes for different folks.</td>
<td>0.132</td>
<td>0.111</td>
<td>-0.021</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>0.301</td>
<td>0.322</td>
<td>0.021</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the ...</td>
<td>0.323</td>
<td>0.181</td>
<td>-0.142</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>0.403</td>
<td>0.330</td>
<td>-0.073</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>0.237</td>
<td>0.213</td>
<td>-0.024</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>0.193</td>
<td>0.137</td>
<td>-0.056</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MEAN</th>
<th>-0.0178</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARD DEVIATION</td>
<td>0.0736</td>
</tr>
</tbody>
</table>

As seen in table 4.6, indexers in group A were more consistent than indexers in group C in less than half of the test cases (i.e. five out of twelve).

To test the null hypothesis A ≤ C vs. the alternative A > C, we performed a paired t test based on the differences A-C shown in table 4.6. If A was consistently bigger than C, we would get large positive differences which in turn would give rise to a large positive t-statistic value. Only if this value was positive and large enough could we reject the null hypothesis in favour of the alternative, where large enough was judged relative to a t-distribution with 11 degrees of freedom.
As reported in table 4.6, however, the mean difference of A-C was -0.0178; from this negative difference, indicating that on average A was smaller than C, we knew that we could not get a statistically significant result for the alternative A > C.

The mean of -0.0178 and the standard deviation of 0.0736 gave rise to a negative $t$-statistic of -0.8354, with a $p$ value of 0.789. The null hypothesis, therefore, was not rejected at the 5% significance level.

The third research hypothesis (H3) was not supported: we found no evidence that novice non specialist indexers working with an augmented thesaurus were more consistent in their assignment of a complete set of descriptors to a document than novice non specialist indexers working with a standard thesaurus.

4.3.3 Differences in group consistency: stripped vs. control

The second research hypothesis relating to consistency in the assignment of a complete set of descriptors to a document was:

H4. On average, novice non specialist indexers working with a stripped thesaurus will achieve levels of interindexer terminological consistency at least equal to those of novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers. Indexers working with the stripped thesaurus (S) had access to a standardized definition for each descriptor, and to a display of relationships of equivalence linking synonymous terms; they did not have access to the conventional display of hierarchical and associative relationships generally provided with
descriptors in thesauri. Indexers working with the standard thesaurus (C) had access only to the display of relationships generally provided in this instrument.

The dependent variable was the consistency of indexers in assignment of a complete set of descriptors to a document.

Table 4.7 shows differences in the consistency of groups S and C in their assignment of complete sets of descriptors to the sample documents\(^3\). Positive differences indicate cases where indexers in group S were more consistent than indexers in group C in their assignment of a complete set of descriptors to a particular document. Negative differences represent cases where indexers in group S were less consistent than indexers in group C.

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>S</th>
<th>S-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>0.264</td>
<td>0.190</td>
<td>-0.074</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book...</td>
<td>0.123</td>
<td>0.064</td>
<td>-0.059</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>0.186</td>
<td>0.215</td>
<td>0.029</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy ....</td>
<td>0.118</td>
<td>0.152</td>
<td>0.034</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>0.178</td>
<td>0.125</td>
<td>-0.053</td>
</tr>
<tr>
<td>#6 Older displaced workers write ...</td>
<td>0.183</td>
<td>0.158</td>
<td>-0.025</td>
</tr>
<tr>
<td>#7 Different strokes for different folks.</td>
<td>0.132</td>
<td>0.100</td>
<td>-0.032</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>0.301</td>
<td>0.220</td>
<td>-0.081</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the ...</td>
<td>0.323</td>
<td>0.189</td>
<td>-0.134</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>0.403</td>
<td>0.212</td>
<td>-0.191</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>0.237</td>
<td>0.279</td>
<td>0.042</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>0.193</td>
<td>0.098</td>
<td>-0.095</td>
</tr>
<tr>
<td><strong>MEAN</strong></td>
<td></td>
<td></td>
<td><strong>-0.05325</strong></td>
</tr>
<tr>
<td><strong>STANDARD DEVIATION</strong></td>
<td></td>
<td></td>
<td><strong>0.06953</strong></td>
</tr>
</tbody>
</table>

\(^3\) The same data are presented in graphic form in figure 5.2 in Chapter 5 of the thesis.
As shown in table 4.7, indexers in group S were, on average, more consistent than indexers in group C in three cases only.

To test the null hypothesis $S \geq C$ vs. the alternative $S < C$, we performed a paired $t$ test based on the differences $S - C$ shown in table 4.7. If $S$ was consistently smaller than $C$, we would get large negative differences which would in turn give rise to a negative $t$-statistic value far from 0. If this value was negative and far enough from zero, we would reject the null hypothesis in favour of the alternative, where far enough from 0 was judged relative to a $t$-distribution with 11 degrees of freedom.

The mean difference of -0.05325, indicating that on average $S$ was smaller than $C$, and the observed standard deviation of 0.06953, gave rise to a $t$-statistic value of -2.6532. The null hypothesis was rejected in favour of the alternative, at the 5% significance level, since our $t$-statistic was smaller than -1.7959. Our observed $t$-statistic -2.6532 has a $p$ value of 0.0112.

The fourth research hypothesis was not supported: we found evidence that indexers working with a stripped thesaurus were less consistent in their assignment of complete sets of descriptors to a document than indexers working with a standard thesaurus.

4.4 Consistency in main descriptor selection ("main")

In this section, we present the results obtained by each one of our test groups as to their internal consistency in main descriptor selection, along with the statistical analysis of the data in relation to the set of two research hypotheses relating to this issue.
4.4.1 Group consistency in main descriptor selection

Group consistency results in the selection of a main descriptor for each one of the twelve documents in the sample collection were obtained by averaging indexer-pair consistency ratios in the selection of a main descriptor for each document. Indexer-pair consistency results in main descriptor selection are provided in Appendix 18 of this thesis.

Table 4.8 shows group consistency results in main descriptor selection for each one of the twelve documents in the sample collection\(^4\). The consistency results are expressed as decimal numbers, with a minimum value of 0 and a maximum value of 1.

Table 4.8
Group consistency: main descriptors

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>0.142</td>
<td>0.142</td>
<td>0.055</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book...</td>
<td>0.142</td>
<td>0.749</td>
<td>0.027</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>0.535</td>
<td>0.714</td>
<td>0.444</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy ...</td>
<td>0.071</td>
<td>0.249</td>
<td>0.166</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>0.107</td>
<td>0.142</td>
<td>0.444</td>
</tr>
<tr>
<td>#6 Older displaced workers write ...</td>
<td>0.142</td>
<td>0.476</td>
<td>0.583</td>
</tr>
<tr>
<td>#7 Different strokes for different folks.</td>
<td>0.357</td>
<td>0.142</td>
<td>0.083</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>0.071</td>
<td>0.357</td>
<td>0.083</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the ...</td>
<td>0.142</td>
<td>0.071</td>
<td>0.194</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>0.571</td>
<td>0.392</td>
<td>0.611</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>0.312</td>
<td>0.142</td>
<td>0.444</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>0.035</td>
<td>0.214</td>
<td>0.083</td>
</tr>
</tbody>
</table>

\(^4\) The same data are presented in graphic form in figure 5.3 in Chapter 5 of the thesis.
There were no cases of total group inconsistency (0) or of total group consistency (1) in main descriptor selection.

4.4.2 Differences in group consistency: augmented vs. control

The first research hypothesis relating to consistency in the selection of a main descriptor for a document was:

H5. On average, novice non specialist indexers working with an augmented thesaurus will achieve higher levels of interindexer terminological consistency in their selection of a main descriptor for a document than novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers (see 4.3.2 above for a full description).

The dependent variable was the consistency of indexers in their selection of a main descriptor for a document.

Table 4.9 shows differences in the consistency in main descriptor selection of groups A and C. Positive differences indicate cases where indexers in group A were more consistent than indexers in group C in their selection of a main descriptor for a particular document. Negative differences indicate cases where indexers in group A were less consistent than indexers in group C.
As seen in table 4.9, indexers in group A were more consistent than indexers in group C in their selection of main descriptors for seven documents. In the case of one document, the consistency results of group A and group C were identical.

Hypothesis H5 was tested in the same way as hypothesis H3 (see 4.3.2 above).

The mean difference of 0.0969 and the observed standard deviation of 0.2446 gave rise to a $t$-statistic value of 1.372, with a $p$ value of 0.0986. The null hypothesis could not, therefore, be rejected at the 5% significance level.

The fifth research hypothesis was not supported: we found no strong evidence that novice non specialist indexers working with an augmented thesaurus were more

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5 The $t$ and $p$ values obtained in this case would allow us, however, to consider rejecting the null hypothesis at the 10% level. This result will be discussed further in Chapter 5, section 5.2.1.
consistent in their selection of main descriptors than novice non specialist indexers working with a standard thesaurus.

4.4.3 Differences in group consistency: stripped vs. control

The second research hypothesis relating to consistency in the selection of a main descriptor for a document was:

H6. On average, novice non specialist indexers working with a stripped thesaurus will achieve levels of interindexer terminological consistency in their selection of a main descriptor for a document at least equal to those of novice non specialist indexers working with a standard thesaurus.

The independent variable was the semantic content of the thesaurus used by the indexers (see 4.3.3 above for a full description).

The dependent variable was the consistency of indexers in their selection of a main descriptor for a document.

Table 4.10 shows differences in the consistency in main descriptor selection of groups S and C. Positive differences indicate cases where indexers in group S were more consistent than indexers in group C in their selection of a main descriptor for a particular document. Negative differences indicate cases where indexers in group S were less consistent than indexers in group C in their selection of a main descriptor for a particular document.
Table 4.10 shows that indexers in group S were more consistent than indexers in group C in their selection of a main descriptor for a document in eight cases out of twelve.

Hypothesis H6 was tested in the same way as hypothesis H4 (see 4.3.3).

As reported in table 4.10, we obtained a positive mean difference S-C of 0.0492. With an observed standard deviation of 0.1946, this mean difference gave rise to a positive $t$-statistic value of 0.8754. To be able to reject the null hypothesis in favour of the alternative at the 5% significance level, we needed a $t$-statistic smaller than -1.7959. Our observed $t$-statistic 0.8754 is not smaller than -1.7959, indeed it is not even negative, and it has a $p$ value of 0.8007. The null hypothesis was, therefore, not rejected.
Our last research hypothesis (H6) was supported: we found no evidence that novice non specialist indexers working with a stripped thesaurus were less consistent in their selection of main descriptors than novice non specialist indexers working with a standard thesaurus.

4.5 Important comment on the statistical analysis

It must be noted that in the test cases involving the consistency of indexers working with a stripped thesaurus, the investigator really wanted to see if the null hypothesis, representing the status quo, would hold. It would indeed be considered a positive effect of having access to standardized definitions if indexers working with a stripped thesaurus could do as well, in terms of consistency, as indexers working with a standard thesaurus.

In such a situation, one would have to consider the power of the test performed, as it would be possible, in some cases, to "not reject" a null hypothesis simply by making the significance levels very small (lower than 5% for example), and in this way making it easier to conclude that the test group was not different from the control group. However, two occurrences made this unnecessary here.

For hypothesis H4 (consistency in assignment of complete sets of descriptors), we did in fact reject the null hypothesis at the 5% significance level ($t(11) = -2.653; p=0.0112$), and therefore the issue did not arise. In fact, the $p$ value of our $t$-statistic would also have led to a "reject" verdict at the 1% level.

For hypothesis H6 (consistency in main descriptor selection), we did not reject the null hypothesis, but the difference S-C (on which the test statistic was based) was positive. This indicated that the observed average for S was bigger than the observed
average for C, and, in this case, we could never reject a null hypothesis in favour of an alternative stating that S was "less than". Therefore, the issue of making it too easy to accept the null hypothesis again did not arise, as a "not reject" verdict would have been obtained regardless of the significance level used.

4.6 Summary of the statistical analysis

Table 4.11 provides a summary of the statistical analysis. In the table, mean \( d \) represents the mean difference between the two groups under observation, \( s \) is the standard deviation, \( t \) is the calculated \( t \)-statistic, and \( p \) is the value which determines the significance of the results.

<table>
<thead>
<tr>
<th>HYPOTHESIS</th>
<th>mean ( d )</th>
<th>( s )</th>
<th>( t )</th>
<th>( p^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of descriptors</td>
<td>A - C</td>
<td>0.4390</td>
<td>0.5661</td>
<td>2.6873</td>
</tr>
<tr>
<td></td>
<td>S - C</td>
<td>0.3275</td>
<td>0.4432</td>
<td>-2.5595</td>
</tr>
<tr>
<td>Consistency &quot;all&quot;</td>
<td>A - C</td>
<td>-0.0178</td>
<td>0.0736</td>
<td>0.8354</td>
</tr>
<tr>
<td></td>
<td>S - C</td>
<td>-0.0532</td>
<td>0.0695</td>
<td>2.6352</td>
</tr>
<tr>
<td>Consistency &quot;main&quot;</td>
<td>A - C</td>
<td>0.0969</td>
<td>0.2446</td>
<td>1.3720</td>
</tr>
<tr>
<td></td>
<td>S - C</td>
<td>0.0492</td>
<td>0.1946</td>
<td>0.8754</td>
</tr>
</tbody>
</table>

* derived from a \( t \)-distribution with 11 degrees of freedom

A full discussion of these results is offered in the next chapter of this thesis.
5
DISCUSSION

5.1 Introduction

This chapter contains a discussion of the results of the indexing experiment conducted in the framework of this project, and it offers preliminary conclusions. In section 5.2, the results are presented in relation to the purpose of our project and to the research questions. In section 5.3, we look at the results in the light of the findings of the second Slamecka and Jacoby indexing consistency study (described in Chapter 2, section 2.4.2.2). In 5.4, the results are related to the findings of previous consistency studies conducted in similar conditions. Limitations of the methodology are discussed in 5.5.

The data collected during the indexing experiment were used to test six research hypotheses. In Chapter 4, table 4.11 presented a summary of the results of the statistical testing. Table 5.1 provides a summary of the data analysis, in terms of whether or not the research hypotheses were supported. The subject of the hypotheses is given on the left. The right side of the table presents the results in two columns, on the basis of the type of indexing aid which represented the independent variable in the experiment.
Table 5.1
Summary of the data analysis, in terms of whether the research hypotheses were supported

<table>
<thead>
<tr>
<th>HYPOTHESES</th>
<th>INDEXING AID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Augmented vs. Control</td>
</tr>
<tr>
<td>Number of descriptors (H1, H2)</td>
<td>Not supported</td>
</tr>
<tr>
<td>Consistency &quot;all descriptors&quot; (H3, H4)</td>
<td>Not supported</td>
</tr>
<tr>
<td>Consistency &quot;main descriptors&quot; (H5, H6)</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

None of the three research hypotheses involving the augmented thesaurus was supported. These hypotheses could be summarized as follows: novice non specialist indexers working with an augmented thesaurus will do better in terms of consistency than their counterparts working with a standard thesaurus.

Two of the three research hypotheses involving the stripped thesaurus were supported. The hypotheses involving the stripped thesaurus could be summarized as follows: novice non specialist indexers working with a stripped thesaurus will do as well in terms of consistency as their counterparts working with a standard thesaurus.

5.2 Discussion of results in relation to the purpose of this study and to the research questions

The independent variable, the indexing aid, is used as a starting point in this first part of the discussion. In 5.2.1, we comment on the results obtained by the participants who were provided with the augmented thesaurus, in relation to those obtained by the participants who worked with the standard (or control) thesaurus. In 5.2.2, we comment on the results obtained by the participants who were provided with the stripped thesaurus, in relation to those obtained by the participants who worked with the standard thesaurus.
The discussion and interpretation of the results of the experiment are based on the following assumptions:

- The selection of indexable concepts and of descriptors by the participants in this study was the result of conscious decisions, and was not primarily based upon factors such as clerical error, oversight, distraction, fatigue, or other extraneous conditions (adapted from Tarr and Borko 1974, 51);

- The participants took into account the indexing policy, and applied the rule of specificity;

- The participants did indeed use the indexing aid to complete the indexing task at hand;

- The participants did indeed look at the various elements of semantic information provided in the indexing aid;

- The participants took the semantic information available into account in their decision as to which descriptor should be used to represent a concept, or as to the number of index terms needed to describe completely and accurately the subject content of a document.

Most investigations of the indexing process have to build on similar foundations. It is next to impossible, for example, to know for sure that indexers read all the semantic information provided in a thesaurus before making a selection decision. If a methodology involving unobtrusive observation reveals that indexers do in fact read the information, it remains extremely difficult to evaluate how much of the information read is actually used, as well as how it is used, in the decision-making process.

A recent analysis of the indexing process by Bertrand and Cellier has made inroads in this grey area. The investigators estimated that reading of the specific, generic and other terms related to the heading under consideration counted for 50.5%
of the "vocabulary exploration" actions of participants in their experiment (Bertrand and Cellier 1995, 466). Participants in the Bertrand and Cellier study included all categories of indexers: experienced and novice, subject specialists and non specialists, individuals trained in the use of an indexing language and others not trained in the use of this type of indexing aid. In the same study, Bertrand and Cellier also concluded that novice indexers depended on the indexing aid much more than experienced indexers to make selection decisions (1995, 470). Since the participants in our experiment were all novices, the assumptions that they did look at and use the semantic information available to support their decision appear valid. The fact that novice indexers would read most or all of the semantic information provided does not mean, of course, that they would understand all of it, and that, in the end, they would make an appropriate selection decision.

5.2.1 Augmented vs. control thesaurus

Our first research question focused on the effect on inter indexer terminological consistency of increasing the amount of semantic information provided with descriptors in a thesaurus used as indexing aid. The question was whether the availability of standardized definitions in a thesaurus of descriptors, as an addition to the standard display of semantic relationships generally provided in such a tool, would lead to an increase in consistency among novice non specialist indexers.

The reasoning behind the question was that if novice indexers were offered more, and more precise information on the meaning of a particular descriptor than is usually the case in a thesaurus, they would be more accurate in their selection of index terms, not using so many closely related ambiguous terms just to make sure that they had covered the subject and that the most appropriate descriptor was in there somewhere. The availability of a definition was expected to reduce the amount of guesswork which often goes into descriptor selection. It was hypothesized that novice
indexers who had access to standardized definitions, as well as to a display of semantic relationships among terms, would use fewer descriptors than would normally be the case to express a subject, would be more consistent in their choice of all index terms needed to describe the content of a document, and would also agree more often on which of these terms were the most important ones. A reduction in the number of descriptors assigned, combined with an increase in interindexer terminological consistency, would be seen as positive effects of the availability of standardized definitions at the time of descriptor selection.

Eight novice non specialist indexers (group A) were given the augmented version of the Core Literacy Thesaurus to index twelve informative abstracts covering various topics in the field of adult literacy. The augmented version of the thesaurus provided at least one definition for each one of the 367 descriptors the indexers could choose from, in addition to the conventional thesaural display of semantic relationships that are also believed to give significant clues on the meaning of each term. As such, the augmented thesaurus was redundant, since information on the parentage of a particular descriptor was found in both its definition and in the hierarchical relationship linking it to a broader term. The results obtained by indexers in group A were compared to those obtained by the eight novice non specialist indexers (group C) who used a standard version of the prototype thesaurus, structured around the same semantic network of relationships but containing no definitions, to index the same abstracts.

As reported in table 5.1, none of the three research hypotheses involving the augmented thesaurus was supported by the data collected. There was no evidence that indexers working with the augmented thesaurus used fewer descriptors to represent the subject of a document, were more consistent in assignment of a complete set of descriptors to a particular document, or were even more consistent in selection of main descriptors, than indexers working with a standard thesaurus.
On average, indexers in group A used 5.55 descriptors to represent the subject content of a document, as compared to an average of 5.11 for indexers in group C. Table 4.3 shows that the minimum and maximum numbers of descriptors assigned by the two groups were almost identical: in group A, a minimum of 4.75 and a maximum of 6.25 descriptors, and in group C, a minimum of 4.63 and a maximum of 6.25. It is of interest to note that where indexers in group A used their maximum number of terms to represent the subject content of the document being indexed (i.e. 6.25), indexers in group C used their minimum number of terms (i.e. 4.63); that indexers in group A and indexers in group C could react so differently to the same document would demonstrate that the complexity of the document being indexed could not be the most important variable at play, at least in this case.

The difference of less than half a term (i.e. 0.44) in the averages of group A and group C was not statistically significant, and it is also of no practical significance. In essence, we can say that indexers in group A and indexers in group C used the same number of descriptors to represent the subject content of documents. It appears, therefore, that the availability of standardized definitions did not have the hypothesized positive effect on indexing outcomes, in terms of number of descriptors assigned.

This preliminary conclusion must be considered, of course, in the context of an indexing experiment in which depth of indexing was semi-controlled, and where the freedom of the indexers as to how many index terms they could assign to a document was restricted. In this experiment, the minimum number of descriptors required (i.e. four) and the maximum allowed (i.e. eight) precluded large differences in average number of terms assigned, without excluding the possibility of significant
differences between the test groups, given the range of potential values that could still be obtained.

Previous investigations in the area of indexing consistency have detected a relationship between the number of descriptors assigned and the consistency of indexing (Tinker 1966; Tarr and Borko 1974; Leonard 1975; Reich and Biever 1991). In our study, it could now be expected that the group consistency of A and C would be quite similar.

The average consistency of group A in indexing the twelve documents in the sample collection was 0.202; the average consistency of group C was 0.22. The slight difference in consistency levels (i.e. 0.018) is again of no practical significance, and we can say that, in effect, and as expected given the similarity in number of descriptors assigned, groups A and C were equally consistent in their assignment of complete sets of descriptors. And again, we have to conclude that the availability of standardized definitions did not have the hypothesized positive effect over indexing outcomes, in terms of consistency in assignment of a complete set of descriptors to a document.

Indexers in group A were more consistent in main descriptor selection, on average, than indexers in group C. The average consistency in main descriptor selection for group A was 0.315, a considerable improvement over the consistency of the group in assignment of all descriptors. Surprisingly, average main descriptor consistency was only 0.219 for group C, slightly below the group average in "all descriptors" assignment. The statistical analysis revealed that the difference in group consistency between A and C could be considered significant at the 10% level ($t(11)=1.372; p=0.0986$). This does little more, however, than indicate a tendency

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1 A significant difference in number of descriptors assigned was in fact found in comparing the results of group S and group C. This finding is discussed in section 5.2.2.
among the participants in our experiment who were working with an augmented thesaurus to agree more often than their colleagues on which index terms were to be seen as the most important ones. The evidence that the use of an augmented thesaurus has a beneficial effect on consistency in main descriptor selection is not very strong. In any case, main descriptor consistency has to be considered secondary in the framework of this project, but in information systems where a single descriptor can be assigned, this could be of critical interest.

The hoped-for improvement in consistency levels of novice indexers working with an augmented thesaurus did not materialize. This appears as a valid conclusion since we are reasonably certain, given the conditions of the experiment, that factors other than the structure and content of the controlled vocabulary used as indexing aid could not have affected significantly the results of experimental group A.

All of our participants indexed the same documents. Figure 5.1 shows that consistency in indexing the sample collection varied in a way which can be considered "normal" within one group, and between the two groups: in most cases, the consistency of the groups in their representation of a document increased or decreased in parallel fashion (see, for example, group consistency for documents #1, #2, #3, #6, #7, #8, #10, #11, and #12), and sometimes A did better than C, sometimes C did better than A. The document factor, therefore, does not appear to have affected the results of group A.
Participants in the experiment possessed comparable amounts of knowledge of adult literacy and of expertise in indexing. A potentially important factor would have been the presence of a larger number of doctoral students in one of the test groups, since these students had probably not had recent contact with indexing issues in the same way as their colleagues from the masters program who had just completed several basic courses in this area. As it happens, there were two doctoral students in each of group A and group C, and their presence, if at all significant, would presumably have affected indexing outcomes equally in both groups.

Personal factors are also known to influence the results of the indexing process. Some people are naturally adept at indexing, others are not. The participants in our experiment were volunteers who were all, if not equally proficient, at least equally interested in the process: this would not be a guarantee of good indexing, but it is taken as an indication that our participants all gave their best to the task at hand.
Individual results were not analyzed, but given the random assignment of our participants to one of the test groups, we assume that group A contained "good indexers" and "not so good indexers" in the same proportion as group C.

All indexers worked simultaneously in the same physical environment, and they completed the task in the same amount of time (an average of 111 minutes for group A, and of 112.5 minutes for group C). The environmental and the time factors could not, therefore, have affected significantly the results obtained by group A.

Consequently, we believe that the results obtained by the indexers forming test group A in this experiment are a fair and accurate representation of what novice non specialist indexers could achieve with the aid of an augmented thesaurus. The answer to our first research question must then be that the availability of standardized definitions in a thesaurus of descriptors, as an addition to the standard display of semantic relationships generally provided in such a tool, does not lead to an increase in terminological consistency, at least where indexers are novices and non specialists.

5.2.2 Stripped vs. control thesaurus

Our second research question focused on the effect on interindexer terminological consistency of modifying the nature of the semantic information provided with descriptors in a thesaurus used as indexing aid. The question was whether the availability of standardized definitions in a thesaurus of descriptors would be enough, in the absence of the standard display of semantic relationships generally provided in such a tool, to lead novice non specialist indexers to the same level of consistency as that achieved by their colleagues working with a standard thesaurus.

The reasoning behind the question was that if indexers were offered systematically the type of prescriptive meaning information that a terminological
definition can provide, they would not need suggestive associative relationships to help them decide whether a term should be assigned or not. They could still be accurate in their index terms selection, but without associative relationships, they would be less inclined to assign several closely related terms not necessarily appropriate to the subject or to the document at hand. It was hypothesized that novice indexers would use fewer descriptors than would normally be the case to express a subject, that they would be as consistent in their choice of all index terms needed to describe the content of a document, and that they would also agree as often on which of these terms were the most important ones as novice indexers working with a traditional tool. A reduction in the number of descriptors used, combined with evidence of comparable consistency levels in a group of indexers having no access to hierarchical and associative relationships among terms and in a group of indexers having access to this semantic information, would be seen as positive effects of the availability of standardized definitions at the time of descriptor selection.

Nine novice non specialist indexers (group S) were given the stripped version of the Core Literacy Thesaurus to index the sample collection. The stripped version of the thesaurus provided at least one definition for each one of the 367 descriptors the indexers could choose from, but not the standard display of hierarchical and associative relationships that are also believed to give significant clues on the meaning of each term. This resulted, in effect, in a decrease in the amount of semantic information available to the indexer. The type of definition chosen for integration into the prototype thesaurus did provide hierarchical information, since the proper genus of the concept represented by the descriptor was necessarily identified in the first part of the definiens (i.e. the defining phrase). The definition did not, however, offer the exact equivalent of the related terms (RTs).

Results obtained by the indexers using the stripped thesaurus were compared to those obtained by the eight indexers (group C) who used a standard version of the prototype thesaurus to index the same abstracts.
As reported in table 5.1, two of the three research hypotheses involving the stripped thesaurus were supported by the data collected. There was statistical evidence that indexers in group S used fewer descriptors to represent the subject content of a document, and that they were at least as consistent in their selection of main descriptors as indexers in group C. But the data also showed that indexers in group S were significantly less consistent in their assignment of complete sets of descriptors to a particular document than indexers working with a standard thesaurus.

On average, indexers in group S used 4.78 descriptors to represent the subject content of a document, as compared to an average of 5.11 for indexers in group C. Minimum and maximum numbers of descriptors assigned were quite different: 4.22 to 5.56 in group S, 4.63 to 6.25 in group C (see table 4.4). Although our research hypothesis was supported in this case, we must look at consistency before we can conclude that the observed effect is in fact positive: the finding that group S used fewer descriptors is of no interest if it does not correspond to findings of acceptable levels of consistency, here established in accordance with the results achieved by group C.

The research hypothesis relating to consistency in main descriptor selection was also supported. Indexers in group S were in agreement slightly more often than indexers in group C as to which descriptors were the most important ones. The average consistency in main descriptor selection was 0.268 in group S and 0.219 in group C, and the statistical analysis provided evidence that those consistency levels could be considered equivalent. But this finding is also secondary; it loses much of its pertinence if we cannot observe the same equivalence in consistency in assignment of complete sets of descriptors.

An examination of the consistency of group S in assignment of complete sets of descriptors forces us to recognize that the preceding results are of no practical significance to our immediate purpose. The use of fewer descriptors by indexers in
group S, instead of increasing consistency, appears to have had the opposite effect; indexers in group S used fewer terms, but they used different terms to describe a document. Group S had the highest proportion of complete inconsistency in pairs of indexers, with one pair result out of every 4.85 being 0, as compared to one pair result out of every 7.65 in group C (see table 5.2, in section 5.4). Average consistency stood at 0.167 in group S, and at a considerably higher level of 0.22 in group C. This difference of 0.053 in the overall consistency of the groups was statistically significant.

Before answering the research question, we must look closely at factors which might have affected adversely interindexer consistency in group S.

As reported in table 4.7, and again in graphic form in figure 5.2, the consistency of S and C vary "normally", with indexers using the stripped thesaurus being less consistent more often, but usually not by very much, than indexers working with the standard thesaurus. In this experiment, all participants were indexing the same documents. The complexity of these documents does not appear, therefore, as a significant factor in the lower average consistency of group S.
The factor "indexers" might be important here because test group S happened to be composed of five masters students and four doctoral students, a higher proportion of doctoral students than in group C. Since the doctoral students were presumed not to have had recent contact with indexing issues in the same way as their colleagues from the masters program, there was a distinct possibility that, by systematically contributing lower pair consistency results, they could affect the overall consistency of the group.

We compared the average indexer-group consistency\(^2\) of the doctoral students with that of the masters students to see if there was a large difference in the performance of the two sub-groups. The average consistency of doctoral students with the rest of their group was 0.162, while the average consistency of masters students

\(^2\) The consistency of an indexer with the group (or indexer-group consistency) is obtained by averaging the pair consistency results calculated for this indexer.
with the rest of the group was 0.171. The slight difference of 0.009 is of no practical significance, and we can safely conclude that the larger number of doctoral students in group S did not have an adverse effect over the average consistency of this test group.

Other personal factors could not be considered a major influence over the final results. Given the random assignment of our participants to the test groups, we assume that group S contained the same proportion of "good indexers" and of "not so good indexers" as group C. It is of interest to recall that, with one exception only, all participants who had declared some indexing or thesaurus experience found themselves, by chance, in group S. We had previously judged that their experience was not sufficient to skew the results of the group, and this judgment was confirmed by the analysis. In fact, while it could have been expected that group S would do better in terms of consistency because of the presence of these individuals, it actually did worse.

Indexers in groups S and C worked simultaneously, and in the same room. On average, indexers working with the stripped thesaurus took less time to complete the assignment than their colleagues who were using a standard tool. Indexers in group S left after 106 minutes, while indexers in group C took 112.5 minutes to finish. It is doubtful, however, that this difference of roughly half a minute per document could have affected significantly the results obtained by group S.

We believe that the results obtained by the indexers forming test group S in this experiment are a fair and accurate representation of what novice non specialist indexers could achieve with the aid of a stripped thesaurus. The answer to our second research question must then be that the availability of standardized definitions in a thesaurus of descriptors is not enough, in the absence of the standard display of semantic relationships generally provided in such a tool, to lead indexers to the same level of terminological consistency as that achieved by indexers working with a standard thesaurus, at least where these indexers are novices and non specialists.
Indexers in group S used, on average, fewer terms than their colleagues to represent the content of documents, and this should have been beneficial to consistency. But the terms selected were too often different from one indexer to the other, and that, of course, was detrimental to consistency. It is possible that indexers did not understand the meaning of each descriptor as clearly as we thought they could with the semantic information provided in the standardized definition. It is also possible that the much decried associative relationships may be more useful in the maintenance of terminological indexing consistency than they were held to be by Slamecka and Jacoby, among others.

5.3 Discussion of results in relation to the findings of the second Slamecka and Jacoby study of consistency (1963)

From data obtained in their second study of indexing consistency, Slamecka and Jacoby concluded that the use of a prescriptive indexing aid was beneficial, while that of a suggestive aid which included a large number of variable semantic relations among terms was ultimately detrimental to interindexer consistency. For the purpose of their experiment, the investigators had classified the thesaurus as a suggestive indexing aid. In the suggestive indexing aid, variable relations among terms do not apply to all indexing situations, and where exhibited, "they are to be employed according to the indexer's judgment"; indexer inconsistency is then viewed as "a result of the indexers' disagreement in their selection of 'related terms' from associative devices" (Slamecka 1963, 227).

Slamecka recognized that "thesauri, cross-referenced subject heading lists, or dictionaries are frequently employed in both [prescriptive and suggestive] functions" (1963, 224). In our project, the standard and the augmented versions of the Core Literacy Thesaurus were meant to be simultaneously prescriptive and suggestive. The
stripped version of the thesaurus was strictly prescriptive since it provided only equivalence relationships, as well as standardized definitions, all of which could be considered invariable in context. The stripped version was in fact the most prescriptive of the three versions of the prototype indexing language used by the participants in our experiment.

On the basis of Slamecka and Jacoby's conclusion that, "other factors being constant, a highly prescriptive indexing aid . . . may be expected to improve indexer reliability" (Slamecka 1963, 225), indexers using the stripped thesaurus in this study were expected to do well in terms of consistency. The data analysis showed, however, that they did significantly worse than their colleagues working with the standard and the augmented thesauri. Our use of novices, as compared to Slamecka and Jacoby's professional indexers, could, of course, be an important factor in the different results obtained.

We believe, however, that the absence of associative relationships in the stripped thesaurus is largely responsible for these results. The absence of related terms obviously restricted the possibility for our indexers to move around freely in the thesaurus. Although the standardized definitions contained entailed terms, that are in fact "invariable" related terms, this was probably insufficient for the indexers to find all terms necessary to represent completely the content of a document. Indexers working with the stripped thesaurus likely ended up using fewer index terms not because they were more accurate in their indexing, but because they did not find other appropriate terms. This would also explain the low consistency of these indexers. Once they had found an appropriate representation for an indexable concept, they were not led any further into the thesaurus structure which they then had to re-access through another indexable concept. Indexers might have been willing to do this exercise once or twice for each document in the sample collection, but, not surprisingly, they accessed the thesaurus structure using different concepts, and they stopped looking for terms earlier than their colleagues.
Given the results obtained in our study, we cannot join Slamecka in stating that "relatively high consistency among indexers should be attainable through the use of indexing aids which display only the invariable [i.e. the equivalence and the hierarchical] relationships among the vocabulary terms" (Slamecka 1963, 227). Associative relationships appear to have a role to play not only in relation to completeness, but also to consistency of indexing. We would, therefore, suggest that it is not the availability of related terms which leads to greater inconsistency among indexers, but rather the presence of inappropriate, subjective, and syntactically- rather than semantically-based relationships among potential index terms.

Slamecka and Jacoby observed a consistency of 0.083 only among indexers working with the associative tool (i.e. the thesaurus), lower even than that of 0.091 achieved by indexers working without the help of a controlled vocabulary (Leonard 1977, 17). Indexers in our experiment were all using a thesaurus as indexing aid, and as seen in table 4.5, they were considerably more consistent than Slamecka and Jacoby's indexers. The results obtained by the participants in our study are consistent with those reported by various investigators over the past forty years.

5.4 Discussion of results in relation to the findings of previous interindexer consistency studies

Although the main purpose of this project was not to study indexing consistency itself, we did obtain consistency measurements that might be of interest to other researchers in the field. The results of our experiment will now be presented in relation to observations made by previous investigators in this area.

The participants in this study were all novice indexers, having very little or no knowledge of the subject area described in the indexing aid and in the indexed
documents. The participants received no special training which might have smoothed out individual differences due to different backgrounds.

It has been observed that novice indexers tend to use more terms than experienced indexers to represent the subject content of a document (Slamecka 1963; Lancaster 1991; Bertrand and Cellier 1995). We consider that the participants in our study were conservative in their use of descriptors, with an average of 5.15 terms per document, well below the mid-range point between the minimum required and the maximum allowed (i.e. four and eight descriptors respectively). The design of this study does not allow us to compare this figure with one obtained by trained indexers working in the same conditions and on the same documents. But the average number of descriptors used by our novice indexers is lower than could be expected, given the specificity of the indexing language and the large amount of overlap between the concepts and the terms it contains. The time factor has to be considered: participants were given an average of ten minutes to index a document, and this time constraint alone might account for the lower number of descriptors assigned. The sample documents were short: this could also explain the smaller number of index terms judged necessary to represent completely their content. The availability of standardized definitions in two of the three versions of the indexing aid does not appear as a significant factor in this case, however, since the participants who did not have access to the definitions did not assign more terms, on average, than the participants who had access to them.

As mentioned already, smaller sets of index terms usually correlate with higher consistency, especially when a controlled vocabulary is used (Tinker 1966; Tarr and Borko 1974; Leonard 1975; Reich and Biever 1991). The participants in this experiment were working with a small controlled vocabulary, and they were asked to index short documents in which a good portion of the conceptual analysis had already been done; these factors could also lead to high levels of terminological consistency (Tinker 1966; Tarr and Borko 1974; Leonard 1975; Funk and Reid 1983; Reich and
Biever 1991). As seen in figures 5.1 and 5.2, overall levels of consistency in this study were generally low, although they remain well within the range of what has been observed before (see section 2.4.2.1). The highest group consistency ratio in assignment of complete sets of descriptors stands at 0.403, the lowest at 0.044. The average consistency of our novice indexers was 0.196.

Complete consistency in a pair of indexers was extremely rare: only four indexer-pair results of 1 were recorded, representing 0.18% of the 2,152 pair results available for analysis. On the other hand, a very large amount of complete inconsistency was observed among our participants. Table 5.2 shows the number of indexer-pair results equivalent to 0 calculated in each group and for each document. A total of 342 indexer-pair results of 0 were recorded; this represents 16% of the 2,152 results available. In group C, one indexer-pair result out of every 7.65 was 0. In group A, one indexer-pair result out of every 8.18, and in group S one out of every 4.85 were also 0. This is quite surprising: given that an average of 5.15 terms were used to describe a document, one could expect that at least one of these terms would be used by both indexers in a pair in almost all, if not all, test cases. This result is attributed to the lack of experience of the indexers; we believe that trained indexers working on abstracts would not have been so often totally inconsistent with one another.
Another unexpected result was the rather low consistency in main descriptor selection. Whether novice or experienced, indexers have always been more likely to agree when asked which index term in a given set is the most important one, than when asked which index terms should be used to describe a particular document (Lancaster 1991, 62). In this experiment, the average consistency of participants in main descriptor selection was 0.267; this means that indexers agreed not much more than 25% of the time on the term which was the most important one in the description of a document (as compared to about 20% of the time on which descriptors should be used to represent completely and accurately the subject content of the same document).

As reported in table 4.8, and as illustrated here in figure 5.3, the range of consistency values in main descriptor selection was wide, the highest group consistency result being 0.749, the lowest 0.027 (interestingly enough, both values

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>C</th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Making meaning, making change.</td>
<td>-</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>#2 Literacy action. A resource book</td>
<td>14</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>#3 Literacy in the workplace.</td>
<td>8</td>
<td>-*</td>
<td>2</td>
</tr>
<tr>
<td>#4 A collaborative adult literacy</td>
<td>14</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>#5 Working with beginners.</td>
<td>12</td>
<td>22*</td>
<td>20</td>
</tr>
<tr>
<td>#6 Older displaced workers write</td>
<td>8</td>
<td>-*</td>
<td>14</td>
</tr>
<tr>
<td>#7 Different strokes for different ...</td>
<td>16</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>#8 From parent to child ...</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>#9 Sources of difficulty in the ...</td>
<td>-*</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>#10 Fresno County library ...</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>#11 Developing native language ...</td>
<td>4</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>#12 Opening the doors to lifelong ...</td>
<td>10</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>86</td>
<td>78</td>
<td>178</td>
</tr>
</tbody>
</table>

* number of indexers = 7
were calculated for the same document). Since one term only could be selected as main descriptor by each indexer, two values could be obtained as pair consistency results: a value of 1 if the two indexers in a pair had used the same term, a value of 0 if the indexers had selected different terms. Given the small number of indexers in each test group, one could reasonably expect a few occurrences of perfect consistency in main descriptor selection, but there was none.

![Figure 5.3 Consistency in main descriptor selection](image)

Lancaster has suggested that complex subjects cannot be represented by one descriptor only but most probably by at least two (1991, 62). If this assumption is valid, consistency might remain low when indexers are asked to identify one descriptor only as main, but it should go up if they can designate the two most important descriptors. In our experiment, overall consistency in main descriptor
selection would probably have been higher had the indexing policy required the identification of the two most significant index terms.

The lack of experience of our participants was unquestionably a major factor in the low consistency levels observed. The participants had to deal with a lot more than reading definitions. They also had to adjust, in a restricted period of time, to the global experimental situation, to the sample documents, to the lexicon, to the many elements of semantic information provided in the indexing aid, and to a type of decision making which they were not used to. According to Lancaster, the use of a controlled vocabulary does not necessarily promote consistency, especially among novice indexers; higher consistency levels become attainable only "after indexers have learned the particular nuances of a vocabulary and the rules and protocols associated with its use" (1986, 150). Obviously, the participants in our experiment could not, in just a few hours, develop much familiarity with the indexing aid. It would be interesting indeed to compare the performance of the novice indexers who participated in this study with that of trained indexers working in similar conditions, since indexing experience has been recognized as a major variable in indexing consistency (Leonard 1975).

We believe, however, that other factors known to affect consistency have also contributed to these results. Among these factors are the already mentioned time constraint, the softness and the degree of abstraction of the subject area, and the specificity of the vocabulary. The content and structure of the indexing aid itself was also, most likely, a major influence.

The sample collection and the indexing aid described a field of the social sciences, adult literacy theory and practice, considered to be highly abstract since it does not involve the manipulation of physical objects but rather that of cognitive entities and processes. Furthermore, the terminology of this field is not standardized yet. Finally, literacy specialists use commonly known words to form terms, and when
these terms are used in source documents, they trick the indexer into thinking that the conceptual issues have been perfectly understood when in fact they have not. All these characteristics of the field were likely to result in much inconsistency in indexing (Zunde and Dexter 1969a; Funk and Reid 1983). And as we have seen already, the availability of standardized definitions in two of the three versions of the indexing aid did not, contrary to our expectations, make a difference in the results.

In most indexing situations, a specific vocabulary usually corresponds to a large one. In our experiment, indexers worked with a small lexicon of 367 descriptors, which was at the same time a highly specific controlled vocabulary describing the core of an abstract subject field. There were only 367 descriptors to choose from, and interindexer consistency had the potential to be high (Borko 1964; Tarr and Borko 1974). Because of the specificity level, however, it could be predicted that consistency would go down all the same, given the number of closely related terms available (Tinker 1966; Reich and Biever 1991). The addition of standardized definitions, again, does not appear to have made a difference in the results obtained.

The Core Literacy Thesaurus was made of terms extracted from a general thesaurus in the field (see section 3.5.2), and it was designed independently from the sample collection the participants would have to index. Term extraction from the source thesaurus was made according to principles and criteria that were valid, but that could not guarantee that all terms needed to index the sample documents would actually be available, defined or not. Of course, this is no different from what happens in a "normal" indexing situation where the controlled vocabulary does not necessarily provide all the terms needed to index all documents. We might want to consider that consistency is as much a factor of what is not available in the controlled vocabulary as a factor of what is. The low consistency of indexers in this experiment might be explained, at least partly, by the fact that the prototype thesaurus was likely missing some terms which would have been appropriate and maybe even essential.
A final potential explanation for the low consistency of our participants relates to the choice of Hooper's formula to determine degrees of agreement among indexers. This formula, which reflects an entity-oriented view of consistency, is known as one which produces "consistently lower consistency measures than one would intuitively be willing to accept" (Zunde and Dexter 1969b, 260). This is due to the fact that Hooper's equation gives a value only to those terms that have been used by both indexers in a pair; terms that are used only by one of the two indexers count for zero in the calculation of consistency.

5.5 Limitations of this study

Our data analysis, based on an assessment of consistency which did not involve a judgment on the accuracy, appropriateness, and relative importance of descriptors assigned, suggests the following interpretation of the results:

1. the availability of standardized definitions in a thesaurus does not lead to an increase in overall terminological consistency among novice non specialist indexers;

2. the availability of standardized definitions in a thesaurus which does not display the conventional associative relationships among terms is not sufficient to prevent a decrease in overall terminological consistency among novice non specialist indexers;

3. the availability of standardized definitions in a thesaurus may lead novice non specialist indexers to acceptable levels of consistency in main descriptor selection, even if the thesaurus does not display the conventional associative relationships among terms.
It would thus appear that the writing of standardized terminological definitions for integration into a thesaurus used as indexing aid may not be worth the effort and the cost, at this time and in most environments, where novice indexers would be the main users.

This preliminary conclusion is justified and valid in the framework of this study, given the data collected. We could not affirm without a doubt, however, that the standardized definitions integrated into the Core Literacy Thesaurus were not at all helpful to the participants in this experiment. Several factors also call for caution in generalizing the findings to the whole population of novice non specialist indexers.

The results have to be considered in the light of some of our assumptions about the participants' behaviour (see section 5.2). It cannot be known for sure that indexers who had access to definitions actually read them, even in the case of those indexers using the stripped version of the indexing aid who had very little semantic information to work with. If the indexers read the definitions, we cannot determine how much of the semantic information they contained was understood, how much of that information struck the indexers as significant and particularly revealing, and how much of it ultimately supported or influenced the decision-making process. Posttest interviews with the participants would have been useful to gather more information on the behaviour of the indexers in each of the three test groups, and on their reaction to the content of the indexing tool they had used to index the sample collection.

Interindexer consistency was calculated in a way which has become the norm in consistency studies, by looking at a document and comparing sets of descriptors used by two indexers to represent its content. In our data analysis, we used numbers (e.g. five descriptors in common out of sixteen descriptors assigned by two indexers), never actual index terms. This way of looking at consistency provides unambiguous and certainly valid results, but many see as a shortcoming the fact that the entity view of consistency does not take into account the frequency of use of an index term or its
relative importance in the representation of a document (Cooper 1969; Zunde and Dexter 1969b; Rolling 1981; Soergel 1994). In section 2.4.2.1, a reference was made to the descriptor view of consistency which measures interindexer agreement on the basis of frequency of use of a descriptor to index a particular document. In an experiment such as this one, a term-based analysis would have allowed for an assessment of full agreement, near agreement, and disagreement among indexers by looking at the proportion of terms used by more than half the indexers, by half the indexers, by one indexer only, etc.; this new information could then have been related to the availability or non availability of a definition and/or of semantic relationships, to the content of the definitions, etc.

A term-based analysis could also reveal whether the rule of specificity was applied by all participants. It is evident that the use of a controlled vocabulary does not eliminate the possibility of a "type I" translation failure in indexing, i.e. the failure to use the most specific term available to represent a concept or a subject (Lancaster 1991). In our experiment, a specific term could have been chosen by one indexer in a pair while the other assigned the corresponding broader term: such terminological inconsistency could not be attributed solely to the indexing aid, but also to the fact that, possibly, one indexer had not applied the indexing policy generally, and the rule of specificity in particular.

The terminological inconsistency just described could also be traced to a difference in conceptual interpretation and in selection of indexable concepts among the indexers involved. The conceptual consistency factor is another factor which affects the interpretation and generalization of our findings. The participants in this experiment indexed short abstracts, and they were given the possibility to translate into index terms up to eight different concepts; in these conditions, it can be safely assumed that conceptual consistency among our indexers was high. It is certain, however, that perfect conceptual consistency was not always achieved by the participants. An undetermined amount of terminological inconsistency must therefore
be attributed to preexisting differences in interindexer conceptual consistency, rather than to the indexers' use of the indexing aid.

Our decision to use novice indexers in this project was deliberate. The fact that our participants were novice non specialist indexers is not, per se, considered a limitation of this study, but it should be taken into account in the interpretation and generalization of the findings. The behaviour of novice indexers is more difficult to predict than that of trained indexers. Even slightly modified conditions in the testing of the prototype *Core Literacy Thesaurus* (e.g. use of longer texts as indexable documents, increase in number of mandatory descriptors, etc.) might lead to different results in experiments otherwise similar to this one.

Sample sizes have been a limitation of most laboratory-type consistency studies. The small number of indexers involved in this project must naturally be considered when reaching conclusions and generalizing findings. Although the use of Hooper's formula for calculating indexer-pair consistency compensated somewhat for the shortage of participants, there remains a definite possibility that our restricted group of volunteers may not be absolutely representative of the population of novice indexers as a whole. The design of our experiment, however, guarantees the internal validity of the results obtained; these could certainly be used as a base-zero level in further investigations involving similar variables.
6
CONCLUSION

6.1 Summary of the study

In information transfer systems that rely on human-based subject indexing for conceptual structuring and access, controlled indexing languages are used as an aid to maintain or even increase interindexer consistency. The thesaurus of descriptors has been the controlled indexing language of choice for more than three decades. The content and the structure of the thesaurus have not changed much during that time, even if previous research has shown that the thesaurus in its present form may not be all that useful as an indexing aid and may not be so effective in maintaining consistency among indexers. One of the main functions of the thesaurus used as indexing aid is to clarify meaning, thus increasing the possibility that indexers will consistently select the same term to express the same concept. Given the low levels of consistency observed among indexers working with a thesaurus, it has been suggested that meaning may not be explained and defined clearly enough in these tools.

The general purpose of this research project was to look at the effect on interindexer terminological consistency of providing clearer and more prescriptive information on the meaning of each descriptor than is normally the case in a thesaurus. The research questions and hypotheses focused on the positive effects on interindexer consistency of making standardized terminological definitions available to the indexers at the time of descriptor selection. The preparation of standardized
definitions for integration into a thesaurus used as indexing aid would be a costly
venture, requiring much expertise and effort. If an organization chose to
systematically integrate definitions into a thesaurus, it could be only with the
assurance that the availability of definitions does improve the outcome of the indexing
process, or that the definitions can effectively replace other elements of semantic
information normally provided in a thesaurus, the associative relationships for
example, that are themselves difficult to create and whose usefulness has been
questioned.

A small prototype thesaurus describing the field of adult literacy and practice
was developed. The Core Literacy Thesaurus contained 367 specific descriptors
representing the core concepts in a field that exhibits many of the semantic and
terminological problems associated more generally with the social sciences. The
terminology of adult literacy is "soft", ambiguous, and shifting constantly.

Definitions were prepared for each one of the 367 descriptors in the thesaurus.
The definitions were written with the help of a defining model and in accordance with
defining rules borrowed from the field of Terminology. In the Core Literacy
Thesaurus, the standardized definitions specified the meaning of descriptors by
establishing fixed links between concepts and their verbal designations. In doing so,
the definitions also prescribed appropriate uses for descriptors. The standardized
definitions thus created are valid only within the Core Literacy Thesaurus lexicon and
structure; the prototype thesaurus is seen as a special language for the communication
of specialized literacy information, and it is considered a self-contained terminological
system.

Three different versions of the prototype thesaurus were created. The standard
version of the thesaurus contained no definitions. The augmented version of the
thesaurus provided at least one standardized definition for each descriptor, in addition
to the conventional display of semantic relationships of equivalence, hierarchy, and
association generally found in such a tool. The stripped version of the thesaurus provided the same definitions, but did not display hierarchical and associative relationships among terms.

A standard interindexer consistency study methodology was used as a means to assess the usefulness of definitions in the thesaurus used as indexing aid. It was hypothesized that the availability of standardized definitions at the time of descriptor selection would lead to an increase in the terminological consistency of those indexers who also had access to a display of relationships among terms, and that it would be sufficient to maintain acceptable levels of consistency among indexers who did not have access to such a display. Three sets of data were used to rate consistency: average number of descriptors used to represent the subject content of a document, group consistency in assignment of all descriptors, and group consistency in main descriptor selection.

The controlled indexing experiment set up to gather consistency measurements for comparison and analysis was conducted in conditions similar to those of previous interindexer consistency studies. Twenty-five volunteer novice indexers, randomly assigned to one of three test groups, were asked to index a collection of twelve informative abstracts using one of the three versions of the prototype thesaurus, in a period of two hours and in the presence of the investigator. Differences in the consistency of the test groups were then analyzed.

The statistical analysis of data collected during the experiment revealed no significant differences in number of index terms used and in terminological consistency in assignment of all descriptors between the indexers who had worked with the augmented thesaurus and the indexers who had worked with the standard thesaurus to index the sample collection. As for those indexers who had been provided with the stripped thesaurus, they used fewer index terms and they were
significantly less consistent in assignment of all descriptors than their colleagues who had worked with the standard thesaurus.

Mild positive effects were detected in the indexers’ terminological consistency in main descriptor selection: there was a tendency among indexers who had been provided with the augmented thesaurus to be more consistent than those using the standard version, and the indexers working with the stripped thesaurus agreed as often as their colleagues on which index term was the most important one in a given set.

Given these results, it appears that the writing of standardized terminological definitions for integration into a thesaurus used as indexing aid may not at this time be worth the effort and the cost, at least when novice indexers are the main users. It also appears that the often criticized display of semantic relationships in thesauri might be essential to the maintenance of acceptable levels of overall interindexer consistency.

This conclusion must be considered of course in the light of the scope and limitations of this particular project, and caution should be exerted in generalizing the findings. The general limitations associated with any investigation of the highly subjective indexing process or observation of indexers’ behaviour apply to this study. As we were conscious of preexisting limitations in this area of investigation, a considerable amount of control was applied to the various phases of this project, and especially in the design and conduct of the indexing experiment. The results obtained by the participants in this study are considered a fair and accurate representation of what inexperienced indexers could achieve in these particular conditions with the indexing aid provided. The small size of our samples (indexers and documents), and the nature and characteristics of our population (i.e. novice non specialist indexers) have to be considered, however, in the interpretation and generalization of the findings.
This investigation focused on outcomes rather than on process. We found that the availability of standardized definitions at the time of descriptor selection did not make a significant positive difference in indexing outcomes, where novice non specialist indexers were concerned. Our research design did not allow us, unfortunately, to determine if and how the indexing process itself had been influenced by the availability of this new type of semantic information in a traditional indexing language structure.

6.2 Recommendations for further research in the area

This research project was based on the belief, inspired and supported by previous research in the area, that the systematic integration of standardized definitions into a thesaurus of descriptors was a good idea. The limited amount of data collected in this study did not support entirely our hypotheses. Given the scope and limitations of our project, however, it is evident that much more research is needed before we can reach a definitive conclusion on the usefulness of standardized definitions in the thesaurus used as indexing aid. The methodology designed for this project is reusable, and the results obtained can serve as a base-zero comparison point for further studies involving similar variables.

Five recommendations for further investigations in the area are offered below. Four of the briefly described potential projects are meant as further exploration of the link between standardized definitions and interindexer consistency. The fifth project concerns the standardized definitions themselves. All proposals involve further use of the instruments created in the framework of this project.
6.2.1 Experienced indexers as users

In our study, novice non-specialist indexers were given the difficult task of indexing with a thesaurus they had never seen before, in what can be considered a very unnatural situation. The availability of standardized definitions in the indexing aid did not have the hypothesized positive effects on overall terminological consistency among these users.

It has been suggested that controlled indexing languages, and particularly those that contain mostly very specific terms, can be used efficiently only by trained indexers (Lancaster 1991). We do not agree with this statement, and still think, along with Wellisch (1972), that thesauri can be used by, and will be useful to, novice indexers in many circumstances. We believe, however, that the reaction of experienced indexers to the availability and to the content and structure of an indexing aid could indeed be quite different from that of inexperienced indexers.

Previous consistency studies have shown that experienced indexers were more consistent than novice indexers. It is not clear, however, whether this is due to their greater familiarity with the task of indexing, to the fact that they are making an overall better use of the indexing aids provided, or to the combination of both factors.

It would be interesting to verify whether terminological consistency among experienced indexers would increase if they were given access to standardized definitions.

The methodology and the instruments designed for this study could be reused with this new class of indexers. We recommend the addition of a qualitative part to the methodology to obtain information on indexer’s individual reaction to the availability or non-availability of definitions and of display of semantic relationships, and on the specific use and role played in decision-making by the various elements of
semantic information available. Such qualitative information could be obtained through a questionnaire or an interview administered after the indexing session. The analysis of this different type of information could also shed some light on whether or not a modification in the nature and amount of semantic information provided in the thesaurus could also affect the indexing process.

In a study involving trained indexers, both indexers who are also specialists of the subject and indexers who are not specialists should be recruited; it would then become possible to compare not only the consistency of specialists and that of non specialists, but also the reactions of each group to the availability of clear defining information.

This suggested project, however, would suffer from the same weakness in external validity as the project we conducted. It would still be a laboratory experiment, and all the limitations associated with investigations of indexing conducted in artificial conditions would apply.

6.2.2 Consistency in "natural" indexing conditions

Lancaster suggests that indexers will be more consistent when they have developed a familiarity with the vocabulary and with the protocol for its use (1986, 150). Assuming that this is true, an investigation conducted in a "natural" setting and involving various categories of indexers (i.e. novices and experienced, specialists and non specialists) might lead to interesting discoveries on the relationship between standardized definitions and indexing consistency.

In a natural indexing situation, many, but not all, of the constraints that were applied in our study would be removed. The influence of the time factor and of the stress associated with stringent experimental conditions would be eliminated. Indexers
would be allowed to work at their own rhythm, to perform postindexing editing, to access and review previously assigned descriptor sets, etc.

Such a study would ideally involve the participation of several indexers working in similar environments, who would be asked to follow the same indexing policy but would be provided with different versions of the prototype thesaurus to index a given sample collection over a certain, still limited, period of time. Participants could likely be recruited in institutions that house and organize specialized collections in the field of adult literacy. Inter indexer consistency could be compared and group consistency "curves" drawn to verify whether, for example, consistency in a group of indexers having access to definitions appeared to increase faster, as indexers became more familiar with the indexing aid, than consistency in another group who did not have access to the same information on meaning.

We recognize that the design and set-up of such a project would be quite challenging. Pragmatic factors (i.e. those related to the indexers themselves) and environmental factors would be extremely difficult to control, and their influence would have to be reflected in any interpretation of the results. Since full documents would likely be involved, semantic factors would also come into play, and conceptual consistency would have to be established as a distinct parameter. A way would need to be found to ensure that indexers did not exchange defining information in a way that would eliminate basic differences in the test groups, bringing all indexers to work with a maximum of semantic information. It might be possible to control this factor if the groups of indexers did not work simultaneously, but rather sequentially, so that only one version of the thesaurus would be in use at any one time. In any case, an extraordinary amount of cooperation would be required from participants, and it is quite clear that the project would not attract more than a few volunteers.

Such an experiment would be most interesting, however, in that it could also allow the investigator to measure consistency in assignment of descriptor sets to
documents on the same subjects over a period of time, a type of consistency which is, in both Fugmann (1985) and Lancaster’s (1991) opinion, more revealing and more productive from an information transfer viewpoint.

6.2.3 Term-based analysis

In our study, we adopted the entity view of consistency, and our analysis was based on a comparison of complete sets of descriptors assigned to a document. But a descriptor view of consistency could also generate interesting observations.

In the Core Literacy Thesaurus, series of closely related descriptors were present that, we believe, would lead to terminological inconsistency among indexers and in the same indexer over time. We added standardized definitions as a potential solution to this problem, with the hope of removing at least some of the ambiguity and equivocation present in this particular thesaurus as it is in many others, especially in the social sciences.

A different look at terms assigned seems warranted to gather information on whether definitions actually contributed to the removal of such ambiguity and equivocation. A different way of analyzing data obtained through an indexing experiment would be to look at the selected terms themselves, at their inherent characteristics and at their frequency of use in a single document, or in many documents on the same subject.

Data collection could be made in controlled, semi-controlled, or "natural" conditions, with various types of indexers. To obtain valid data, however, more control would have to be exerted over the sample documents submitted for indexing. Judgments would need to be made on the appropriateness of descriptors used to represent a concept or a subject. A few targeted descriptors (those that could create
the most serious problems because they are ambiguous, for example) would have to be identified, and sample documents to which these terms should be applied, correctly of course, would need to be found.

The interest of this type of study and change of perspective is that it would allow for an extensive analysis of term use. Frequency would be a factor, but other characteristics such as length of term, degree of precoordination, type of concept represented, type and content of definition, etc., could all be factored in to see which terms seemed to be used correctly by a majority of indexers most often. The investigator could then try to determine whether the availability of definitions appeared to have anything to do with the result. The series of closely related terms already identified in the prototype thesaurus could be targeted more specifically.

Such a study would also allow for further testing and development of a term-based methodology for assessing consistency; although strongly recommended, this type of methodology has been used only infrequently in our field.

6.2.4 Consistency in main descriptor selection

Although consistency in main descriptor selection was considered secondary in the framework of our study, we must point out that the mild positive results obtained are interesting when viewed in the larger perspective of new developments in information economics and environments.

Important changes have taken place in the information transfer environment since the thesaurus of descriptors' first appearance on the scene forty years ago.

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1 Examples of application of a term-based methodology can be found in Zunde and Dexter (1969b), White and Griffith (1987), and Chu and Ajiferuke (1989).
Technological innovations, and more recently economic restrictions, have contributed to a revision of general views and opinions on the value and necessity of human-based indexing. At the present time, human-based subject indexing is still considered value-added to the information transfer process, but the increasing capabilities of search engines for accessing full texts or document surrogates have modified considerably the tasks and responsibilities of the indexer. The indexer once had to provide as many indexing terms as possible to describe the content of a document, since those terms were to become the most important means of accessing the document itself. At present, the same indexer, who must work quickly and efficiently, must be much more accurate and selective in his or her choice of terms, keeping in mind that indexing has now become closer to the classifying function. In many environments, the number of descriptors an indexer is required to assign has decreased; the one or two descriptors assigned have now acquired greater importance, and they must be accurate, precise, and highly efficient. The amount of information available makes it impractical to continue to use generic terms to group related documents and information. Indexers must use specific descriptors, and they must be provided with tools that will help them do so consistently.

Further research should concentrate on the link between definitions and consistency in main descriptor selection and assignment. In this study, we did a separate calculation on a single main term. As discussed in section 5.4, however, it would be preferable, in any further investigation, to require the identification of the two (or even three) most important descriptors since that many terms are often needed to express a subject. Qualitative data should also be collected in the manner described in section 6.2.1.

Particular emphasis should be put on the use of the stripped version of the thesaurus for main descriptor selection. The current practice in many organizations of making documents widely available on the Internet, and of building complex intranets for their own internal operations, has exacerbated the access problem that existed
before but was not as visible and probably not as critical. These organizations get quickly to the point of needing a controlled list of terms and/or categories to structure this mass of information. Most organizations are reluctant, and rightly so, to get into thesaurus construction, but they can rarely find a list which is totally appropriate to their needs. A solution might be found in a new type of tool, such as our experimental stripped thesaurus, which offers basic control of synonyms and meanings, without involving huge costs in development and maintenance. Much of the defining work could be shared with terminologists and translators who are already pursuing the goals of tracking concepts and standardizing term use in these same organizations.

6.2.5 Testing the defining model

There have always been some true definitions in thesauri, interspersed with instructional or historical notes on the use of descriptors. As discussed in section 2.3.2.2, many of the definitions provided have been of questionable usefulness. This is certainly due, at least in part, to the fact that there have been no rules immediately available (through the guidelines for the development of thesauri, for example) for the preparation of new definitions or the rewriting of borrowed ones.

We have no reason to believe that the practice of integrating true definitions into thesauri will disappear in the near future, although the integration of definitions might never be done on a systematic basis. If adopted, a defining model such as the one proposed in our project, would ensure that once it had been established that a definition was needed in a specific case, this definition would contain all the essential defining information and only the essential defining information, and that it would be written in a format and style that would make it accessible to the reader.
The defining model developed in the framework of our study needs to be put to the test in other indexing language creation projects, preferably in social science fields, to see whether it is appropriate, or whether its use would prove to be too taxing and impractical in the daily routine of thesaurus development and maintenance.

Such testing would involve the participation of several thesaurus designers who would be asked to work with the model, in a controlled or natural environment. Structured discussions on the difficulties related to the use of the model, and evaluation by terminologists and by field specialists of the definitions prepared by participating thesaurus designers, would be required as well. The model could also be tested by terminologists in the context of termbank or terminological thesauri development projects.

This last recommendation for further research on the topic of definitions in thesauri stems from our assumption that standardized definitions might have many potential uses for thesaurus designers and for thesaurus users.

In the design and maintenance of a thesaurus, the availability of standardized definitions could facilitate the identification of synonyms and quasi-synonyms within a language, and the identification of linguistic equivalents in a multilingual context. The availability of a formal definition would likely improve updating procedures by providing unambiguous information on concepts already represented in the lexicon. The availability of precise defining information would facilitate the processes of reconciling and merging thesauri, the development of metathesauri and superthesauri, as well as the concurrent use of several distinct controlled vocabularies; all of these trends are already strong in the contemporary world of information transfer.

Another popular trend is that of computerizing not only the development but also the use of thesauri. In an automated context, the availability of standardized definitions could present numerous advantages. A judicious selection of specific and
expressive keywords in the definitions would contribute to an expansion of the vocabulary used as search key for automated access to the thesaurus. The genus proximus in each definition could be used to produce automatically a classified or even a faceted structure. And in a hypertext environment, the entailed terms in the definitions would allow for easy and logical navigation within the semantic structure.

All of the above represent other areas of interest for further research on the usefulness of standardized definitions in thesauri.

6.3 Contribution of this project to the field of information studies

The task of indexing is as complex today as it has always been, and the amount of information needing to be organized for later access still grows at an exponential rate. To prevent conceptual and terminological chaos in such a context, indexing languages are as necessary now as they were decades ago. The traditional controlled languages might not, however, be completely up to the task.

Throughout the years, the thesaurus has remained a key element in the successful transfer of information. The focus of most research projects involving thesauri has been on its role as a searching aid. Few and far between have been studies, like ours, that looked at the input side of the information system on the assumption that the thesaurus was as important to indexers, as it was to information searchers.

There have not been many evaluative studies of the content of thesauri and of their general usefulness to indexers. Despite frequent suggestions that the content of the thesaurus should be adapted to the task (of indexing, searching, etc.), or even to the user (indexer, searcher, etc.), the content and the structure of the tool have not
changed much since the publication of the first set of guidelines for the development of thesauri, which themselves did little more than record and officialize what was already common practice. When assessment projects were conducted, they involved thesauri in their standard format and with their standard elements of content. The most interesting suggestions for modifications to the traditional thesaurus may have come from terminologists who proposed to merge termbanks and thesauri into a semantically rich "terminological thesaurus", a promising tool never put to the test with the indexer as user.

Our study is unique in that, not only did it concentrate on the thesaurus in its role as indexing aid, but it also offered to indexers a modified thesaurus integrating a new type of semantic information presented in a slightly altered thesaural display. Previous studies had compared the behaviour of indexers working with indexing languages that differed not only at the structural level, but also at the lexical level; in our project, the same lexicon was available to all indexers, and it was only in their structure that the indexing tools being tested differed. Although the scope and limitations of the project do not allow us to present definitive conclusions on the usefulness of traditional or of new elements of semantic contents in the thesaurus, our findings should be of interest in discussions of the value of definitions and of hierarchical and associative relationships in the thesaurus.

In this study, we used indexing consistency measurements as a means of assessing the usefulness and effectiveness of the prototype Core Literacy Thesaurus. These measurements, combined with observations relating to the behaviour of the participants in the experimental part of the project, add to the already considerable amount of knowledge on indexing consistency among novice indexers.

We used a terminological model to create standardized definitions, and by systematically integrating definitions into a thesaurus, we developed a close relative of the terminological thesaurus which we consider more accessible to a wider range of
potential users. In doing so, we built another bridge between information studies and Terminology, and we established another link with terminologists, whose work is in so many ways similar to ours.

It is our hope that the defining template and rules developed in the framework of this project will be further tested, and will eventually become of use to fellow thesaurus designers and thesaurus specialists. This would be a most important contribution of our study to the body of research and knowledge on theoretical and pragmatic issues pertaining to thesaurus design and use.
APPENDIX 1
DOCUMENTS USED AS SOURCES OF DEFINITIONS FOR DESCRIPTORS
1. SPECIALIZED DICTIONARIES AND ENCYCLOPEDIAS


2. CONTROLLED INDEXING LANGUAGES / THESAURI


*Canadian Literacy Thesaurus. Thésaurus canadien d’alphabétisation*. 1996. 2nd ed. Toronto, ON: Canadian Literacy Thesaurus Coalition.

Documents used as sources of definitions for descriptors


3. HANDBOOKS, TEXTBOOKS, AND MANUALS


4. GOVERNMENT DOCUMENTS


5. OTHER (ARTICLES, ETC.)


Baldwin, R. 1990. Clear writing and literacy: how to recognize clear writing, how to use it, how to convince others to use it. Toronto, ON: Ontario Literacy Coalition.


APPENDIX 2
SOURCE DEFINITIONS RECORDING FORM
SOURCE:

DEFINITION 1.

SOURCE:

DEFINITION 2.

SOURCE:

DEFINITION 3.

SOURCE:

DEFINITION 4.

SOURCE:

COMMENTS:
APPENDIX 3
RESTRUCTURING DEFINITIONS:
EXAMPLES AND WORKING DOCUMENTS
ACTIVE VOCABULARY

DESCRIPTOR: Active Vocabulary

DEFINITION 1.
A stock of words used by an individual in speech and writing.

SOURCE: ART 1st ed.

DEFINITION 2.
The words that a child or adult is able to use in speech and writing, not just recognize and understand.

SOURCE: Diet. ED.

DEFINITION 3.
The number of different words a person uses in speaking and writing.

SOURCE: Diet. READ

DEFINITION 4.
A person can use properly when speaking or writing.

SOURCE: READANCE

COMMENTS:
<table>
<thead>
<tr>
<th><strong>TERM/CONCEPT:</strong></th>
<th>Active vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOURCE DEFINITION:</strong></td>
<td></td>
</tr>
<tr>
<td>1) Stock of words used by an individual in speech and writing</td>
<td></td>
</tr>
<tr>
<td>2) The words that a child or adult is able to use in speech and writing, not just recognize and understand</td>
<td></td>
</tr>
<tr>
<td>3) The number of different words a person uses in speaking or writing</td>
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<table>
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<tr>
<th>(1) DOMAIN</th>
<th>Literacy</th>
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</thead>
<tbody>
<tr>
<td>(2) CONCEPT CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(3) GENUS</td>
<td>vocabulary</td>
</tr>
<tr>
<td>(4) GENUS CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(5) CONCEPT/GENUS</td>
<td>a subset of</td>
</tr>
<tr>
<td>(6) eCHAR 1</td>
<td>made of those words and idiomatic expressions</td>
</tr>
<tr>
<td>(6) eCHAR 2</td>
<td>that an individual actually uses in oral and written communication</td>
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<td>(6) eCHAR 3</td>
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<td>(6) eCHAR 4</td>
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<td>(6) eCHAR 7</td>
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<tr>
<td>(7) iCHAR</td>
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</table>

**STANDARDIZED DEFINITION:**
= subset of the *vocabulary* of a language, made of those words and idiomatic expressions that an individual actually uses in oral and *written communication*
LIBRARY LITERACY PROGRAMS

**DESCRIPTOR:**
library literacy programs

**DEFINITION 1.** Programs designed, administered and staffed by a library

**SOURCE:** *Library, 1st ed.* p. 63

**DEFINITION 2.** Involves direct instruction and for just organization

**SOURCE:**

**DEFINITION 3.**

**SOURCE:**

**DEFINITION 4.**

**SOURCE:**

**COMMENTS:**
TERM/CONCEPT:
Library literacy programs

SOURCE DEFINITION:
1) programs designed, administered, and staffed by a library

| (1) DOMAIN | Literacy |
| (2) CONCEPT CLASS | AE |
| (3) GENUS | literacy programs |
| (4) GENUS CLASS | AE |
| (5) CONCEPT/GENUS | a type of |
| (6) eCHAR 1 | |
| (6) eCHAR 2 | |
| (6) eCHAR 3 | |
| (6) eCHAR 4 | designed by libraries
administered by libraries
staffed by libraries |
| (6) eCHAR 5 | |
| (6) eCHAR 6 | |
| (6) eCHAR 7 | |
| (7) iCHAR | usually offered in library settings |

STANDARDIZED DEFINITION:
= *literacy programs* designed, administered, and staffed by libraries, and usually offered in library settings
READING HABITS

**DESCRIPTOR:** Reading Habit

**DEFINITION 1.**
Use of reading as a regular activity

**SOURCE:** Diet. Read.

**DEFINITION 2.** A repetitive act in reading, as in continuing to read the same kind of material or in persisting in a particular way of reading.

**SOURCE:** Way of reading. Diet. Read.

**DEFINITION 3.**

**SOURCE:**

**DEFINITION 4.**

**SOURCE:**

**COMMENTS:**
1) Present, but not defined in ELIE.
2) Present, but not defined in IBE.
3) Use "Readership" (not defined) in Socio.
Restructuring definitions: examples...

<table>
<thead>
<tr>
<th>TERM/CONCEPT:</th>
<th>Reading habits</th>
</tr>
</thead>
</table>

**SOURCE DEFINITION:**

1) Use of reading as a regular activity
2) A repetitive act in reading, as in continuing to read the same kind of material or in persisting in a particular way of reading

<table>
<thead>
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<th>(1) DOMAIN</th>
<th>Literacy</th>
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<tbody>
<tr>
<td>(2) CONCEPT CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(3) GENUS</td>
<td>[habits]</td>
</tr>
<tr>
<td>(4) GENUS CLASS</td>
<td>AE</td>
</tr>
<tr>
<td>(5) CONCEPT/GENUS</td>
<td>type of</td>
</tr>
<tr>
<td>(6) eCHAR 1</td>
<td>repetitive acts or behaviour patterns in <em>reading</em>, e.g. continuing to read the same type of materials, constant use of a particular <em>reading</em> technique, etc.</td>
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<td>(6) eCHAR 2</td>
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<td>(6) eCHAR 7</td>
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<tr>
<td>(7) iCHAR</td>
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</tbody>
</table>

**STANDARDIZED DEFINITION:**

= repetitive acts or behaviour patterns in *reading*, e.g. continuing to read the same type of materials, constant use of a particular *reading* technique, etc.
FAMILY LITERACY PROGRAMS

**DEFINITION 1.** Programs which teach literacy skills simultaneously to parents and their children

**SOURCE:** CHT 1st ed.

**DEFINITION 2.** Purpose of family literacy programs has been to support parents in promoting the school achievement of their children

**SOURCE:** Alpha Ontario SF F150

**DEFINITION 3.** Help increase adult literacy levels, broader reading skills for children, and foster good reading habits for all family members.

**SOURCE:** Alpha Ontario SF F150 (School Lib. Jr.)

**DEFINITION 4.** Emphasis on families with young children (pre-school)

**SOURCE:**

**COMMENTS:**
**TERM/CONCEPT:**  
Family literacy programs

**SOURCE DEFINITION:**  
1) programs which teach literacy skills simultaneously to parents and their children  
2) purpose of family literacy programs has been to support parent in promoting the school achievement of their children  
3) help increase adult literacy levels, broaden reading skills for children, and foster good reading habits for all family members

| (1) DOMAIN | Literacy |
| (2) CONCEPT CLASS | AE |
| (3) GENUS | literacy programs |
| (4) GENUS CLASS | AE |
| (5) CONCEPT/GENUS | type of |
| (6) eCHAR 1 |  |
| (6) eCHAR 2 | to improve *parental literacy*, to broaden children’s exposure to *written language*, and to foster good *reading habits* in all family members |
| (6) eCHAR 3 |  |
| (6) eCHAR 4 |  |
| (6) eCHAR 5 | designed for and offered to parents and their young children |
| (6) eCHAR 6 |  |
| (6) eCHAR 7 |  |
| (7) iCHAR |  |

**STANDARDIZED DEFINITION:**  
= *literacy programs* designed for and offered to parents and their young children, with the objectives of improving *parental literacy*, broadening the children’s exposure to *written language*, and fostering good *reading habits* in all family members
CONTENT AREA READING

**DESCRIPTOR:** Content Area Reading

**DEFINITION 1.** Instructional materials in such subject areas as social studies, mathematics, sciences, and English.

**SOURCE:** ERIC 11th ed.

**DEFINITION 2.** Reading exercise focusing on a specific subject area such as child care, travel, mother’s health, etc.

**SOURCE:** LIT 1st ed.

**DEFINITION 3.** Textbook reading core in various content areas such as science, social studies, etc.

**SOURCE:** Duffy

**DEFINITION 4.** CONTENT READING

Reading in subject matter areas such as history, science, mathematics, etc. Usually for study purposes.

**SOURCE:** DIET. READ

**COMMENTS:**
**TERM/CONCEPT:**
Content area reading

**SOURCE DEFINITION:**
1) Reading exercises focusing on a specific subject area such as child care, travel, women’s health, etc.
2) textbook reading done in various content areas such as science, social studies, etc. usually for study purposes

<table>
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<tr>
<th>(1) DOMAIN</th>
<th>Literacy</th>
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<tbody>
<tr>
<td>(2) CONCEPT CLASS</td>
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<tr>
<td>(3) GENUS</td>
<td>reading</td>
</tr>
<tr>
<td>(4) GENUS CLASS</td>
<td>AC</td>
</tr>
<tr>
<td>(5) CONCEPT/GENUS</td>
<td>type of</td>
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<tr>
<td>(6) eCHAR 1</td>
<td></td>
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<tr>
<td>(6) eCHAR 2</td>
<td>on subject matter of common interest to learners (e.g. child care, travel, health)</td>
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<td>(6) eCHAR 3</td>
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<td>(6) eCHAR 4</td>
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<td>(6) eCHAR 7</td>
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<td>(7) iCHAR</td>
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</table>

**STANDARDIZED DEFINITION:**
= reading on subject matter of common interest to learners (e.g. child care, travel, health)
FLUENT READERS

**DESCRIPTOR:** Fluent Readers

**DEFINITION 1.** Fluency
The ability to speak, write, or perform smoothly, easily, and readily.

**SOURCE:** Dict. Read

**DEFINITION 2.** Fluency
A smooth, flowing facility of any kind. Capability of carrying out any kind of function easily and smoothly.

**SOURCE:** Conc. Ed.

**DEFINITION 3.** Fluency
Relative smoothness of constructing meaning from text. Fluent reading reflects the reader's clear understanding of the material used, the topic, the author's purpose, and the text structure, and is evidenced by correct intonation and an absence of interruption.

**SOURCE:** Duffy

**COMMENTS:**
**TERM/CONCEPT:**
Fluent readers

**SOURCE DEFINITION:**
1) Fluency: the ability to speak, write, or perform smoothly, easily and readily
2) Fluency: smoothly flowing facility of any kind
3) Reading fluency: relative smoothness of constructing meaning from text

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<tbody>
<tr>
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<tr>
<td>(3) GENUS</td>
<td>[readers] individuals</td>
</tr>
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</tr>
<tr>
<td>(5) CONCEPT/GENUS</td>
<td>subset of</td>
</tr>
<tr>
<td>(6) eCHAR 1</td>
<td>who read smoothly, easily, and readily, and who use their reading skills for maximum reading efficiency</td>
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<td>(6) eCHAR 2</td>
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<td>(6) eCHAR 7</td>
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<tr>
<td>(7) iCHAR</td>
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</tbody>
</table>

**STANDARDIZED DEFINITION:**
= individuals who read smoothly, easily, and readily, and who use their reading skills for maximum reading efficiency
LITERACY CENTRES

DESCRIPTOR: Literacy Centres

DEFINITION 1. Community Centres
Facilities at which social, educational, recreational and other activities are held for the benefit of the community.

SOURCE: Eric 12th

DEFINITION 2. Information Centres
Facilities or places that provide a variety of information services.

SOURCE: Eric 12th

DEFINITION 3. Centers
Facilities serving as a focal point for activities or services

SOURCE: Socio 3rd

DEFINITION 4.

SOURCE:

COMMENTS:
TERM/CONCEPT:
Literacy centres

SOURCE DEFINITION:
1) Centers: facilities serving as a focal point for activities or services
2) Community centres: Facilities at which social, educational, recreational, and other activities are held for the benefit of the community

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<tr>
<td>(2) CONCEPT CLASS</td>
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</tr>
<tr>
<td>(3) GENUS</td>
<td>[centres]</td>
</tr>
<tr>
<td>(4) GENUS CLASS</td>
<td>MEI</td>
</tr>
<tr>
<td>(5) CONCEPT/GENUS</td>
<td>a</td>
</tr>
<tr>
<td>(6) eCHAR 1</td>
<td>physical facilities</td>
</tr>
<tr>
<td>(6) eCHAR 2</td>
<td>at which literacy services are provided, and where literacy related activities such as literacy classes and literacy workshops take place</td>
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<td>(6) eCHAR 3</td>
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<td>(7) iCHAR</td>
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</tbody>
</table>

STANDARDIZED DEFINITION:
= physical facilities at which literacy services are provided, and where literacy related activities such as literacy classes and literacy workshops take place
COLLECTIVE WRITING

**DESCRIPTOR:** Collective Writing

**DEFINITION 1.** Collective ... adj. Involving or characterized by the united efforts of cooperative teamwork of all members of a group

**SOURCE:** WEBSTER'S UNABRIDGED

**DEFINITION 3.**

**SOURCE:**

**DEFINITION 4.**

**SOURCE:**

**COMMENTS:**
TERM/CONCEPT:
Collective writing

SOURCE DEFINITION:
1) Collective: involving or characterized by the united action or cooperative endeavour of all members of a group

| (1) DOMAIN | Literacy |
| (2) CONCEPT CLASS | AC |
| (3) GENUS | writing |
| (4) GENUS CLASS | AC |
| (5) CONCEPT/GENUS | type of |
| (6) eCHAR 1 | |
| (6) eCHAR 2 | of a text |
| (6) eCHAR 3 | with all individuals contributing ideas, vocabularies, etc. |
| (6) eCHAR 4 | by a group of individuals |
| (6) eCHAR 5 | |
| (6) eCHAR 6 | |
| (6) eCHAR 7 | |
| (7) iCHAR | |

STANDARDIZED DEFINITION:
= writing of a text by a group of individuals, with all individuals contributing ideas, vocabulary, etc.
SPONTANEOUS WRITING

**DESCRIPTOR:** SPONTANEOUS WRITING

**DEFINITION 1.** SPONTANEOUS adj.

Traced by a natural feeling or impulse, without constraint, effort or forethought.

**SOURCE:**

**DEFINITION 2.** WEBSTER'S UNABRIDGED

**SOURCE:**

**DEFINITION 3.**

**SOURCE:**

**DEFINITION 4.**

**SOURCE:**

**COMMENTS:**
TERM/CONCEPT:  
Spontaneous writing

SOURCE DEFINITION:  
1. Spontaneous: moved by a natural feeling or impulse, without constraint, effort, or forethought

<table>
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<tbody>
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<td>(2) CONCEPT CLASS</td>
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<td>writing</td>
</tr>
<tr>
<td>(4) GENUS CLASS</td>
<td>AC</td>
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<tr>
<td>(5) CONCEPT/GENUS</td>
<td>type of</td>
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<tr>
<td>(6) eCHAR 2</td>
<td></td>
</tr>
<tr>
<td>(6) eCHAR 3</td>
<td>with little or no planning and no external constraints</td>
</tr>
<tr>
<td>(6) eCHAR 4</td>
<td>which arises from a natural impulse in an individual</td>
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<td>(6) eCHAR 5</td>
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<td>(6) eCHAR 6</td>
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<td>(6) eCHAR 7</td>
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<tr>
<td>(7) iCHAR</td>
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</tbody>
</table>

STANDARDIZED DEFINITION:  
= writing which arises from a natural impulse in an individual, with little or no planning and no external constraints
APPENDIX 4
STANDARDIZED DEFINITIONS FOR THE CORE LITERACY THESAURUS

Ability = combination of natural talent and qualities, and acquired knowledge and skills that allows an individual to carry out successfully a mental or physical task with or without instruction.

Aboriginal language literacy = first language literacy skills in Aboriginal peoples.

Aboriginal literacy programs (1) = literacy programs designed for and offered to Aboriginal peoples.

Aboriginal literacy programs (2) = literacy programs designed for and offered to individuals who need/want to develop Aboriginal language literacy skills.

Active vocabulary = subset of the vocabulary of a language, made of those words and idiomatic expressions that an individual actually uses in oral and written communication.

Adolescent literacy = literacy levels and literacy skills of adolescents (between the age of 13 and 17).

Adult basic education = instructional programs and activities, designed for and offered to adults who have not completed high school, with emphasis on general communication skills, literacy skills, and social skills.

Adult basic education centres = physical facilities at which adult basic education services are provided, and where adult basic education programs and activities take place.

After school literacy programs = literacy programs designed for and offered to adolescents after regular school hours.

Assessment = process of measuring and placing a value upon an individual's ability or skills in relation to stated objectives, standards, and criteria.

Assisted reading = reading along, silently or orally, or repeating passages that are being read by someone else, either face to face or on a recording.

Assisted writing = writing with the immediate and interactive help of an instructor or tutor.

Basic literacy = ability of an individual to recognize and understand common words found in his or her immediate environment

Basic numeracy = ability of an individual to recognize and understand numbers and simple mathematical elements found in his or her immediate environment

Basic vocabulary = subset of the vocabulary of a language, made of those words and idiomatic expressions considered essential for minimal comprehension and use of this language

Beginning readers = adults who are in the process of acquiring and/or developing basic reading skills through formal or informal reading instruction

Beginning writers = adults who are in the process of acquiring and/or developing basic writing skills through formal or informal writing instruction

Bilingual instruction = instruction in two languages, usually the first language of the learners and a second, officially recognized, language

Bilingual literacy = ability of an individual to read and write in two natural languages

Bilingual literacy instruction = literacy instruction in two languages, usually the first language of the learners (2) and a second, officially recognized, language

Bilingual literacy programs = literacy programs which offer bilingual literacy instruction

Bilingual tutoring = tutoring in two languages, usually the first language of the learner and a second, officially recognized, language

Campus literacy programs = literacy programs offered on or off campus, and using university or college students as literacy facilitators, literacy instructors, or literacy tutors

Church literacy programs = literacy programs designed, administered, and staffed by churches, and usually offered in church settings

Clear writing = writing in such a way as to maximize legibility and readability, to make written information accessible to the largest possible number of readers

Close procedure = reading exercise used to evaluate reading comprehension, in which the reader is asked to insert or delete appropriate words in a text with the aid of surrounding context

Collective writing = writing of a text by a group of individuals, with all individuals contributing ideas, vocabulary, etc.

Community literacy = literacy rates in a population of individuals linked by common interests, sharing similar cultural patterns, and/or living in close proximity in a delimited geographical area (a neighbourhood in a city for example)
Community literacy groups = literacy groups formed exclusively of individuals linked by common interests, sharing similar cultural patterns, and/or living in close proximity in a delimited geographical area (a neighbourhood in a city for example)

Community literacy instruction = literacy instruction conducted in the framework of a community literacy program, with the objective of developing in members of a community the specific literacy skills which will allow them to participate fully in the life of that community

Community literacy programs = literacy programs offered by neighbourhood based agencies to the members of a community, and which address the specific cultural, social and economic concerns and needs of that community

Community literacy projects = literacy projects designed by neighbourhood based agencies and involving the participation of the members of a community, and which address the specific cultural, social and economic concerns and needs of that community

Community literacy services = literacy services set up and offered by neighbourhood based agencies to the members of a community

Community literacy tutoring = literacy tutoring undertaken in the framework of a community literacy program, with the objective of developing in members of a community the specific literacy skills which will allow them to participate fully in the life of that community

Comparative reading = reading several related texts with the purpose of identifying similarities and/or differences in style or contents

Computer assisted literacy programs = literacy programs built around extensive use of computers in literacy instruction, and in administrative functions

Computer assisted reading = method of reading instruction which makes extensive use of computers to present and explain appropriate instructional materials, and to monitor learners' responses and progress

Computer assisted writing = method of writing instruction which makes extensive use of computers to present and explain appropriate instructional materials, and to monitor learners' responses and progress

Content area reading = reading on subject matter of common interest to learners (e.g. child care, travel, health)

Content area writing = writing on subject matter of common interest to learners (e.g. child care, travel, health)

Creative writing = highly personal form of writing, which allows individuals to communicate their thoughts and feelings in an imaginative, original, sometimes poetic manner
Critical reading = reading with a questioning attitude, using logical analysis and inference to judge the value of what is read and form an opinion about it

Cursive writing = handwriting in which all or most letters are joined together within a word

Easy to read materials = reading materials characterized by a readability level which makes them accessible to beginning readers and to new readers

Emergent literacy = early stage in literacy skills acquisition and development when learners start noticing oral written language relationships and begin to express themselves in writing

English language literacy = ability of an individual to read and write in the English language

English language literacy programs = literacy programs designed for and offered to individuals who need/want to develop English language literacy skills

ESL literacy = English language literacy in an individual for whom English was not the first language learned in childhood

Experience writing = writing on subject matter directly related to one’s own life, to events in which one has participated, etc.

Expository writing = writing with the purpose of elucidating and/or explaining facts or phenomena, of clarifying ideas and principles, etc.

Expressive writing = writing with the purpose of communicating personal thoughts and opinions

Family literacy instruction = literacy instruction conducted in the framework of a family literacy program, and which caters to the specific literacy needs of each family member

Family literacy programs = literacy programs designed for and offered to parents and their young children, with the objectives of improving parental literacy, broadening the children’s exposure to written language, and fostering good reading habits in all family members

Family literacy projects = literacy projects designed for and involving the participation of parents and their young children, with the objectives of improving parental literacy, broadening the children’s exposure to written language, and fostering good reading habits in all family members

Family refrancisation = process of working together to reacquire and/or develop French language literacy skills for members of families of Francophones living outside of Québec

First language literacy = ability of an individual to read and write in the first language learned in childhood
Fluent readers = individuals who read smoothly, easily, and readily, and who use their reading skills for maximum reading efficiency.

French language literacy = ability of an individual to read and write in the French language.

French language literacy programs = literacy programs designed for and offered to individuals who need/want to develop French language literacy skills.

FSL literacy = French language literacy in an individual for whom French was not the first language learned in childhood.

Full time literacy programs = literacy programs designed for and offered to individuals available for literacy instruction on a complete and regular weekly schedule (equivalent to a work schedule), and for whom literacy instruction constitutes a main occupation.

Functional literacy = ability of an individual to read and write at the level required to cope with the demands of everyday life in his or her family, community, and workplace.

Functional numeracy = ability of an individual to use numbers and fundamental mathematical elements at the level required to cope with the demands of everyday life in his or her family, community, and workplace.

Functional reading = reading nonfiction, nonacademic materials such as train schedules, tax forms, recipes, street signs, etc., to acquire needed information or complete a task.

Functional writing = writing nonfiction, nonacademic texts such as letters, memoranda, etc., to request or provide practical information.

Genre literacy instruction = literacy instruction with an emphasis on the genres or forms of writing rather than on the processes involved in writing.

Grass roots literacy groups = non institutional literacy groups formed spontaneously in a community to deal with specific literacy needs identified by its members.

Group reading = oral reading by an ensemble of readers.

Guided reading = reading done by a learner on the recommendation of an instructor or tutor who has defined a purpose and provided context and structure to improve reading comprehension.

Handwriting (1) = production of visual symbols, letters or numbers, by hand rather than by mechanical means such as a typewriter.

Handwriting (2) = an individual's distinctive style and manner of producing by hand visual symbols, letters or numbers.
Handwriting difficulties = delays and problems experienced by a learner in the acquisition, development, and use of handwriting skills, due to physical or mental disability, or to external factors such as socioeconomic or cultural background.

Handwriting exercises = systematic sets of problems to be solved, questions to be answered, repetitive tasks to be accomplished, etc., used in an instructional environment to develop handwriting skills in learners.

Handwriting instruction = process of deliberately conveying to learners appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners in the acquisition and/or development of handwriting skills.

Handwriting skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual in handwriting.

Home instruction = instruction provided at the residence of a learner.

Illiteracy (1) = inability of an individual to read and write.

Illiteracy (2) = inability of an individual to read and write at the level required to fulfil his or her own self-determined objectives as family and community member, citizen, and worker.

Illiteracy (3) = inability of an individual to read and write at the level established as the standard in the society in which he or she lives.

Immigrant literacy programs = literacy programs designed for and offered to individuals of foreign origin who have recently settled in the country.

Independent reading = reading done by a learner without assistance or guidance from an instructor or tutor.

Informal reading inventories = nonstandardized assessment instruments, usually a graded series of passages of increasing difficulty selected from readers [texts], used to determine an individual’s reading ability.

Inhome tutoring = tutoring provided at the residence of the learner or that of the tutor.

Instruction = process of deliberately conveying to learners appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners in the acquisition and/or development of specific skills.

Instructional aids = objects or techniques used intermittently to support the instruction process, by providing supplementary information through visual and/or auditory channels, or through manipulation.
**Instructional materials** = print or nonprint documents, physical objects, etc., specially designed and/or selected and recommended to support the *instruction* process in a field or discipline, by providing essential information through visual and/or auditory channels, or through manipulation

**Instructional methods** = formal and systematic ways of presenting *instructional materials* and conducting instructional activities

**Instructional models** = descriptions of *instructional strategies* and *instructional styles* identified as most appropriate and/or efficient in given environments and situations, or with specific audiences

**Instructional skills** = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an *instructor* in the *instruction* process

**Instructional strategies** = plans of action describing appropriate *instructional methods*, *instructional materials*, etc., designed and implemented by *instructors* to achieve specific instructional objectives

**Instructional styles** = individual *instructors’* preferred methods and habitual manner of presenting *instructional materials* and communicating with *learners* in the classroom

**Instructor training** = systematic development, through formal and informal activities and experiences, of the knowledge, attitudes and *skills* necessary for an individual to qualify as an *instructor* and to assume all of an *instructor’s* responsibilities adequately and effectively

**Instructors** = formally trained individuals responsible for conveying to *learners*, through planned hands-on activities, demonstrations, and lectures, the information, attitudes, etc. that are needed to successfully acquire and/or develop specific skills

**Integrated literacy instruction** = form of *literacy instruction* which brings together into a coherent curriculum *reading skills*, *writing skills*, *spelling skills*, and *vocabulary skills*

**Integrated literacy tutoring** = form of *literacy tutoring* which brings together into a coherent curriculum *reading skills*, *writing skills*, *spelling skills*, and *vocabulary skills*

**Intergenerational literacy instruction** = *literacy instruction* conducted in the framework of an *intergenerational literacy program*, and which caters to the specific *literacy needs* of each participant

**Intergenerational literacy programs** = *literacy programs* designed for and offered to *literacy groups* formed of *learners (2)* from various age groups

**International Literacy Year 1990** = commemorative year proclaimed in 1987 by the United Nations General Assembly, and celebrated in 1990
Journal writing = spontaneous writing by learners (2), as a means of presenting their ideas without worrying about mechanics, and of maintaining an on-going written conversation with their literacy instructors or literacy tutors

Journals [learner written] = written records of learners (2)' personal feelings and reactions, read but not corrected by their literacy instructors or literacy tutors

Learner centred curriculum = sequence of subjects and instructional activities planned by an instructor, in accordance with a group of learners' previous experiences, backgrounds, interests, and specific needs

Learner centred instruction = mode of instruction which focuses on learners rather than on the subject taught, with instructional strategies established in accordance with learners' personalities, previous experiences, backgrounds, interests and specific needs

Learner centred programs = planned systematic sequences of instructional activities designed jointly by program coordinators, instructors, and learners, in accordance with the learners' previous experiences, backgrounds, interests and specific needs

Learner centred tutoring = mode of tutoring which focuses on the learner rather than on the subject taught, with tutoring strategies established in accordance with the learner's personality, previous experiences, background, interests and specific needs

Learner instructor relationships = type of communication established between a learner and his or her instructor within the instructional environment, and influence that each individual exerts upon the other

Learner opinions = personal views, beliefs, judgments and conclusions formed and expressed by a learner on any issue pertaining or not to his or her own experience

Learner produced curriculum = sequence of subjects and instructional activities planned by a group of learners, in accordance with their own previous experiences, backgrounds, interests, and specific needs

Learner produced materials = documents in various forms, physical objects, etc., designed, written, and/or published by learners (2)

Learner profiles = standardized descriptions of learners' individual characteristics, attitudes, behaviours, educational attainment, etc.

Learner support groups = set of individuals who provide constant encouragement, comfort and practical assistance to a learner (2)

Learner support services = functions, operations, facilities, products, etc., specially designed and offered to facilitate a learner's (2) active and frequent participation in formal literacy instruction
Learner tutor relationships = type of communication established between a learner and his or her tutor within the tutoring environment, and influence that each individual exerts upon the other.

Learners (1) = individuals who are engaged in acquiring new skills, attitudes or knowledge, either within a systematic sequence of formal instructional activities or from a random assortment of stimuli.

Learners (2) = individuals who are actively engaged in acquiring and/or developing literacy skills through formal literacy instruction.

Learners' committees = small groups of learners (2) appointed or elected to deal with specific issues and problems arising in the course of literacy instruction for example, on behalf of the larger group to which they belong.

Legibility = ease and efficiency with which written materials can be read and understood by intended readers, depending on such physical factors as general document formatting, selected fonts, text display, etc.

Leisure reading = reading during unscheduled periods of time for relaxation and amusement, or to satisfy personal interests unrelated to educational or vocational obligations.

Letter writing = writing personal or official messages addressed to an individual or an organization.

Letters [learner written] = personal or official messages addressed to individuals or organizations, composed by learners (2) as a writing exercise.

Library literacy programs = literacy programs designed, administered, and staffed by libraries, and usually offered in library settings.

Library literacy services = literacy services set up and offered by libraries on their premises.

Literacy (1) = ability of an individual to read and write.

Literacy (2) = ability of an individual to read and write at the level required to fulfill his or her own self-determined objectives as family and community member, citizen, and worker.

Literacy (3) = ability of an individual to read and write at the level established as the standard in the society in which he or she lives.

Literacy across the curriculum = educational movement advocating the incorporation of reading activities and writing activities into instructional strategies for all subjects and disciplines, to help learners develop, improve, and/or retain their literacy skills.

Literacy assessment = process of measuring and placing a value upon an individual's literacy skills in relation to stated objectives, standards, and criteria.
Literacy associations = special interest groups of literacy practitioners, literacy specialists, and other individuals concerned with literacy related issues, organized for consideration of, and action on, matters of interest to their members.

Literacy awards = verbal commendations or material prizes given as tokens of recognition for exceptional contributions in literacy related work.

Literacy campaigns = coordinated series of planned and connected actions and events designed and conducted to increase public awareness of, and interest for, literacy related issues, and to generate support for literacy programs and literacy services.

Literacy centres = physical facilities at which literacy services are provided, and where literacy related activities such as literacy classes and literacy workshops take place.

Literacy certificates = official documents given to learners (2) at the end of a period of formal literacy instruction, as proof of attendance and completion.

Literacy classes = formal literacy instruction offered to closed groups of registered learners (2) scheduled to meet in regular sessions with their literacy instructor for a predetermined length of time.

Literacy coalitions = temporary alliances of associations, organizations, and/or individuals concerned with literacy related issues, for cooperative action in support of literacy campaigns, literacy movements, literacy policy, etc.

Literacy collections (1) = systematically organized and accessible sets of documents in various forms which provide literacy related information.

Literacy collections (2) = systematically organized and accessible sets of easy to read materials provided by educational institutions, libraries, etc., to learners (2), beginning readers, and new readers.

Literacy committees = small groups of individuals appointed or elected to deal with literacy related issues in organizations, enterprises, institutions, etc.

Literacy consultants = literacy specialists hired on a temporary basis to provide ad hoc expertise in the design, development, implementation, and/or evaluation of literacy programs, literacy projects, etc.

Literacy coordinators = individuals responsible for bringing together into functional relationship, for most effective results, various literacy related actions, literacy movements, literacy projects, etc.

Literacy councils = groups of appointed or elected individuals who constitute advisory bodies with a degree of responsibility and power in literacy policy and decision-making.
Standardized definitions for the Core Literacy Thesaurus

Literacy development relationships = formal links or interactions between literacy rates in a society, and this society’s ability and willingness to create and maintain social, political, and economic institutions to improve the general living conditions of its members.

Literacy diplomas = official documents given to learners (2) who have successfully completed, and have satisfied all requirements of, a literacy program.

Literacy events = happenings, gatherings, etc., organized in the context of a literacy campaign to increase public awareness of, and interest for, literacy related issues, to generate support for literacy programs and literacy services, and/or to identify potential learners (2).

Literacy facilitators = literacy practitioners whose task it is to make possible and encourage productive interactions within literacy groups.

Literacy groups = small numbers of individuals who get together on a regular basis for formal or informal literacy instruction.

Literacy guides = resource documents which outline the objectives and expected learning outcomes of formal literacy instruction.

Literacy health relationships (1) = formal links or interactions between literacy levels in individuals and their general health condition.

Literacy health relationships (2) = formal links or interactions between literacy rates in a society and the general health condition of its members.

Literacy income relationships = formal links or interactions between literacy levels in individuals and their earnings, actual and potential.

Literacy instruction = process of deliberately conveying to learners (2) appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners (2) in the acquisition and/or development of literacy skills.

Literacy instructors = specially trained instructors responsible for helping groups of learners (2) acquire and/or develop basic literacy skills, in the context of formal literacy instruction.

Literacy job relationships = formal links or interactions between literacy levels in individuals and their employment status and potential.

Literacy levels = quantifiable individual standards of achievement in reading and writing, established on the basis of performance in completion of tasks with predetermined literacy requirements.

Literacy manuals = resource documents which provide practical information on literacy related issues, along with literacy programming and literacy instruction strategies, and listings of literacy resources.
Literacy materials = instructional materials used in/for literacy instruction

Literacy methods = instructional methods considered appropriate and recommended for use in literacy instruction

Literacy models = descriptions of literacy strategies, literacy programs, and literacy projects identified as most appropriate and/or efficient in given environments and situations, or with specific audiences

Literacy movement = collective action in support of the right to literacy, originating spontaneously in the context of some form of perceived injustice

Literacy needs = disjuncture between an individual’s own literacy skills and literacy requirements attached to specific tasks, or literacy standards in the society in which he or she lives

Literacy networks = sets of formal and informal connections and communication channels through which literacy associations, literacy organizations, etc. exchange information and coordinate their activities

Literacy organizations = formally structured groups of individuals concerned with literacy related issues, set-up with a body of officers and a set of regulations for the purpose of creating and providing literacy services

Literacy partnerships = formal associations of corporate and/or individual parties for permanent or ad hoc provision of literacy services, the effectiveness and success of which depend on precise definition of joint and respective rights and responsibilities and on close cooperation of all parties involved

Literacy philosophy = system of motivating beliefs, ideologies, and principles of conduct which underlies, supports and/or justifies the work of literacy organizations, literacy practitioners, etc.

Literacy policy = set of governing principles which serve as guidelines or rules for decision-making and official action in literacy programming, literacy promotion, etc.

Literacy poverty relationships (1) = formal links or interactions between literacy levels in individuals and their economic situation and status

Literacy poverty relationships (2) = formal links or interactions between literacy rates in a society and the average general economic conditions and status of its members

Literacy practitioners = literacy workers who are directly involved with learners (2) as literacy facilitators, literacy instructors, or literacy tutors

Literacy primers [texts] = introductory textbooks which provide elements of literacy philosophy, literacy theory, and literacy methods to literacy workers and to any other individual concerned with literacy related issues
Literacy productivity relationships = formal links or interactions between literacy rates in a society and this society's capacity to effectively grow, make, market, and distribute economically valuable goods and services.

Literacy programming = process of designing, implementing, evaluating, and accounting for one or more literacy programs.

Literacy programs = planned systematic sequences of instructional activities directed towards the acquisition and/or development of literacy skills, designed for and offered to individuals who are beyond mandatory schooling age.

Literacy projects = special assignments or tasks given to individuals or to groups of learners (2), with the objective of inspiring positive attitudes towards literacy while developing specific literacy skills, and involving discrete phases of research, data and information collection, discussions, problem-solving and reporting.

Literacy promotion = process of planning and conducting consciousness raising actions, events, etc., with the specific objective of furthering the cause of literacy.

Literacy rates = actual numbers and/or proportion of individuals who perform at each literacy level in a given population.

Literacy reports = formal and official documents which provide general information on literacy and/or literacy statistics, discuss matters of literacy policy, etc.

Literacy requirements = sets of literacy skills considered appropriate and necessary for successful completion of a specific task.

Literacy research = systematic investigation, collection, and analysis of relevant data, to document problems, test hypotheses, and advance general and specialized knowledge about literacy.

Literacy resource centres = physical facilities where literacy materials are housed and are made available to learners (2) and literacy workers.

Literacy resources = facilities, equipment, materials, funds, and personnel available to supply and/or support literacy programs and literacy services.

Literacy retention = process of committing to memory and integrating to one's knowledge structure what is learned during formal or informal literacy instruction, so as to be able to recall and apply literacy skills when they are needed at a later time.

Literacy services = specially designed functions, operations, facilities, products, etc., provided to facilitate and support the acquisition and/or development of literacy skills in a given population.
Literacy skills = integrated set of reading skills, vocabulary skills, and writing skills possessed by an individual

Literacy specialists = individuals who have extensive theoretical and practical knowledge of issues pertaining to literacy assessment, literacy instruction, literacy programming, etc.

Literacy standards = sets of individual literacy skills considered by authority, custom or general consensus as appropriate and necessary to participate fully in the life of a given society, and on the basis of which literacy levels and literacy rates are measured

Literacy statistics = numerical data relating to literacy levels, literacy rates, etc.

Literacy strategies = plans of action describing appropriate literacy methods, literacy materials, etc., designed and implemented by literacy practitioners to achieve specific literacy instruction objectives

Literacy surveys = means for collecting descriptive and/or numerical data relating to literacy levels, literacy rates, etc., in a given environment and at a specific point in time

Literacy tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual's literacy skills, at a specific point in time

Literacy theory = body of generally accepted knowledge, principles and rules, which supports literacy methods, literacy models, and literacy strategies

Literacy tutoring = literacy instruction provided to a learner (2) on a one-on-one basis by an individual with appropriate training or experience

Literacy tutors = specially trained tutors responsible for helping learners (2) acquire and/or develop basic literacy skills, in the context of formal literacy tutoring

Literacy workers = all individuals actively involved in literacy instruction, literacy programming, and/or literacy research

Literacy workshops = instructional activities of short duration, designed for and involving the active participation of individuals with common interests in literacy, which provide them with an opportunity to exchange information, develop solutions to common problems, and/or learn new techniques from literacy specialists

Literates (1) = individuals who have acquired, and who retain the ability to use, literacy skills

Literates (2) = individuals who have acquired, and who retain the ability to use, literacy skills, at the level required to fulfill their own self-determined objectives as family and community members, citizens, and workers

Literates (3) = individuals who have acquired, and who retain the ability to use, literacy skills, at the level established as the standard in the society in which they live
Local literacy associations = literacy associations with a range of action and influence extending to a municipality (a town for example)

Local literacy campaigns = literacy campaigns coordinated by local authorities, and conducted in a municipality (a town for example)

Local literacy councils = literacy councils with a range of action and influence extending to a municipality (a town for example)

Local literacy organizations = literacy organizations operating in a municipality (a town for example)

Local literacy programs = publicly or privately funded literacy programs offered to residents of a municipality (a town for example)

Mass literacy campaigns = large scale literacy campaigns which do not target any specific group or community

Memo writing = writing brief, informal, business-oriented messages, to request or to provide practical information, such as directions or specific instructions

Multilingual literacy = ability of an individual to read and write in three or more natural languages

Multilingual literacy instruction = literacy instruction in three languages or more, including usually the first language of the learners (2)

National literacy associations = literacy associations with a range of action and influence extending to a country

National literacy campaigns = literacy campaigns coordinated by national authorities, and conducted on a country-wide level

National literacy councils = literacy councils with a range of action and influence extending to a country

National literacy organizations = literacy organizations operating on a country-wide level

National literacy programs = publicly or privately funded literacy programs offered to residents of a country

New readers = adults who have recently acquired basic literacy skills

New writers = adults who have recently acquired basic writing skills

Nonreaders = adults who do not have the ability to read
Nonwriters = adults who do not have the ability to write

Numeracy (1) = ability of an individual to understand and use numbers and fundamental mathematical elements

Numeracy (2) = ability of an individual to understand and use numbers and fundamental mathematical elements at the level required to fulfil his or her own self-determined objectives as family and community member, citizen, and worker

Numeracy (3) = ability of an individual to understand and use numbers and fundamental mathematical elements at the level established as the standard in the society in which he or she lives

Numeracy assessment = process of measuring and placing a value upon an individual’s numerical ability and/or numeracy skills in relation to stated objectives, standards, and criteria

Numeracy classes = formal numeracy instruction offered to closed groups of registered learners (2) scheduled to meet in regular sessions with their numeracy instructor for a predetermined length of time

Numeracy instruction = process of deliberately conveying to learners (2) appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners (2) in the acquisition and/or development of numeracy skills

Numeracy instructors = specially trained instructors responsible for helping groups of learners (2) acquire and/or develop basic numeracy skills, in the context of formal numeracy instruction

Numeracy materials = instructional materials used in/for numeracy instruction

Numeracy programs = planned systematic sequences of instructional activities directed towards the acquisition and/or development of numeracy skills, designed for and offered to individuals who are beyond mandatory schooling age

Numeracy skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual when manipulating numbers and fundamental mathematical elements

Numeracy tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual’s numerical ability and numeracy skills, at a specific point in time

Numeracy tutoring = numeracy instruction provided to a learner (2) on a one-on-one basis by an individual with appropriate training or experience

Numeracy tutors = specially trained tutors responsible for helping learners (2) acquire and/or develop basic numeracy skills, in the context of formal numeracy tutoring
Numerates (1) = individuals who have acquired, and who retain the ability to use, numeracy skills

Numerates (2) = individuals who have acquired, and who retain the ability to use, numeracy skills, at the level required to fulfil their own self-determined objectives as family and community members, citizens, and workers

Numerates (3) = individuals who have acquired, and who retain the ability to use, numeracy skills, at the level established as the standard in the society in which they live

Numerical ability = combination of natural talent and qualities, and acquired knowledge and skills, that allows an individual to manipulate numbers and fundamental mathematical elements efficiently and with comprehension

Oral reading = reading in which visual scanning of the text is accompanied by simultaneous distinctly audible vocal utterance of every word

Oral vocabulary = subset of the vocabulary of a language, made of those words and idiomatic expressions that an individual uses ordinarily for meaningful oral communication

Oral written language relationships = formal links and interactions between the oral and the written forms of a natural language in its use by an individual or by a group of speakers

Oral written language variation = set of structural and functional differences which exist between the oral and the written forms of a natural language

Outreach literacy programs = literacy programs offered in underserved areas, in locations and facilities which are convenient to the target population and make it possible for potential learners (2) to enroll and participate

Paced reading = guided reading or independent reading at a rate established in accordance with the reader's own reading ability rather than on the basis of external standards or expectations

Paired reading = for a learner, the act of reading alone when able, and with the temporary help of a tutor when experiencing difficulties

Parental literacy = literacy levels in parents of young children

Part time literacy programs = literacy programs designed for and offered to individuals available for literacy instruction for short periods at a time (e.g. a few hours), on a regular or irregular basis

Passive vocabulary = subset of the vocabulary of a language, made of those words and idiomatic expressions that an individual recognizes and understands when they are heard or read

Peer instruction = instruction provided to fellow learners by a more advanced colleague who has received minimal training and works under an instructor's supervision
Peer tutoring = tutoring of fellow learners by a more advanced colleague who has received minimal training and works under an instructor's supervision

Poems [learner written] = imaginative texts in metrical form, composed by learners (2) as a writing exercise

Postliteracy assessment = process of measuring and placing a value upon an individual’s literacy skills following a period of formal literacy instruction

Postliteracy employment = employment status and potential of an individual following a period of formal literacy instruction and the acquisition and/or development of literacy skills

Postliteracy programs = programs designed for and offered to new readers, with the objective of increasing and improving literacy retention

Preliteracy assessment = process of measuring and placing a value upon an individual’s literacy skills prior to a period of formal literacy instruction

Preliteracy programs = programs designed for and offered to future learners (2), with the objective of developing the motivation and basic skills upon which depends the success of literacy instruction

Prereading = process of preparing for reading activities by eliciting prior knowledge, establishing purposes, and focusing attention

Preventive literacy programs = literacy programs designed for and offered to parents and their young children, with the objective of reducing the risk for the children of encountering in the future significant difficulties in the acquisition, development, and use of literacy skills

Prewriting = process of preparing for writing activities by eliciting prior knowledge, establishing purposes, focusing attention, gathering and organizing information, and outlining the composition

Print culture = culture based on knowledge and use of written language

Prison literacy programs = literacy programs offered to inmates in correctional institutions

Process writing = writing using a linear sequence of discrete tasks: prewriting, drafting, revising, editing, publishing

Programmed reading = approach to reading instruction which allows learners to progress at an individual rate, using specially designed instructional materials to present new knowledge in discrete steps, test learning at each step, and provide immediate feedback on progress

Programs = planned systematic sequences of activities, events, courses, procedures, etc., directed toward specific objectives and desirable outcomes
Projects = special assignments or tasks given to individuals or to groups of learners with the objective of developing specific attitudes and/or skills, and involving discrete phases of research, data and information collection, discussions, problem-solving, and reporting

Provincial literacy associations = literacy associations with a range of action and influence extending to a province

Provincial literacy campaigns = literacy campaigns coordinated by provincial authorities, and conducted on a province-wide level

Provincial literacy councils = literacy councils with a range of action and influence extending to a province

Provincial literacy organizations = literacy organizations operating on a province-wide level

Provincial literacy programs = publicly or privately funded literacy programs offered to residents of a province

Pseudo literacy = apparent ability of an individual to read and write at a higher level than that which corresponds to his or her actual literacy skills

Read alongs = reading materials which provide readers with the same text in print form and recorded on a sound cassette

Readability = ease and interest with which written materials can be read and understood by intended readers, depending on general writing style, familiarity of the vocabulary, length of words and sentences, balance between abstract and concrete ideas and examples, etc.

Readability formulas = mathematically derived methods for evaluating the readability of a text on the basis of word length and frequency, sentence length and structure, etc.

Readers = individuals who have acquired, and who retain the ability to use, reading skills

Readers [texts] = textbooks designed to present and explain the principles, rules, and techniques of reading to learners, in the successive grades of reading instruction

Reading = integrated process of decoding written language, reconstructing the meaning of a written passage by analysis and/or interpretation, and incorporating new information to one's existing knowledge structure in accordance with individual purposes and needs

Reading ability = combination of natural talent and qualities, and acquired knowledge and skills, that allows an individual to read efficiently and with comprehension

Reading across the curriculum = educational movement advocating the incorporation of reading activities into instructional strategies for all subjects and disciplines, to help learners develop, improve, and/or retain their reading skills
Reading activities = in reading instruction, tasks or pursuits which require the application of reading skills, with the specific objective of increasing and/or improving these skills.

Reading anxiety = unpleasant feeling of apprehension and helplessness experienced by an individual in anticipation of, and/or during reading activities and reading exercises.

Reading assessment = process of measuring and placing a value upon an individual’s reading ability and/or reading skills in relation to stated objectives, standards, and criteria.

Reading comprehension = extent to which a reader can reconstruct the intended message of a text by translating lexical and grammatical information into meaning units for integration to his or her own knowledge structure.

Reading difficulties = delays and problems experienced by an individual in the acquisition, development, and use of reading skills, due to physical or mental disability, or to external factors such as socioeconomic or cultural background.

Reading disabilities = disorders due to identifiable neurological dysfunctions which interfere with the process of reading, and may lead to an inability to apply reading skills in spite of intensive reading instruction.

Reading efficiency = ability of a reader to reach his or her own reading objectives without waste of time and effort.

Reading enjoyment = pleasant feeling of satisfaction and happiness experienced by an individual in anticipation of, during, and/or following reading activities.

Reading exercises = systematic sets of problems to be solved, questions to be answered, repetitive tasks to be accomplished, etc., used in an instructional environment to develop reading skills in learners.

Reading games = reading activities specially designed to develop reading skills in an entertaining, rather than in an obviously didactic, fashion.

Reading habits = repetitive acts or behaviour patterns in reading, e.g. continuing to read the same type of materials, constant use of a particular reading technique, etc.

Reading instruction = process of deliberately conveying to learners appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners in the acquisition and/or development of reading skills.

Reading levels = quantifiable individual standards of achievement in reading within a specific curriculum and assessment system.

Reading materials = written texts and documents meant to be read for a purpose or at leisure.
Reading methods = instructional methods considered appropriate and recommended for use in reading instruction

Reading programs = planned systematic sequences of reading activities directed towards the acquisition and/or development of reading skills, based on the use of preselected appropriate reading materials

Reading progress = significant increase and improvement in an individual's ability to participate in reading activities, complete reading exercises, and perform well in reading tests

Reading rate = measure of the speed at which an individual can read with comprehension, normally expressed in number of words per minute

Reading readiness = stage of an individual's development at which interests and cognitive, perceptual, and motor abilities have matured sufficiently to make it possible for him or her to successfully acquire, develop, and use reading skills

Reading research = systematic investigation, collection, and analysis of relevant data, to document problems, test hypotheses, and advance general and specialized knowledge about reading

Reading skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual in reading

Reading tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual's reading ability and/or reading skills, at a specific point in time

Reading themes = topics suggested by instructors and/or learners for reading activities, reading exercises, or reading programs

Reading workshops = instructional activities of short duration, designed for and involving the active participation of individuals with common interests in the reading process, which provide them with an opportunity to exchange information, develop solutions to common problems, and/or learn new techniques from reading specialists

Reading writing relationships = formal links or interactions between the reading and the writing processes, between reading skills and writing skills, and between an individual's reading ability and writing ability

Refrancisation = process of reacquiring and/or developing French language literacy skills among Francophones living outside of Québec

Refrancisation classes = literacy classes for Francophones living outside of Québec who wish to reacquire and/or develop French language literacy skills
Refrancisation needs = disjuncture between a Francophone living outside of Québec’s French language literacy skills and French language literacy requirements attached to specific tasks, or literacy standards in a French speaking society

Refrancisation programs = literacy programs designed for and offered to Francophones living outside of Québec who wish to reacquire and/or develop French language literacy skills

Refrancisation projects = literacy projects designed for and involving the participation of Francophones living outside of Québec who wish to reacquire and/or develop French language literacy skills

Regional literacy associations = literacy associations with a range of action and influence extending to an administrative region

Regional literacy campaigns = literacy campaigns coordinated by regional authorities, and conducted in an administrative region

Regional literacy councils = literacy councils with a range of action and influence extending to an administrative region

Regional literacy organizations = literacy organizations operating in an administrative region

Regional literacy programs = publicly or privately funded literacy programs offered to residents of an administrative region

Remedial reading = specialized reading instruction which aims at correcting faulty reading habits or improving reading skills in learners whose reading ability is below average in their peer group

Report writing = writing a formal text to provide information on a plan of action, an event, an ongoing project, etc., or to present results obtained in an experiment or an investigation

Rereading = act of looking again at a short passage of text which has just been read to clarify and/or ascertain meaning

Right to literacy = natural and just claim of all individuals to equal access to literacy instruction and comparable opportunities in acquiring, developing, and using literacy skills

Rural literacy programs = literacy programs designed for and offered to individuals living in sparsely populated areas, who do not have access to literacy services available in large cities

School literacy = literacy skills acquired and developed during the mandatory schooling period of an individual

Script = handwriting in which all or most letters are drawn separately and are not joined together within a word
Second language literacy = ability of an individual to read and write in a natural language which is not the first language learned in childhood.

Shared reading = for a learner, the act of reading with the constant interactive help of a better reader, with the aim of improving the former's reading skills.

Short stories [learner written] = brief fictional prose narratives, with unified plot and setting, composed by learners (2) as a writing exercise.

Sight reading = reading based on word recognition and comprehension, without previous study of the text or conscious recourse to word analysis.

Silent reading = reading without distinctly audible vocal utterance of every word.

Skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon in the execution of learned mental or physical tasks.

Special needs learners = learners who are experiencing difficulties due to cognitive or physical disabilities, or to psychological or emotional conditions.

Spelling = process of recalling and writing visual symbols, letters, etc., in their proper sequence, to form words.

Spelling assessment = process of measuring and placing a value upon an individual's ability to spell in relation to stated objectives, standards, and criteria.

Spelling exercises = systematic sets of problems to be solved, questions to be answered, repetitive tasks to be accomplished, etc., used in an instructional environment to develop spelling skills in learners.

Spelling instruction = process of deliberately conveying to learners appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners in the acquisition and/or development of spelling skills.

Spelling tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual's ability to spell, at a specific point in time.

Spontaneous writing = writing which arises from a natural impulse in an individual, with little or no planning and no external constraints.

Stories [learner written] = fictional prose narratives, with unified plot and setting, composed by learners (2) as a writing exercise.

Technical reading = reading business-oriented, engineering, and scientific texts.
Technical vocabulary = subset of the vocabulary of a language, made of those words and idiomatic expressions that have acquired a specialized and distinct meaning in a specific field of study or practice

Technical writing = writing for business, engineering, or scientific communication purposes

Tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual's knowledge, ability, skills, etc., at a specific point in time

Tutor training = systematic development, through formal and informal activities and experiences, of the knowledge, attitudes, and skills necessary for an individual to qualify as a tutor and to assume all of a tutor's responsibilities adequately and effectively

Tutoring = specialized instruction provided to a learner on a one-on-one basis by an individual with appropriate training or experience

Tutoring aids = objects or techniques used intermittently to support the tutoring process, by providing supplementary information through visual and/or auditory channels, or through manipulation

Tutoring materials = print or nonprint documents, physical objects, etc., specially designed and/or selected and recommended to support the tutoring process in a field or discipline, by providing essential information through visual and/or auditory channels, or through manipulation

Tutoring methods = formal and systematic ways of presenting tutoring materials and conducting tutoring activities

Tutoring models = descriptions of tutoring strategies and tutoring styles identified as most appropriate and/or efficient in given environments and situations, or with specific audiences

Tutoring skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by a tutor in the tutoring process

Tutoring strategies = plans of action describing appropriate tutoring methods, tutoring materials, etc., designed and implemented by tutors to achieve specific tutoring objectives

Tutoring styles = individual tutors' preferred methods and habitual manner of presenting tutoring materials and communicating with learners

Tutors = formally trained individuals who provide specialized instruction to learners on a one-on-one basis

Universal literacy = ideal of equal access to literacy instruction and comparable opportunities for acquiring, developing, and using literacy skills for all individuals, regardless of race, colour, age, sex, citizenship, place of residence, socioeconomic status, and ability
Urban literacy programs = literacy programs designed for and offered to individuals living in heavily populated and industrialized areas

Vocabulary = complete stock of words and idiomatic expressions available to the speakers of a natural language

Vocabulary development = process of acquiring an understanding of, and the individual ability to use, new words and idiomatic expressions in a natural language

Vocabulary exercises = systematic sets of problems to be solved, questions to be answered, repetitive tasks to be accomplished, etc., used in an instructional environment to develop vocabulary skills in learners

Vocabulary games = vocabulary exercises specially designed to develop vocabulary skills in an entertaining, rather than in an obviously didactic, fashion

Vocabulary skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual in his or her use of the vocabulary of a language for oral or written communication

Women's literacy materials = literacy materials designed for women of all ages and backgrounds, and which deal with issues of special interest to them

Women's literacy programs = literacy programs designed for and offered to women of all ages and backgrounds

Word attack skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual when decoding and elucidating the meaning of new and unfamiliar words

Word recognition = quick and easy identification by a reader of the pronunciation and usual meaning of a word previously met in its written form

Workplace literacy = ability of an individual to read, write and use technical vocabulary at the level required to execute work related tasks in his or her occupation

Workplace literacy instruction = literacy instruction provided to the workers of an enterprise at their worksite

Workplace literacy programs = literacy programs designed for and offered to the workers of an enterprise

Workplace numeracy = ability of an individual to understand and use numbers and fundamental mathematical elements at the level required to execute work related tasks in his or her occupation
**Workplace reading** = *reading* work related texts, at the worksite, to acquire needed information or complete a task

**Workplace writing** = *writing* work related texts, at the worksite, to request or communicate practical information, complete a task, etc.

**World literacy day** = commemorative day established in 1966, and celebrated annually on September 8

**Writers** = individuals who have acquired, and who retain the *ability* to use, *writing skills*

**Writing** = integrated process of organizing thoughts and ideas, and expressing them through *written language* for aesthetic or functional communication purposes

**Writing ability** = combination of natural talent and qualities, and acquired knowledge and *skills*, that allows an individual to write efficiently and appropriately

**Writing across the curriculum** = educational movement advocating the incorporation of *writing activities* into *instructional strategies* for all subjects and disciplines, to help *learners* develop, improve, and/or retain their *writing skills*

**Writing activities** = in *writing instruction*, tasks or pursuits which require the application of *writing skills*, with the specific objective of increasing and/or improving these skills

**Writing anxiety** = unpleasant feeling of apprehension and helplessness experienced by an individual in anticipation of, and/or during *writing activities* and *writing exercises*

**Writing assessment** = process of measuring and placing a value upon an individual’s *writing ability* and/or *writing skills* in relation to stated objectives, standards, and criteria

**Writing difficulties** = delays and problems experienced by an individual in the acquisition, development, and use of *writing skills*, due to physical or mental disability, or to external factors such as socioeconomic or cultural background

**Writing disabilities** = disorders due to identifiable neurological dysfunctions which interfere with the process of *writing*, and may lead to an inability to apply *writing skills* in spite of intensive *writing instruction*

**Writing exercises** = systematic sets of problems to be solved, questions to be answered, repetitive tasks to be accomplished, etc., used in an instructional environment to develop *writing skills* in *learners*

**Writing games** = *writing activities* specially designed to develop *writing skills* in an entertaining, rather than in an obviously didactic, fashion
Writing instruction = process of deliberately conveying to learners appropriate information, attitudes, etc., through planned hands-on activities, demonstrations, and lectures, intended to result for the learners in the acquisition and/or development of writing skills

Writing levels = quantifiable individual standards of achievement in writing within a specific curriculum and assessment system

Writing methods = instructional methods considered appropriate and recommended for use in writing instruction

Writing models = descriptions of styles, text structures, language levels, etc., identified as most appropriate and/or efficient in given environments and situations, and for specific types of writing

Writing progress = significant increase and improvement in an individual's ability to participate in writing activities, complete writing exercises, and perform well in writing tests

Writing research = systematic investigation, collection, and analysis of relevant data, to document problems, test hypotheses, and advance general and specialized knowledge about writing

Writing skills = complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual in writing

Writing tests = techniques, procedures, sets of questions, problems or exercises, used to assess an individual's writing ability and/or writing skills, at a specific point in time

Writing themes = topics suggested by instructors and/or developed by learners for writing activities and writing exercises

Writing workshops = instructional activities of short duration, designed for and involving the active participation of individuals with common interests in the writing process, which provide them with an opportunity to exchange information, develop solutions to common problems, and/or learn new techniques from writing specialists

Written communication = process of transmitting or exchanging ideas, instructions, information, etc. through written language

Written language = system of conventional standardized graphic signs and symbols, with rules for their use to convey meaning
APPENDIX 5
THE CORE LITERACY THESAURUS
TEST VERSION C (CONTROL)

Note: In the original version of this document, page numbers (1-41) appeared at the bottom of each page. The original page numbers have been taken out to avoid confusion.
CORE LITERACY THESAURUS
TEST VERSION C

PARTICIPANT ID: C-1
SAMPLE TERM RECORDS

1) Non-descriptor record:

Adult literacy programs  ⇒  Non-descriptor: cannot be used as index term.

USE LITERACY PROGRAMS  ⇒  Reference to valid descriptor(s) which can/must be used to represent the concept.

2) Descriptor record:

LITERACY PROGRAMS (220)  ⇒  Subject descriptor (descriptor's record number). Appears in upper-case letters, and in boldface.

CL Planning, programming and evaluation  ⇒  Term class.

SN Use only for a general discussion of several types of literacy programs; if possible, use a more specific term (Family literacy programs, etc.)  ⇒  Scope note: gives precise directions for the use of the descriptor.

UF Adult literacy programs  ⇒  Synonymous term or expression: other concepts/subjects which are expressed by the descriptor, in the framework of the thesaurus. Cannot be used as index terms.

BT PROGRAMS  ⇒  Broader term: other valid index term more general in meaning than the descriptor, in the framework of the thesaurus

NT COMMUNITY LITERACY PROGRAMS  ⇒  FAMILY LITERACY PROGRAMS
LIBRARY LITERACY PROGRAMS
URBAN LITERACY PROGRAMS ⇒  Narrower terms: other valid index terms more restricted in meaning than the descriptor, in the framework of the thesaurus

RT LITERACY INSTRUCTION
NUMERACY PROGRAMS
POSTLITERACY PROGRAMS  ⇒  Related terms: other valid index terms with which the descriptor is associated, in the framework of the thesaurus
### ABE

USE ADULT BASIC EDUCATION

### ABILITY (1529)

- **CL**: Cognitive and learning processes
- **SN**: Use only for a general discussion of the concept or of several types of abilities; if possible use a specific term (Reading ability, etc.)
- **UF**: Aptitude
- **NT**: NUMERICAL ABILITY
  - READING ABILITY
  - WRITING ABILITY
- **RT**: SKILLS

Able readers

USE FLUENT READERS

### ABORIGINAL LANGUAGE LITERACY (719)

- **CL**: Literacy, numeracy, and adult basic ed.
- **UF**: Native language literacy
- **BT**: LITERACY
- **RT**: FIRST LANGUAGE LITERACY

### ABORIGINAL LITERACY PROGRAMS (184)

- **CL**: Planning, programming and evaluation
- **UF**: Native literacy programs
- **BT**: LITERACY PROGRAMS

### ACTIVE VOCABULARY (30)

- **CL**: Language and communication skills
- **BT**: VOCABULARY
- **RT**: PASSIVE VOCABULARY

### ADOLESCENT LITERACY (720)

- **CL**: Literacy, numeracy, and adult basic ed.
- **UF**: Youth literacy
- **BT**: LITERACY

### ADULT BASIC EDUCATION (263)

- **CL**: Literacy, numeracy, and adult basic ed.
- **UF**: ABE
  - Basic education
  - Fundamental education
- **RT**: ADULT BASIC EDUCATION CENTRES
  - LITERACY

### ADULT BASIC EDUCATION CENTRES (3485)

- **CL**: Education: philosophy, system, and facilities
- **UF**: Basic education centres
- **RT**: ADULT BASIC EDUCATION
  - LITERACY CENTRES

Adult basic literacy

USE BASIC LITERACY

Adult learners

USE LEARNERS

Adult literacy

USE LITERACY

Adult literacy programs

USE LITERACY PROGRAMS

Adult new readers

USE NEW READERS

Adult new writers

USE NEW WRITERS

Adult nonreaders

USE NONREADERS
Adult nonwriters
USE NONWRITERS

Adult numeracy
USE NUMERACY

Adult students
USE LEARNERS

AFTER SCHOOL LITERACY PROGRAMS (589)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY PROGRAMS

Aptitude
USE ABILITY

ASSESSMENT (373)
CL Planning, programming and evaluation
SN Use only for a general discussion of the concept or of several types of assessment; if possible use a specific term (Literacy assessment, etc.)
UF Evaluation
Learner assessment
Rating
Student assessment
NT LITERACY ASSESSMENT
NUMERACY ASSESSMENT
POSTLITERACY ASSESSMENT
PRELITERACY ASSESSMENT
READING ASSESSMENT
SPELLING ASSESSMENT
WRITING ASSESSMENT
RT TESTS

ASSISTED READING (1270)
CL Instructional materials and methodologies
UF Duet reading
Echo reading
Reading with support
BT READING
NT COMPUTER ASSISTED READING
RT PAIRED READING
SHARED READING

ASSISTED WRITING (1271)
CL Instructional materials and methodologies
BT WRITING
NT COMPUTER ASSISTED WRITING

BASAL READERS [TEXTS] (1322)
CL Instructional materials and methodologies
BT READERS [TEXTS]

Basic education
USE ADULT BASIC EDUCATION

Basic education centres
USE ADULT BASIC EDUCATION CENTRES

BASIC LITERACY (723)
CL Literacy, numeracy, and adult basic ed.
UF Adult basic literacy
Core literacy
Fundamental literacy
BT LITERACY
RT FUNCTIONAL LITERACY

BASIC NUMERACY (724)
CL Literacy, numeracy, and adult basic ed.
UF Fundamental numeracy
BT NUMERACY
RT FUNCTIONAL NUMERACY

BASIC VOCABULARY (806)
CL Language and communication skills
BT VOCABULARY

BEGINNING READERS (1016)
CL People
BT READERS
RT NEW READERS
<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<td>People new writers</td>
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<td>Instructional materials and methodologies instruction</td>
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<td>Planning, programming and evaluation literacy programs</td>
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<td>Instructional materials and methodologies reading comprehension reading exercises reading tests</td>
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<td>Coaching</td>
<td>Use tutoring</td>
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<tr>
<td>Business writing</td>
<td>Use technical writing</td>
</tr>
</tbody>
</table>
Community based literacy programs
USE COMMUNITY LITERACY PROGRAMS

COMMUNITY LITERACY (1136)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY

COMMUNITY LITERACY GROUPS (200)
CL People
BT LITERACY GROUPS
RT GRASS ROOTS LITERACY GROUPS

COMMUNITY LITERACY INSTRUCTION (3648)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY INSTRUCTION
RT COMMUNITY LITERACY PROGRAMS

COMMUNITY LITERACY PROGRAMS (194)
CL Planning, programming and evaluation
UF Community based literacy programs
Community operated literacy programs
Neighbourhood literacy programs
BT LITERACY PROGRAMS
RT COMMUNITY LITERACY INSTRUCTION
LOCAL LITERACY PROGRAMS
OUTREACH LITERACY PROGRAMS

COMMUNITY LITERACY PROJECTS (195)
CL Planning, programming and evaluation
BT LITERACY PROJECTS

COMMUNITY LITERACY SERVICES (1068)
CL Planning, programming and evaluation
BT LITERACY SERVICES

COMMUNITY LITERACY TUTORING (1166)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY TUTORING

Community operated literacy programs
USE COMMUNITY LITERACY PROGRAMS

COMPARATIVE READING (1273)
CL Instructional materials and methodologies
BT READING

Competency
USE SKILLS

Composition
USE WRITING

Computation skills
USE NUMERACY SKILLS

Computation tests
USE NUMERACY TESTS

COMPUTER ASSISTED LITERACY PROGRAMS (1133)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS

COMPUTER ASSISTED READING (1246)
CL Instructional materials and methodologies
BT ASSISTED READING
RT PROGRAMMED READING

COMPUTER ASSISTED WRITING (1274)
CL Instructional materials and methodologies
BT ASSISTED WRITING

CONTENT AREA READING (101)
CL Instructional materials and methodologies
UF Reading in content areas
BT READING
CONTENT AREA WRITING (137)
  CL Instructional materials and methodologies
  UF Writing in content areas
  BT WRITING

Core literacy
  USE BASIC LITERACY

CREATIVE WRITING (1275)
  CL Instructional materials and methodologies
  BT WRITING
  RT POEMS [LEARNER WRITTEN]
       STORIES [LEARNER WRITTEN]

CRITICAL READING (1276)
  CL Instructional materials and methodologies
  BT READING

CURSIVE WRITING (1277)
  CL Language and communication skills
  BT HANDWRITING

Development literacy relationships
  USE LITERACY DEVELOPMENT
       RELATIONSHIPS

Developmental reading
  USE REMEDIAL READING

Dialog journal writing
  USE JOURNAL WRITING

Diaries [learner written]
  USE JOURNALS [LEARNER WRITTEN]

Directed reading
  USE GUIDED READING

Dual curriculum
  USE FAMILY LITERACY PROGRAMS

Duet reading
  USE ASSISTED READING

Dysgraphia
  USE WRITING DISABILITIES

Dyslexia
  USE READING DISABILITIES

EASY TO READ MATERIALS (915)
  CL Instructional materials and methodologies
  UF Simplified materials
  BT READING MATERIALS
  RT CLEAR WRITING
       READABILITY

Echo reading
  USE ASSISTED READING

EMERGENT LITERACY (726)
  CL Literacy, numeracy, and adult basic ed.
  BT LITERACY

Employable literacy
  USE WORKPLACE LITERACY

Employable numeracy
  USE WORKPLACE NUMERACY

Employee literacy
  USE WORKPLACE LITERACY

Employee numeracy
  USE WORKPLACE NUMERACY
Employment literacy relationships
USE LITERACY JOB RELATIONSHIPS

ENGLISH LANGUAGE LITERACY (1135)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY
RT ESL LITERACY
FIRST LANGUAGE LITERACY

ENGLISH LANGUAGE LITERACY PROGRAMS (374)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY PROGRAMS

ESL LITERACY (3693)
CL Literacy, numeracy, and adult basic ed.
BT SECOND LANGUAGE LITERACY
RT ENGLISH LANGUAGE LITERACY

Essay writing
USE EXPOSITORY WRITING

Evaluation
USE ASSESSMENT

EXPERIENCE WRITING (1278)
CL Instructional materials and methodologies
UF Writing from experience
BT WRITING
RT JOURNAL WRITING

EXPOSITORY WRITING (1520)
CL Instructional materials and methodologies
UF Essay writing
BT WRITING

EXPRESSION WRITING (1279)
CL Instructional materials and methodologies
BT WRITING
RT JOURNAL WRITING

FAMILY LITERACY INSTRUCTION (3905)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY INSTRUCTION
RT INTERGENERATIONAL LITERACY INSTRUCTION

FAMILY LITERACY PROGRAMS (204)
CL Planning, programming and evaluation
UF Dual curriculum
Parent child literacy programs
Worker family literacy programs
BT LITERACY PROGRAMS
RT INTERGENERATIONAL LITERACY PROGRAMS

FAMILY LITERACY PROJECTS (503)
CL Planning, programming and evaluation
BT LITERACY PROJECTS

FAMILY REFRANCISATION (3397)
CL Literacy, numeracy, and adult basic ed.
BT REFRANCISATION

Fear of reading
USE READING ANXIETY

Fear of writing
USE WRITING ANXIETY

FIRST LANGUAGE LITERACY (733)
CL Literacy, numeracy, and adult basic ed.
UF Mother tongue literacy
BT LITERACY
RT ABORIGINAL LANGUAGE LITERACY
ENGLISH LANGUAGE LITERACY
FRENCH LANGUAGE LITERACY
REFRANCISATION

FLUENT READERS (1018)
CL People
UF Able readers
BT READERS
RT READING SKILLS

Fluent reading
USE READING SKILLS

Follow up assessment
USE POSTLITERACY ASSESSMENT

Free reading
USE LEISURE READING

Free writing
USE SPONTANEOUS WRITING

French as a second language literacy
USE FSL LITERACY

FRENCH LANGUAGE LITERACY (729)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY
RT FIRST LANGUAGE LITERACY
FSL LITERACY
REFRANCISATION

FRENCH LANGUAGE LITERACY PROGRAMS (205)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS
RT REFRAncisation PROGRAMS

FSL LITERACY (843)
CL Literacy, numeracy, and adult basic ed.
UF French as a second language literacy
BT SECOND LANGUAGE LITERACY
RT FRENCH LANGUAGE LITERACY

FULL TIME LITERACY PROGRAMS (206)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS
RT PART TIME LITERACY PROGRAMS

Functional illiteracy
USE FUNCTIONAL LITERACY

FUNCTIONAL LITERACY (730)
CL Literacy, numeracy, and adult basic ed.
UF Functional illiteracy
BT LITERACY
RT BASIC LITERACY

FUNCTIONAL NUMERACY (731)
CL Literacy, numeracy, and adult basic ed.
UF Utilitarian arithmetic
BT NUMERACY
RT BASIC NUMERACY

FUNCTIONAL READING (1308)
CL Language and communication skills
UF Utilitarian reading
BT READING
RT WORKPLACE READING

FUNCTIONAL WRITING (1309)
CL Language and communication skills
UF Utilitarian writing
BT WRITING
RT WORKPLACE WRITING

Fundamental education
USE ADULT BASIC EDUCATION

Fundamental literacy
USE BASIC LITERACY
Fundamental numeracy
USE BASIC NUMERACY

GENRE LITERACY INSTRUCTION (3477)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY INSTRUCTION

GRASS ROOTS LITERACY GROUPS (1349)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY GROUPS
RT COMMUNITY LITERACY GROUPS

GROUP READING (1151)
CL Instructional materials and methodologies
BT READING
RT INDEPENDENT READING

GUIDED READING (1283)
CL Instructional materials and methodologies
UF Directed reading
BT READING
RT INDEPENDENT READING
READING PROGRAMS

HANDWRITING (1284)
CL Language and communication skills
UF Calligraphy
Penmanship
NT CURSIVE WRITING
SCRIPT
RT LEGIBILITY
WRITING
WRITTEN LANGUAGE

Handwriting clarity
USE LEGIBILITY

HANDWRITING EXERCISES (1164)
CL Instructional materials and methodologies
UF Handwriting practice
Handwriting tasks
RT WRITING EXERCISES

HANDWRITING INSTRUCTION (301)
CL Instructional materials and methodologies
BT INSTRUCTION
RT WRITING INSTRUCTION

Handwriting practice
USE HANDWRITING EXERCISES

HANDWRITING SKILLS (249)
CL Language and communication skills
BT SKILLS

Handwriting tasks
USE HANDWRITING EXERCISES

Health literacy relationships
USE LITERACY HEALTH RELATIONSHIPS

HOME INSTRUCTION (1152)
CL Instructional materials and methodologies
BT INSTRUCTION
RT INHOME TUTORING

ILLITERACY (734)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY

Illiterates
USE NONREADERS
NONWRITERS
ILY
USE INTERNATIONAL LITERACY YEAR
1990

IMMIGRANT LITERACY PROGRAMS (208)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS

Income literacy relationships
USE LITERACY INCOME RELATIONSHIPS

INDEPENDENT READING (1285)
CL Instructional materials and methodologies
BT READING
RT GROUP READING
GUIDED READING
LEISURE READING

Individualized instruction
USE LEARNER CENTRED INSTRUCTION
TUTORING

Individualized learning programs
USE LEARNER CENTRED PROGRAMS

Individualized programs
USE LEARNER CENTRED PROGRAMS

INFORMAL READING INVENTORIES (468)
CL Planning, programming and evaluation
RT READING ASSESSMENT
READING MATERIALS

INHOME TUTORING (1171)
CL Instructional materials and methodologies
BT TUTORING
RT HOME INSTRUCTION

Inmate literacy programs
USE PRISON LITERACY PROGRAMS

Innercity literacy programs
USE URBAN LITERACY PROGRAMS

INSTRUCTION (1173)
CL Instructional materials and methodologies
SN Use only for a general discussion of several
types of instruction; if possible use a
more specific term (Bilingual instruction,
etc.)
UF Teaching
NT BILINGUAL INSTRUCTION
HANDWRITING INSTRUCTION
HOME INSTRUCTION
LEARNER CENTRED INSTRUCTION
LITERACY INSTRUCTION
NUMERACY INSTRUCTION
PEER INSTRUCTION
READING INSTRUCTION
SPELLING INSTRUCTION
WRITING INSTRUCTION

INSTRUCTIONAL AIDS (920)
CL Instructional materials and methodologies
UF Teaching aids
RT INSTRUCTIONAL MATERIALS
TUTORING AIDS

Instructional approaches
USE INSTRUCTIONAL METHODS

Instructional formats
USE INSTRUCTIONAL METHODS

INSTRUCTIONAL MATERIALS (1658)
CL Instructional materials and methodologies
UF Learning materials
Teaching materials
RT INSTRUCTIONAL AIDS
TUTORING MATERIALS
INSTRUCTIONAL METHODS (1236)

CL  Instructional materials and methodologies
UF  Instructional approaches
    Instructional formats
    Instructional practices
    Instructional techniques
    Teaching methods
    Teaching practices
RT  INSTRUCTIONAL STRATEGIES
    INSTRUCTIONAL STYLES
    TUTORING METHODS

Instructional systems
USE INSTRUCTIONAL STRATEGIES

Instructional techniques
USE INSTRUCTIONAL METHODS

Instructor education
USE INSTRUCTOR TRAINING

INSTRUCTIONAL MODELS (921)

CL  Instructional materials and methodologies
UF  Teaching models
RT  INSTRUCTIONAL STRATEGIES
    INSTRUCTIONAL STYLES
    TUTORING MODELS

Instructional practices
USE INSTRUCTIONAL METHODS

INSTRUCTIONAL SKILLS (31)

CL  Language and communication skills
UF  Teaching skills
BT  SKILLS
RT  TUTORING SKILLS

INSTRUCTIONAL STRATEGIES (1237)

CL  Instructional materials and methodologies
UF  Instructional systems
    Teaching strategies
RT  INSTRUCTIONAL METHODS
    INSTRUCTIONAL MODELS
    INSTRUCTIONAL STYLES
    TUTORING STRATEGIES

INSTRUCTIONAL STYLES (424)

CL  Instructional materials and methodologies
UF  Teaching styles
RT  INSTRUCTIONAL METHODS
    INSTRUCTIONAL STRATEGIES
    TUTORING STYLES

INSTRUCTOR TRAINING (426)

CL  Planning, programming and evaluation
UF  Instructor education
RT  INSTRUCTORS
    TUTOR TRAINING

INSTRUCTORS (979)

CL  People
UF  Teachers
NT  LITERACY INSTRUCTORS
    NUMERACY INSTRUCTORS
RT  INSTRUCTOR TRAINING
    TUTORS

INTEGRATED LITERACY INSTRUCTION (3619)

CL  Literacy, numeracy, and adult basic ed.
BT  LITERACY INSTRUCTION

INTEGRATED LITERACY TUTORING (1111)

CL  Instructional materials and methodologies
BT  LITERACY TUTORING
INTERGENERATIONAL LITERACY
INSTRUCTION (3907)
  CL  Literacy, numeracy, and adult basic ed.
  BT  LITERACY INSTRUCTION
  RT  FAMILY LITERACY INSTRUCTION

INTERGENERATIONAL LITERACY
PROGRAMS (214)
  CL  Planning, programming and evaluation
  BT  LITERACY PROGRAMS
  RT  FAMILY LITERACY PROGRAMS

International literacy
  USE  UNIVERSAL LITERACY

International literacy day
  USE  WORLD LITERACY DAY

INTERNATIONAL LITERACY YEAR 1990 (737)
  CL  Literacy, numeracy, and adult basic ed.
  UF  LLY
  RT  LITERACY EVENTS

Introductory programs
  USE  PRELITERACY PROGRAMS

Job literacy relationships
  USE  LITERACY JOB RELATIONSHIPS

Job related literacy
  USE  WORKPLACE LITERACY

Job related numeracy
  USE  WORKPLACE NUMERACY

Job related reading
  USE  WORKPLACE READING

Job related writing
  USE  WORKPLACE WRITING

JOURNAL WRITING (1286)
  CL  Instructional materials and methodologies
  UF  Dialog journal writing
  BT  WRITING
  RT  EXPERIENCE WRITING
  USE  EXPRESSIVE WRITING
  JOURNALS [LEARNER WRITTEN]

JOURNALS [LEARNER WRITTEN] (1375)
  CL  Instructional materials and methodologies
  UF  Diaries [learner written]
       Logbooks
  RT  JOURNAL WRITING

Learner assessment
  USE  ASSESSMENT

Learner centred approach
  USE  LEARNER CENTRED INSTRUCTION

LEARNER CENTRED CURRICULUM (351)
  CL  Curriculum
  UF  Negotiated curriculum
       Student centred curriculum
  RT  LEARNER PRODUCED CURRICULUM

LEARNER CENTRED INSTRUCTION (1559)
  CL  Instructional materials and methodologies
  UF  Individualized instruction
       Learner centred approach
       Learner centred methods
       Learner controlled instruction
       Learner directed instruction
       Negotiated approach
       Personalized instruction
       Student centred approach
       Student centred instruction
       Student centred methods
  BT  INSTRUCTION
Learner centred methods
USE LEARNER CENTRED INSTRUCTION

LEARNER CENTRED PROGRAMS (245)
CL Planning, programming and evaluation
UF Individualized learning programs
Individualized programs
Participatory programs
Student centred programs
BT PROGRAMS

LEARNER CENTRED TUTORING (1245)
CL Instructional materials and methodologies
UF Student centred tutoring
BT TUTORING

Learner controlled instruction
USE LEARNER CENTRED INSTRUCTION

Learner directed instruction
USE LEARNER CENTRED INSTRUCTION

LEARNER INSTRUCTOR RELATIONSHIPS (3760)
CL Individual characteristics and behaviour
UF Instructor learner relationships
Instructor student relationships
Student instructor relationships
RT LEARNER TUTOR RELATIONSHIPS

LEARNER OPINIONS (1105)
CL Individual characteristics and behaviour
UF Student opinions

LEARNER PRODUCED CURRICULUM (352)
CL Curriculum
UF Student produced curriculum
RT LEARNER CENTRED CURRICULUM

LEARNER PRODUCED MATERIALS (1428)
CL Instructional materials and methodologies
SN Use only for a general discussion of several types of materials; if possible use a more specific term (Stories [learner written], etc.)
UF Learner publications
Learner writings
Learner written materials
Student produced materials
Student publications
Student writings
Student written materials

LEARNER PROFILES (3558)
CL Planning, programming and evaluation
UF Student profiles

Learner publications
USE LEARNER PRODUCED MATERIALS

LEARNER SUPPORT GROUPS (1031)
CL Guidance and counselling
UF Student support groups
RT LEARNERS’ COMMITTEES

LEARNER SUPPORT SERVICES (459)
CL Education: philosophy, system, and facilities
UF Student support services

LEARNER TUTOR RELATIONSHIPS (3761)
CL Individual characteristics and behaviour
UF Student tutor relationships
Tutor learner relationships
Tutor student relationships
RT LEARNER INSTRUCTOR RELATIONSHIPS

Learner writings
USE LEARNER PRODUCED MATERIALS
Learner written materials
USE LEARNER PRODUCED MATERIALS

LEARNERS (1527)
CL People
UF Adult learners
Adult students
Literacy learners
Literacy students
Numeracy learners
Numeracy students
Participants
Students
NT SPECIAL NEEDS LEARNERS

LEARNERS' COMMITTEES (3927)
CL People
RT LEARNER SUPPORT GROUPS

Learning materials
USE INSTRUCTIONAL MATERIALS

LEGIBILITY (848)
CL Language and communication skills
UF Handwriting clarity
RT HANDWRITING

LEISURE READING (1298)
CL Instructional materials and methodologies
UF Free reading
Recreational reading
BT READING
RT INDEPENDENT READING
READING ENJOYMENT

LETTER WRITING (1287)
CL Instructional materials and methodologies
BT WRITING
RT LETTERS [LEARNER WRITTEN]

LETTERS [LEARNER WRITTEN] (1381)
CL Instructional materials and methodologies
RT LETTER WRITING

Library based literacy programs
USE LIBRARY LITERACY PROGRAMS

LIBRARY LITERACY PROGRAMS (219)
CL Planning, programming and evaluation
UF Library based literacy programs
Library operated literacy programs
BT LITERACY PROGRAMS

LIBRARY LITERACY SERVICES (739)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY SERVICES
RT LITERACY COLLECTIONS

Library operated literacy programs
USE LIBRARY LITERACY PROGRAMS

Limited literacy skills
USE LITERACY SKILLS

Limited reading ability
USE READING ABILITY

LITERACY (740)
CL Literacy, numeracy, and adult basic ed.
SN Use only for a general discussion of the concept; if possible use a more specific term (Community literacy, etc.)
UF Adult literacy
NT ABORIGINAL LANGUAGE LITERACY
ADOLESCENT LITERACY
BASIC LITERACY
BILINGUAL LITERACY
COMMUNITY LITERACY
EMERGENT LITERACY
ENGLISH LANGUAGE LITERACY
FIRST LANGUAGE LITERACY
FRENCH LANGUAGE LITERACY
FUNCTIONAL LITERACY
MULTILINGUAL LITERACY
PARENTAL LITERACY
SCHOOL LITERACY
SECOND LANGUAGE LITERACY
UNIVERSAL LITERACY
WORKPLACE LITERACY
RT ADULT BASIC EDUCATION
ILLITERACY
LITERATES
NUMERACY
PSEUDO LITERACY
RIGHT TO LITERACY

LITERACY CAMPAIGNS (743)
CL Literacy, numeracy, and adult basic ed.
NT LOCAL LITERACY CAMPAIGNS
MASS LITERACY CAMPAIGNS
NATIONAL LITERACY CAMPAIGNS
PROVINCIAL LITERACY CAMPAIGNS
REGIONAL LITERACY CAMPAIGNS
RT LITERACY MOVEMENT
LITERACY PROMOTION

LITERACY CENTRES (744)
CL Literacy, numeracy, and adult basic ed.
RT ADULT BASIC EDUCATION CENTRES
LITERACY RESOURCE CENTRES

LITERACY CERTIFICATES (745)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY DIPLOMAS

LITERACY CLASSES (746)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY INSTRUCTION
NUMERACY CLASSES
REFRANCISATION CLASSES

LITERACY COALITIONS (747)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY ASSOCIATIONS
LITERACY NETWORKS

LITERACY COLLECTIONS (933)
CL Instructional materials and methodologies
RT LIBRARY LITERACY SERVICES
LITERACY RESOURCE CENTRES

LITERACY COMMITTEES (1263)
CL Literacy, numeracy, and adult basic ed.

LITERACY AWARDS (742)
CL Literacy, numeracy, and adult basic ed.

LITERACY ACROSS THE CURRICULUM (3952)
CL Literacy, numeracy, and adult basic ed.
RT READING ACROSS THE CURRICULUM
WRITING ACROSS THE CURRICULUM

Literacy activities
USE LITERACY EVENTS

LITERACY ASSESSMENT (543)
CL Literacy, numeracy, and adult basic ed.
BT ASSESSMENT
RT LITERACY TESTS
NUMERACY ASSESSMENT
POSTLITERACY ASSESSMENT
PRELITERACY ASSESSMENT

LITERACY ASSOCIATIONS (741)
CL Literacy, numeracy, and adult basic ed.
NT LOCAL LITERACY ASSOCIATIONS
NATIONAL LITERACY ASSOCIATIONS
PROVINCIAL LITERACY ASSOCIATIONS
REGIONAL LITERACY ASSOCIATIONS
RT LITERACY COALITIONS

LITERACY AWARDS (742)
CL Literacy, numeracy, and adult basic ed.
| LITERACY CONSULTANTS (982)   | BT LITERACY WORKERS  |
|                           | RT LITERACY INSTRUCTORS |
|                           | RT LITERACY TUTORS      |
| LITERACY COORDINATORS (983) | CL People              |
|                           | BT LITERACY WORKERS     |
| LITERACY COUNCILS (749)   |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| NT LOCAL LITERACY COUNCILS |                           |
| NT NATIONAL LITERACY COUNCILS |                           |
| NT PROVINCIAL LITERACY COUNCILS |                           |
| NT REGIONAL LITERACY COUNCILS |                           |
| RT LITERACY POLICY       |                           |

Literacy day
USE WORLD LITERACY DAY

| LITERACY DEVELOPMENT RELATIONSHIPS (1169) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| UF Development literacy relationships |                           |
| RT LITERACY PRODUCTIVITY RELATIONSHIPS |                           |

| LITERACY DIPLOMAS (750) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| RT LITERACY CERTIFICATES |                           |

| LITERACY EVENTS (3953) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| UF Literacy activities |                           |
| RT INTERNATIONAL LITERACY YEAR 1990 |                           |
|                           | LITERACY PROMOTION |
|                           | WORLD LITERACY DAY |

| LITERACY FACILITATORS (931) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |

| LITERACY GROUPS (1069) |                           |
| CL People |                           |
| NT COMMUNITY LITERACY GROUPS |                           |
| NT GRASS ROOTS LITERACY GROUPS |                           |

| LITERACY GUIDES (3428) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| RT LITERACY MANUALS |                           |

| LITERACY HEALTH RELATIONSHIPS (751) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| UF Health literacy relationships |                           |

Literacy in the workplace
USE WORKPLACE LITERACY

| LITERACY INCOME RELATIONSHIPS (752) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| UF Income literacy relationships |                           |
| RT LITERACY JOB RELATIONSHIPS |                           |
| RT LITERACY POVERTY RELATIONSHIPS |                           |

| LITERACY INSTRUCTION (732) |                           |
| CL Literacy, numeracy, and adult basic ed. |                           |
| UF Literacy teaching |                           |
|                           | Literacy training |
| BT INSTRUCTION |                           |
| NT BILINGUAL LITERACY INSTRUCTION |                           |
| NT COMMUNITY LITERACY INSTRUCTION |                           |
| NT FAMILY LITERACY INSTRUCTION |                           |
| NT GENRE LITERACY INSTRUCTION |                           |
| NT INTEGRATED LITERACY INSTRUCTION |                           |
| NT INTERGENERATIONAL LITERACY INSTRUCTION |                           |
| NT MULTILINGUAL LITERACY INSTRUCTION |                           |
WORKPLACE LITERACY INSTRUCTION
RT LITERACY CLASSES
LITERACY METHODS
LITERACY PROGRAMS
LITERACY TUTORING
NUMERACY INSTRUCTION

LITERACY MATERIALS (934)
CL Instructional materials and methodologies
NT WOMEN'S LITERACY MATERIALS
RT LITERACY RESOURCES
NUMERACY MATERIALS

LITERACY METHODS (754)
CL Literacy, numeracy, and adult basic ed.
UF Literacy practices
RT LITERACY INSTRUCTION
LITERACY STRATEGIES

LITERACY MODELS (755)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY STRATEGIES

LITERACY MOVEMENT (756)
CL Literacy, numeracy, and adult basic ed.
UF Movement for literacy
RT LITERACY CAMPAIGNS

LITERACY NEEDS (3910)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY STANDARDS
REFRANCISATION NEEDS

LITERACY NETWORKS (757)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY COALITIONS
LITERACY ORGANIZATIONS

LITERACY ORGANIZATIONS (550)
CL Literacy, numeracy, and adult basic ed.
NT LOCAL LITERACY ORGANIZATIONS
NATIONAL LITERACY ORGANIZATIONS
PROVINCIAL LITERACY ORGANIZATIONS
REGIONAL LITERACY ORGANIZATIONS
RT LITERACY NETWORKS
LITERACY PARTNERSHIPS

Literacy instruction in the workplace
USE WORKPLACE LITERACY INSTRUCTION

LITERACY INSTRUCTORS (984)
CL People
UF Literacy teachers
BT INSTRUCTORS
LITERACY PRACTITIONERS
RT LITERACY FACILITATORS
LITERACY TUTORS
NUMERACY INSTRUCTORS

LITERACY JOB RELATIONSHIPS (753)
CL Literacy, numeracy, and adult basic ed.
UF Employment literacy relationships
Job literacy relationships
RT LITERACY INCOME RELATIONSHIPS
POSTLITERACY EMPLOYMENT
WORKPLACE LITERACY

Literacy learners
USE LEARNERS

LITERACY LEVELS (1248)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY SKILLS

LITERACY MANUALS (1405)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY GUIDES
<table>
<thead>
<tr>
<th>LITERACY PARTNERSHIPS (758)</th>
<th>LITERACY PROGRAMMING (3643)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL Literacy, numeracy, and adult basic ed.</td>
<td>CL Literacy, numeracy, and adult basic ed.</td>
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<td>RT LITERACY ORGANIZATIONS</td>
<td>RT LITERACY PROGRAMS</td>
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</table>

Literacy personnel

USE LITERACY WORKERS

LITERACY PHILOSOPHY (661)

<table>
<thead>
<tr>
<th>CL Education: philosophy, system, and facilities</th>
<th>RT LITERACY THEORY</th>
</tr>
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<tbody>
<tr>
<td>UF Philosophy of literacy</td>
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LITERACY POLICY (759)

<table>
<thead>
<tr>
<th>CL Literacy, numeracy, and adult basic ed.</th>
<th>RT LITERACY COUNCILS</th>
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LITERACY POVERTY RELATIONSHIPS (760)

<table>
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<tr>
<th>CL Literacy, numeracy, and adult basic ed.</th>
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<tbody>
<tr>
<td>UF Poverty literacy relationships</td>
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Literacy practices

USE LITERACY METHODS

LITERACY PRACTITIONERS (985)

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<thead>
<tr>
<th>CL People</th>
<th>BT LITERACY WORKERS</th>
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<tbody>
<tr>
<td>BF LITERACY INSTRUCTORS</td>
<td>NT LITERACY TUTORS</td>
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LITERACY PRIMERS [TEXTS] (1382)

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<tr>
<th>CL Instructional materials and methodologies</th>
<th>RT LITERACY INSTRUCTION</th>
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<tr>
<td>UF Primers [texts]</td>
<td>LITERACY PROGRAMMING</td>
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<td>NUMERACY PROGRAMS</td>
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<td>POSTLITERACY PROGRAMS</td>
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LITERACY PRODUCTIVITY RELATIONSHIPS (764)

<table>
<thead>
<tr>
<th>CL Literacy, numeracy, and adult basic ed.</th>
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<tbody>
<tr>
<td>UF Productivity literacy relationships</td>
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<tr>
<td>RT LITERACY DEVELOPMENT RELATIONSHIPS</td>
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<tr>
<td>PRELITERACY PROGRAMS</td>
<td>LITERACY RESOURCES</td>
</tr>
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<tr>
<td>Literacy programs in the workplace</td>
<td>LITERACY RESOURCES (767)</td>
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<tr>
<td>USE WORKPLACE LITERACY PROGRAMS</td>
<td>CL Literacy, numeracy, and adult basic ed.</td>
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<tr>
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<td>RT LITERACY MATERIALS</td>
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<tr>
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<td>LITERACY RESOURCE CENTRES</td>
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<td>LITERACY PROJECTS (221)</td>
<td>LITERACY RETENTION (738)</td>
</tr>
<tr>
<td>CL Planning, programming and evaluation</td>
<td>CL Literacy, numeracy, and adult basic ed.</td>
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<tr>
<td>BT PROJECTS</td>
<td>RT LITERACY SKILLS</td>
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<td>NT COMMUNITY LITERACY PROJECTS</td>
<td>POSTLITERACY ASSESSMENT</td>
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<td>FAMILY LITERACY PROJECTS</td>
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<td>RT REFRANCISATION PROJECTS</td>
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<td>LITERACY PROMOTION (3911)</td>
<td>LITERACY SERVICES (772)</td>
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<td>CL Literacy, numeracy, and adult basic ed.</td>
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<tr>
<td>RT LITERACY CAMPAIGNS</td>
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<td>LITERACY EVENTS</td>
<td>LIBRARY LITERACY SERVICES</td>
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<td>LITERACY RATES (544)</td>
<td>LITERACY SKILLS (43)</td>
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<td>UF Limited literacy skills</td>
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<td>BT SKILLS</td>
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<td>RT LITERACY LEVELS</td>
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<td>NUMERACY SKILLS</td>
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<tr>
<td>LITERACY REPORTS (1383)</td>
<td>LITERACY SPECIALISTS (986)</td>
</tr>
<tr>
<td>CL Instructional materials and methodologies</td>
<td>CL People</td>
</tr>
<tr>
<td>RT LITERACY STATISTICS</td>
<td>BT LITERACY WORKERS</td>
</tr>
<tr>
<td>LITERACY SURVEYS</td>
<td>RT LITERACY CONSULTANTS</td>
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<td>LITERACY REQUIREMENTS (765)</td>
<td>Literacy staff</td>
</tr>
<tr>
<td>CL Literacy, numeracy, and adult basic ed.</td>
<td>USE LITERACY WORKERS</td>
</tr>
<tr>
<td>RT LITERACY STANDARDS</td>
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<td>LITERACY RESEARCH (771)</td>
<td>LITERACY STANDARDS (768)</td>
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<td>CL Literacy, numeracy, and adult basic ed.</td>
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<td>UF Literacy studies</td>
<td>RT LITERACY NEEDS</td>
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<td>RT READING RESEARCH</td>
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<td>LITERACY RESOURCE CENTRES (766)</td>
<td>LITERACY STATISTICS (769)</td>
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<td>RT LITERACY CENTRES</td>
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<td>LITERACY COLLECTIONS</td>
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</table>
### LITERACY STRATEGIES (770)
- **CL** Literacy, numeracy, and adult basic ed.
- **RT** LITERACY METHODS
  - LITERACY MODELS

### LITERACY SURVEYS (773)
- **CL** Literacy, numeracy, and adult basic ed.
- **RT** LITERACY REPORTS
  - LITERACY STATISTICS

### LITERACY EDUCATORS
- **USE** LITERACY INSTRUCTORS
  - LITERACY TUTORS

### LITERACY TEACHING
- **USE** LITERACY INSTRUCTION
  - LITERACY TUTORING

### LITERACY TESTS (545)
- **CL** Planning, programming and evaluation
- **BT** TESTS
  - LITERACY ASSESSMENT
    - NUMERACY TESTS

### LITERACY THEORY (774)
- **CL** Literacy, numeracy, and adult basic ed.
- **UF** Theory of literacy
- **RT** LITERACY PHILOSOPHY

### LITERACY TRAINING
- **USE** LITERACY INSTRUCTION

### LITERACY TUTORING (1110)
- **CL** Literacy, numeracy, and adult basic ed.
- **UF** Literacy teaching
- **BT** TUTORING
  - COMMUNITY LITERACY TUTORING
  - INTEGRATED LITERACY TUTORING
  - LITERACY INSTRUCTION
  - NUMERACY TUTORING

### LITERACY TUTORS (987)
- **CL** People
- **UF** Literacy teachers
- **BT** LITERACY PRACTITIONERS
  - TUTORS
  - LITERACY FACILITATORS
  - LITERACY INSTRUCTORS
  - NUMERACY TUTORS

### LITERACY WORKERS (988)
- **CL** People
- **UF** Literacy personnel
  - Literacy staff
- **NT** LITERACY CONSULTANTS
  - LITERACY COORDINATORS
  - LITERACY FACILITATORS
  - LITERACY PRACTITIONERS
  - LITERACY SPECIALISTS

### LITERACY WORKSHOPS (775)
- **CL** Literacy, numeracy, and adult basic ed.

### LITERATES (1021)
- **CL** People
- **RT** LITERACY
  - NUMERATES
  - READERS
<table>
<thead>
<tr>
<th><strong>LOCAL LITERACY ASSOCIATIONS</strong> (849)</th>
<th><strong>LOCAL LITERACY CAMPAIGNS</strong> (937)</th>
<th><strong>LOCAL LITERACY COUNCILS</strong> (507)</th>
<th><strong>LOCAL LITERACY ORGANIZATIONS</strong> (858)</th>
<th><strong>LOCAL LITERACY PROGRAMS</strong> (859)</th>
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</thead>
<tbody>
<tr>
<td><strong>CL</strong> Literacy, numeracy, and adult basic ed.</td>
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<td><strong>CL</strong> Planning, programming and evaluation</td>
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<tr>
<td><strong>UF</strong> Municipal literacy associations</td>
<td><strong>UF</strong> Municipal literacy campaigns</td>
<td><strong>UF</strong> Municipal literacy councils</td>
<td><strong>UF</strong> Municipal literacy organizations</td>
<td><strong>UF</strong> Municipal literacy programs</td>
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<tr>
<td><strong>BT</strong> LITERACY ASSOCIATIONS</td>
<td><strong>BT</strong> LITERACY CAMPAIGNS</td>
<td><strong>BT</strong> LITERACY COUNCILS</td>
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<td><strong>BT</strong> LITERACY PROGRAMS</td>
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<tr>
<td><strong>RT</strong> COMMUNITY LITERACY PROGRAMS</td>
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</tbody>
</table>

**Logbooks**

**USE JOURNALS [LEARNER WRITTEN]**

**MASS LITERACY CAMPAIGNS** (776)

**CL** Literacy, numeracy, and adult basic ed.
**BT** LITERACY CAMPAIGNS

**Mathematics ability**

**USE NUMERICAL ABILITY**

**Mathematics literacy**

**USE NUMERACY**

**MEMO WRITING** (1289)

**CL** Instructional materials and methodologies
**BT** WRITING
**RT** TECHNICAL WRITING

**Mother tongue literacy**

**USE FIRST LANGUAGE LITERACY**

**Movement for literacy**

**USE LITERACY MOVEMENT**

**MULTILINGUAL LITERACY** (777)

**CL** Literacy, numeracy, and adult basic ed.
**BT** LITERACY
**RT** BILINGUAL LITERACY

**SECOND LANGUAGE LITERACY**

**MULTILINGUAL LITERACY INSTRUCTION** (1409)

**CL** Literacy, numeracy, and adult basic ed.
**BT** LITERACY INSTRUCTION
**RT** BILINGUAL LITERACY INSTRUCTION

**Municipal literacy associations**

**USE LOCAL LITERACY ASSOCIATIONS**

**Municipal literacy campaigns**

**USE LOCAL LITERACY CAMPAIGNS**

**Municipal literacy councils**

**USE LOCAL LITERACY COUNCILS**

**Municipal literacy organizations**

**USE LOCAL LITERACY ORGANIZATIONS**
Municipal literacy programs
USE LOCAL LITERACY PROGRAMS

NATIONAL LITERACY ASSOCIATIONS (778)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY ASSOCIATIONS

NATIONAL LITERACY CAMPAIGNS (779)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY CAMPAIGNS

NATIONAL LITERACY COUNCILS (780)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY COUNCILS

NATIONAL LITERACY ORGANIZATIONS (860)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY ORGANIZATIONS

NATIONAL LITERACY PROGRAMS (223)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS

Native language literacy
USE ABORIGINAL LANGUAGE LITERACY

Native literacy programs
USE ABORIGINAL LITERACY PROGRAMS

Negotiated approach
USE LEARNER CENTRED INSTRUCTION

Negotiated curriculum
USE LEARNER CENTRED CURRICULUM

Neighbourhood literacy programs
USE COMMUNITY LITERACY PROGRAMS

Neoliterates
USE NEW READERS
NEW WRITERS

New literates
USE NEW READERS
NEW WRITERS

NEW READERS (1024)
CL People
UF Adult new readers
Neoliterates
New literates
BT READERS
RT BEGINNING READERS

NEW WRITERS (958)
CL People
UF Adult new writers
Neoliterates
New literates
BT WRITERS
RT BEGINNING WRITERS

Nonliterate adults
USE NONREADERS
NONWRITERS

NONREADERS (1025)
CL People
UF Adult nonreaders
Illiterates
Nonliterate adults
RT READERS

NONWRITERS (1026)
CL People
UF Adult nonwriters
Illiterates
Nonliterate adults
RT WRITERS
NUMERACY (781)
   CL Literacy, numeracy, and adult basic ed.
   SN Use only for a general discussion of the concept; if possible use a more specific term (Functional numeracy etc.)
   UF Adult numeracy
   Mathematics literacy
   NT BASIC NUMERACY
   FUNCTIONAL NUMERACY
   WORKPLACE NUMERACY
   RT LITERACY

NUMERACY ASSESSMENT (551)
   CL Planning, programming and evaluation
   BT ASSESSMENT
   RT LITERACY ASSESSMENT
   NUMERACY TESTS

NUMERACY CLASSES (782)
   CL Literacy, numeracy, and adult basic ed.
   RT LITERACY CLASSES

Numeracy in the workplace
   USE WORKPLACE NUMERACY

NUMERACY INSTRUCTION (1180)
   CL Instructional materials and methodologies
   UF Numeracy teaching
   Numeracy training
   BT INSTRUCTION
   RT LITERACY INSTRUCTION
   NUMERACY TUTORING

NUMERACY INSTRUCTORS (989)
   CL People
   UF Numeracy teachers
   BT INSTRUCTORS
   RT LITERACY INSTRUCTORS
   NUMERACY TUTORS

Numeracy learners
   USE LEARNERS

NUMERACY MATERIALS (939)
   CL Instructional materials and methodologies
   RT LITERACY MATERIALS

NUMERACY PROGRAMS (225)
   CL Planning, programming and evaluation
   BT PROGRAMS
   RT LITERACY PROGRAMS

NUMERACY SKILLS (50)
   CL Literacy, numeracy, and adult basic ed.
   UF Computation skills
   BT SKILLS
   RT LITERACY SKILLS
   NUMERICAL ABILITY

Numeracy students
   USE LEARNERS

Numeracy teachers
   USE NUMERACY INSTRUCTORS
   NUMERACY TUTORS

Numeracy teaching
   USE NUMERACY INSTRUCTION
   NUMERACY TUTORING

NUMERACY TESTS (553)
   CL Planning, programming and evaluation
   UF Computation tests
   BT TESTS
   RT LITERACY TESTS
   NUMERACY ASSESSMENT

Numeracy training
   USE NUMERACY INSTRUCTION
NUMERACY TUTORING (1181)
CL Instructional materials and methodologies
UF Numeracy teaching
BT TUTORING
RT LITERACY TUTORING
NUMERACY INSTRUCTION

ORAL VOCABULARY (862)
CL Language and communication skills
UF Spoken vocabulary
BT VOCABULARY

NUMERACY TUTORS (990)
CL People
UF Numeracy teachers
BT TUTORS
RT LITERACY TUTORS
NUMERACY INSTRUCTORS

ORAL WRITTEN LANGUAGE RELATIONSHIPS (863)
CL Language and communication skills
UF Spoken written language relationships
Written spoken language relationships
RT WRITTEN LANGUAGE

NUMERATES (1027)
CL People
RT LITERATES

ORAL WRITTEN LANGUAGE VARIATION (864)
CL Language and communication skills
UF Spoken written language variation
Written spoken language variation

NUMERICAL ABILITY (1587)
CL Cognitive and learning processes
UF Mathematics ability
BT ABILITY
RT NUMERACY SKILLS

Orthography
USE SPELLING

Occational literacy
USE WORKPLACE LITERACY

OUTREACH LITERACY PROGRAMS (226)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS
RT COMMUNITY LITERACY PROGRAMS
PRISON LITERACY PROGRAMS
RURAL LITERACY PROGRAMS

Occational numeracy
USE WORKPLACE NUMERACY

PACED READING (1291)
CL Instructional materials and methodologies
BT READING

One to one instruction
USE TUTORING

PARED READING (1032)
CL Instructional materials and methodologies
BT READING
RT ASSISTED READING

One to one tutoring
USE TUTORING

ORAL READING (1290)
CL Instructional materials and methodologies
UF Reading aloud
BT READING
Parent child literacy programs
USE FAMILY LITERACY PROGRAMS

PARENTAL LITERACY (783)
CL Literacy, numeracy, and adult basic ed.
UF Literate parents
BT LITERACY

PART TIME LITERACY PROGRAMS (227)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS
RT FULL TIME LITERACY PROGRAMS

Participants
USE LEARNERS

Participatory programs
USE LEARNER CENTRED PROGRAMS

PASSIVE VOCABULARY (3380)
CL Language and communication skills
BT VOCABULARY
RT ACTIVE VOCABULARY

Peer coaching
USE PEER TUTORING

PEER INSTRUCTION (1182)
CL Instructional materials and methodologies
BT INSTRUCTION

PEER TUTORING (1183)
CL Instructional materials and methodologies
UF Peer coaching
BT TUTORING

Penmanship
USE HANDWRITING

Personalized instruction
USE LEARNER CENTRED INSTRUCTION TUTORING

PERSONALIZED PROGRAMS
USE LEARNER CENTRED PROGRAMS

Philosophy of literacy
USE LITERACY PHILOSOPHY

Plain language approach
USE CLEAR WRITING

Plain writing
USE CLEAR WRITING

POEMS [LEARNER WRITTEN] (1400)
CL Instructional materials and methodologies
RT CREATIVE WRITING

POSTLITERACY ASSESSMENT (558)
CL Planning, programming and evaluation
UF Follow up assessment
BT ASSESSMENT
RT LITERACY ASSESSMENT

POSTLITERACY EMPLOYMENT (861)
CL Literacy, numeracy, and adult basic ed.
RT LITERACY JOB RELATIONSHIPS

POSTLITERACY PROGRAMS (230)
CL Planning, programming and evaluation
BT PROGRAMS
RT LITERACY PROGRAMS

Poverty literacy relationships
USE LITERACY POVERTY RELATIONSHIPS
Prediction reading
USE CLOZE PROCEDURE

PRELITERACY ASSESSMENT (559)
CL Planning, programming and evaluation
BT ASSESSMENT
RT LITERACY ASSESSMENT

PRELITERACY PROGRAMS (232)
CL Planning, programming and evaluation
UF Introductory programs
BT PROGRAMS
RT LITERACY PROGRAMS

PREREADING (1293)
CL Instructional materials and methodologies
RT READING

PREVENTIVE LITERACY PROGRAMS (786)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY PROGRAMS

PREWRITING (1249)
CL Instructional materials and methodologies
RT WRITING

Primers [texts]
USE LITERACY PRIMERS [TEXTS]

PRINT CULTURE (143)
CL Environment
UF Reading culture

PRISON LITERACY PROGRAMS (234)
CL Planning, programming and evaluation
UF Inmate literacy programs
BT LITERACY PROGRAMS
RT OUTREACH LITERACY PROGRAMS

PROCESS WRITING (1294)
CL Instructional materials and methodologies
BT WRITING

Productivity literacy relationships
USE LITERACY PRODUCTIVITY RELATIONSHIPS

PROGRAMMED READING (1296)
CL Instructional materials and methodologies
BT READING
RT COMPUTER ASSISTED READING

PROGRAMS (235)
CL Planning, programming and evaluation
SN Use only for a general discussion of several types of programs; if possible use a more specific term (Literacy programs, etc.)
NT LEARNER CENTRED PROGRAMS
LITERACY PROGRAMS
NUMERACY PROGRAMS
POSTLITERACY PROGRAMS
PRELITERACY PROGRAMS
READING PROGRAMS
REFRANCISATION PROGRAMS
RT PROJECTS

PROJECTS (237)
CL Planning, programming and evaluation
SN Use only for a general discussion of several types of projects; if possible use a more specific term (Literacy projects, etc.)
NT LITERACY PROJECTS
REFRANCISATION PROJECTS
RT PROGRAMS

PROVINCIAL LITERACY ASSOCIATIONS (787)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY ASSOCIATIONS
Core Literacy Thesaurus Test Version C

PROVINCIAL LITERACY CAMPAIGNS (788)
- **CL** Literacy, numeracy, and adult basic ed.
- **BT** LITERACY CAMPAIGNS

PROVINCIAL LITERACY COUNCILS (789)
- **CL** Literacy, numeracy, and adult basic ed.
- **BT** LITERACY COUNCILS

PROVINCIAL LITERACY ORGANIZATIONS (674)
- **CL** Literacy, numeracy, and adult basic ed.
- **BT** LITERACY ORGANIZATIONS

PROVINCIAL LITERACY PROGRAMS (238)
- **CL** Planning, programming and evaluation
- **BT** LITERACY PROGRAMS

PSEUDO LITERACY (790)
- **CL** Literacy, numeracy, and adult basic ed.
- **RT** LITERACY

Rating
- USE ASSESSMENT

READ ALONGS (3866)
- **CL** Instructional materials and methodologies
- **BT** READING MATERIALS

READABILITY (873)
- **CL** Language and communication skills
- **RT** CLEAR WRITING
  - EASY TO READ MATERIALS
  - READABILITY FORMULAS

READABILITY FORMULAS (1359)
- **CL** Planning, programming and evaluation
- **RT** READABILITY

READERS (995)
- **CL** People
- **NT** BEGINNING READERS
  - FLUENT READERS
  - NEW READERS
- **RT** LITERATES
  - NONREADERS

READERS [TEXTS] (1408)
- **CL** Instructional materials and methodologies
- **NT** BASAL READERS [TEXTS]

READING (333)
- **CL** Language and communication skills
- **SN** Use only for a general discussion of the concept; if possible use a more specific term (Leisure reading, etc.)
- **UF** Reading processes
- **NT** ASSISTED READING
  - COMPARATIVE READING
  - CONTENT AREA READING
  - CRITICAL READING
  - FUNCTIONAL READING
  - GROUP READING
  - GUIDED READING
  - INDEPENDENT READING
  - LEISURE READING
  - ORAL READING
  - PACED READING
  - PAIRED READING
  - PROGRAMMED READING
  - REMEDIAL READING
  - SHARED READING
  - SIGHT READING
  - SILENT READING
  - TECHNICAL READING
  - WORKPLACE READING
- **RT** PREREADING
  - READING ACTIVITIES
  - REREADING
READING ABILITY (874)
CL Language and communication skills
UF Limited reading ability
BT ABILITY
RT READING DIFFICULTIES
READING DISABILITIES
READING SKILLS

READING ACROSS THE CURRICULUM (3640)
CL Instructional materials and methodologies
RT LITERACY ACROSS THE CURRICULUM

READING ACTIVITIES (1157)
CL Instructional materials and methodologies
UF Reading tasks
RT READING
READING Exercises
READING GAMES
READING THEMES
READING WORKSHOPS

Reading aloud
USE ORAL READING

READING ANXIETY (1503)
CL Individual characteristics and behaviour
UF Fear of reading
RT READING DIFFICULTIES

READING ASSESSMENT (564)
CL Planning, programming and evaluation
BT ASSESSMENT
RT INFORMAL READING INVENTORIES
READING TESTS

Reading assignments
USE READING EXERCISES

READING COMPREHENSION (1610)
CL Cognitive and learning processes

UF Reading with understanding
Text comprehension
Written language comprehension

RT CLOZE PROCEDURE
READING EFFICIENCY

READING DIFFICULTIES (1611)
CL Language and communication skills
RT READING ABILITY
READING ANXIETY
READING DISABILITIES

READING DISABILITIES (1612)
CL Language and communication skills
UF Dyslexia
Reading handicaps
RT READING ABILITY
READING DIFFICULTIES

READING EFFICIENCY (876)
CL Language and communication skills
RT READING COMPREHENSION
READING SKILLS

READING ENJOYMENT (877)
CL Language and communication skills
RT LEISURE READING

READING EXERCISES (1122)
CL Instructional materials and methodologies
UF Reading assignments
Reading practice
Reading tasks
RT CLOZE PROCEDURE
READING ACTIVITIES
READING THEMES
Reading fluency
USE READING SKILLS

READING GAMES (308)
CL Instructional materials and methodologies
RT READING ACTIVITIES

READING HABITS (879)
CL Language and communication skills

Reading handicaps
USE READING DISABILITIES

Reading improvement
USE READING PROGRESS

Reading in content areas
USE CONTENT AREA READING

READING INSTRUCTION (334)
CL Instructional materials and methodologies
BT INSTRUCTION
RT READING METHODS

READING LEVELS (880)
CL Language and communication skills
RT READING PROGRESS

READING MATERIALS (946)
CL Instructional materials and methodologies
NT EASY TO READ MATERIALS
INFORMAL READING INVENTORIES
READ ALONGS

READING METHODS (189)
CL Instructional materials and methodologies
UF Reading techniques
RT READING INSTRUCTION

Reading pace
USE READING RATE

Reading practice
USE READING EXERCISES

Reading processes
USE READING

Reading proficiency
USE READING SKILLS

READING PROGRAMS (239)
CL Planning, programming and evaluation
BT PROGRAMS
RT GUIDED READING

READING PROGRESS (882)
CL Planning, programming and evaluation
UF Reading improvement
RT READING LEVELS

READING RATE (883)
CL Language and communication skills
UF Reading pace
Reading speed
RT READING SKILLS

READING READINESS (884)
CL Language and communication skills
RT BEGINNING READERS

READING RESEARCH (461)
CL Planning, programming and evaluation
RT LITERACY RESEARCH

READING SKILLS (57)
CL Language and communication skills
UF Fluent reading
Reading fluency
Reading proficiency

BT SKILLS
RT FLUENT READERS
READING ABILITY
READING EFFICIENCY
READING RATE

Reading speed
USE READING RATE

Reading tasks
USE READING ACTIVITIES
READING EXERCISES

Reading techniques
USE READING METHODS

READING TESTS (565)
CL Planning, programming and evaluation
BT TESTS
RT CLOZE PROCEDURE
READING ASSESSMENT

READING THEMES (3443)
CL Instructional materials and methodologies
RT READING ACTIVITIES
READING EXERCISES

Reading with support
USE ASSISTED READING

Reading with understanding
USE READING COMPREHENSION

READING WORKSHOPS (3609)
CL Instructional materials and methodologies
RT READING ACTIVITIES

READING WRITING RELATIONSHIPS (1297)
CL Instructional materials and methodologies
UF Writing reading relationships
RT WRITING

Recreational reading
USE LEISURE READING

REFRANCISATION (591)
CL Literacy, numeracy, and adult basic ed.
NT FAMILY REFRACTION
RT FIRST LANGUAGE LITERACY
FR FRENCH LANGUAGE LITERACY

REFRANCISATION CLASSES (1165)
CL Planning, programming and evaluation
RT LITERACY CLASSES

REFRANCISATION NEEDS (34)
CL Environment
RT LITERACY NEEDS

REFRANCISATION PROGRAMS (3567)
CL Planning, programming and evaluation
BT PROGRAMS
RT FRENCH LANGUAGE LITERACY PROGRAMS

REFRANCISATION PROJECTS (3568)
CL Planning, programming and evaluation
BT PROJECTS
RT LITERACY PROJECTS

REGIONAL LITERACY ASSOCIATIONS (791)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY ASSOCIATIONS

REGIONAL LITERACY CAMPAIGNS (792)
CL Literacy, numeracy, and adult basic ed.
BT LITERACY CAMPAIGNS
REGIONAL LITERACY COUNCILS (793)
  CL Literacy, numeracy, and adult basic ed.
  BT LITERACY COUNCILS

REGIONAL LITERACY ORGANIZATIONS (453)
  CL Literacy, numeracy, and adult basic ed.
  BT LITERACY ORGANIZATIONS

REGIONAL LITERACY PROGRAMS (240)
  CL Planning, programming and evaluation
  BT LITERACY PROGRAMS

REMEDIAL READING (1299)
  CL Instructional materials and methodologies
  UF Developmental reading
  BT READING

REPORT WRITING (1300)
  CL Instructional materials and methodologies
  BT WRITING
  RT TECHNICAL WRITING

REREADING (1301)
  CL Instructional materials and methodologies
  RT READING

RIGHT TO LITERACY (1395)
  CL Literacy, numeracy, and adult basic ed.
  UF Right to read
  RT LITERACY
  UNIVERSAL LITERACY

Right to read
  USE RIGHT TO LITERACY

RURAL LITERACY PROGRAMS (242)
  CL Planning, programming and evaluation
  BT LITERACY PROGRAMS
  RT OUTREACH LITERACY PROGRAMS

URBAN LITERACY PROGRAMS

SCHOOL LITERACY (794)
  CL Literacy, numeracy, and adult basic ed.
  BT LITERACY

SCRIPT (3768)
  CL Language and communication skills
  BT HANDWRITING

SECOND LANGUAGE LITERACY (795)
  CL Literacy, numeracy, and adult basic ed.
  BT LITERACY
  NT ESL LITERACY
  FSL LITERACY
  RT BILINGUAL LITERACY
  MULTILINGUAL LITERACY

SHARED READING (1302)
  CL Instructional materials and methodologies
  BT READING
  RT ASSISTED READING

SHORT STORIES [LEARNER WRITTEN] (1420)
  CL Instructional materials and methodologies
  BT STORIES [LEARNER WRITTEN]

SIGHT READING (420)
  CL Instructional materials and methodologies
  BT READING
  RT WORD RECOGNITION

Sight vocabulary
  USE WORD RECOGNITION

Sight words
  USE WORD RECOGNITION
SILENT READING (1303)
CL Instructional materials and methodologies
BT READING
RT ORAL READING

Simple language
USE CLEAR WRITING

Simple writing
USE CLEAR WRITING

Simplified materials
USE EASY TO READ MATERIALS

SKILLS (60)
CL Language and communication skills
SN Use only for a general discussion of several
types of skills; if possible use a more
specific term (Reading skills, etc.)
UF Competency
NT HANDWRITING SKILLS
INSTRUCTIONAL SKILLS
LITERACY SKILLS
NUMERACY SKILLS
READING SKILLS
TUTORING SKILLS
VOCABULARY SKILLS
WORD ATTACK SKILLS
WRITING SKILLS
RT ABILITY

SPELLING ASSESSMENT (486)
CL Planning, programming and evaluation
BT ASSESSMENT
RT SPELLING TESTS

SPELLING EXERCISES (1132)
CL Instructional materials and methodologies
UF Spelling practice
Spelling tasks
RT VOCABULARY EXERCISES

SPELLING INSTRUCTION (350)
CL Instructional materials and methodologies
BT INSTRUCTION

Spelling practice
USE SPELLING EXERCISES

Spelling rules
USE SPELLING

Spelling tasks
USE SPELLING EXERCISES

SPELLING TESTS (487)
CL Planning, programming and evaluation
BT TESTS
RT SPELLING ASSESSMENT

SPECIAL NEEDS LEARNERS (1001)
CL People
BT LEARNERS

Spoken vocabulary
USE ORAL VOCABULARY

Spoken written language relationships
USE ORAL WRITTEN LANGUAGE RELATIONSHIPS

Spoken written language variation
USE ORAL WRITTEN LANGUAGE VARIATION

SPELLING (1620)
CL Language and communication skills
UF Orthography
Spelling rules
RT WRITING
WRITTEN LANGUAGE
SPONTANEOUS WRITING (1282)
  CL  Instructional materials and methodologies
  UF  Free writing
  BT  WRITING

STORIES [LEARNER WRITTEN] (1426)
  CL  Instructional materials and methodologies
  NT  SHORT STORIES [LEARNER WRITTEN]
  RT  CREATIVE WRITING

Student assessment
  USE ASSESSMENT

Student centred approach
  USE LEARNER CENTRED INSTRUCTION

Student centred curriculum
  USE LEARNER CENTRED CURRICULUM

Student centred instruction
  USE LEARNER CENTRED INSTRUCTION

Student centred methods
  USE LEARNER CENTRED INSTRUCTION

Student centred programs
  USE LEARNER CENTRED PROGRAMS

Student centred tutoring
  USE LEARNER CENTRED TUTORING

Student instructor relationships
  USE LEARNER INSTRUCTOR RELATIONSHIPS

Student opinions
  USE LEARNER OPINIONS

Student produced curriculum
  USE LEARNER PRODUCED CURRICULUM

Student produced materials
  USE LEARNER PRODUCED MATERIALS

Student profiles
  USE LEARNER PROFILES

Student publications
  USE LEARNER PRODUCED MATERIALS

Student support groups
  USE LEARNER SUPPORT GROUPS

Student support services
  USE LEARNER SUPPORT SERVICES

Student tutor relationships
  USE LEARNER TUTOR RELATIONSHIPS

Student writings
  USE LEARNER PRODUCED MATERIALS

Student written materials
  USE LEARNER PRODUCED MATERIALS

Students
  USE LEARNERS

Teachers
  USE INSTRUCTORS TUTORS

Teaching
  USE INSTRUCTION TUTORING
Teaching aids
USE INSTRUCTIONAL AIDS TUTORING AIDS

Teaching materials
USE INSTRUCTIONAL MATERIALS TUTORING MATERIALS

Teaching methods
USE INSTRUCTIONAL METHODS TUTORING METHODS

Teaching models
USE INSTRUCTIONAL MODELS TUTORING MODELS

Teaching practices
USE INSTRUCTIONAL METHODS TUTORING METHODS

Teaching skills
USE INSTRUCTIONAL SKILLS TUTORING SKILLS

Teaching strategies
USE INSTRUCTIONAL STRATEGIES TUTORING STRATEGIES

Teaching styles
USE INSTRUCTIONAL STYLES TUTORING STYLES

TECHNICAL VOCABULARY (1628)
CL Language and communication skills
BT VOCABULARY
RT TECHNICAL READING TECHNICAL WRITING

TECHNICAL WRITING (1306)
CL Language and communication skills
UF Business writing
BT WRITING
RT MEMO WRITING REPORT WRITING TECHNICAL VOCABULARY WORKPLACE WRITING

TESTS (490)
CL Planning, programming and evaluation
SN Use only for a general discussion of several types of tests; if possible use a more specific term (Numeracy tests, etc.)
RT LITERACY TESTS NUMERACY TESTS READING TESTS SPELLING TESTS WRITING TESTS

Text comprehension
USE READING COMPREHENSION

Theory of literacy
USE LITERACY THEORY

Tutor learner relationships
USE LEARNER TUTOR RELATIONSHIPS

Tutor student relationships
USE LEARNER TUTOR RELATIONSHIPS
### TUTOR TRAINING (493)
- **CL** Planning, programming and evaluation
- **RT** INSTRUCTOR TRAINING
  - TUTORS

### TUTORING (1194)
- **CL** Instructional materials and methodologies
- **SN** Use only for a general discussion of the concept; if possible use a more specific term (Literacy tutoring, etc.)
- **UF** Coaching
  - Individualized instruction
  - One to one instruction
  - One to one tutoring
  - Personalized instruction
  - Teaching
- **NT** BILINGUAL TUTORING
- INHOME TUTORING
- LEARNER CENTRED TUTORING
- LITERACY TUTORING
- NUMERACY TUTORING
- PEER TUTORING

### TUTORING AIDS (959)
- **CL** Instructional materials and methodologies
- **UF** Teaching aids
- **RT** INSTRUCTIONAL AIDS
  - TUTORING MATERIALS

### TUTORING METHODS (1264)
- **CL** Instructional materials and methodologies
- **UF** Teaching methods
  - Teaching practices
  - Tutoring approaches
  - Tutoring formats
  - Tutoring practices
  - Tutoring techniques
- **RT** INSTRUCTIONAL METHODS
  - TUTORING STRATEGIES
  - TUTORING STYLES

### TUTORING MODELS (3440)
- **CL** Instructional materials and methodologies
- **UF** Teaching models
- **RT** INSTRUCTIONAL MODELS
  - TUTORING STRATEGIES

### TUTORING SKILLS (54)
- **CL** Language and communication skills
- **UF** Teaching skills
- **BT** SKILLS
- **RT** INSTRUCTIONAL SKILLS

### TUTORING STRATEGIES (1265)
- **CL** Planning, programming and evaluation
- **UF** Teaching strategies
  - Tutoring systems
- **RT** INSTRUCTIONAL STRATEGIES
  - TUTORING METHODS
  - TUTORING MODELS
  - TUTORING STYLES

### TUTORING STYLES (494)
- **CL** Planning, programming and evaluation
- **UF** Teaching styles
- **RT** INSTRUCTIONAL STYLES
  - TUTORING METHODS
  - TUTORING STRATEGIES
Tutoring systems
USE TUTORING STRATEGIES

Tutoring techniques
USE TUTORING METHODS

TUTORS (1008)
CL People
UF Teachers
NT LITERACY TUTORS
NUMERACY TUTORS
RT INSTRUCTORS
TUTOR TRAINING

UNIVERSAL LITERACY (798)
CL Literacy, numeracy, and adult basic ed.
UF International literacy
BT LITERACY
RT RIGHT TO LITERACY

URBAN LITERACY PROGRAMS (253)
CL Planning, programming and evaluation
UF Inncity literacy programs
BT LITERACY PROGRAMS
RT RURAL LITERACY PROGRAMS

Utilitarian arithmetic
USE FUNCTIONAL NUMERACY

Utilitarian literacy
USE FUNCTIONAL LITERACY

Utilitarian reading
USE FUNCTIONAL READING

Utilitarian writing
USE FUNCTIONAL WRITING

VOCABULARY (1632)
CL Language and communication skills
SN Use only for a general discussion of the concept; if possible use a more specific term (Active vocabulary, etc.)
NT ACTIVE VOCABULARY
BASIC VOCABULARY
ORAL VOCABULARY
PASSIVE VOCABULARY
TECHNICAL VOCABULARY

VOCABULARY DEVELOPMENT (1633)
CL Language and communication skills
RT WORD ATTACK SKILLS

VOCABULARY EXERCISES (3926)
CL Instructional materials and methodologies
RT SPELLING EXERCISES
VOCABULARY GAMES
VOCABULARY SKILLS

VOCABULARY GAMES (796)
CL Instructional materials and methodologies
UF Word games
RT VOCABULARY EXERCISES

VOCABULARY SKILLS (67)
CL Language and communication skills
BT SKILLS
RT VOCABULARY EXERCISES

WAC
USE WRITING ACROSS THE CURRICULUM

WOMEN'S LITERACY MATERIALS (960)
CL Instructional materials and methodologies
BT LITERACY MATERIALS
WOMEN'S LITERACY PROGRAMS (257)
CL Planning, programming and evaluation
BT LITERACY PROGRAMS

WORD ATTACK SKILLS (3392)
CL Language and communication skills
BT SKILLS
RT VOCABULARY DEVELOPMENT

Word games
USE VOCABULARY GAMES

WORD RECOGNITION (1640)
CL Language and communication skills
UF Sight vocabulary
Sight words
RT SIGHT READING

Worker family literacy programs
USE FAMILY LITERACY PROGRAMS

WORKPLACE LITERACY (762)
CL Literacy, numeracy, and adult basic ed.
UF Employable literacy
Employee literacy
Job related literacy
Literacy in the workplace
Occupational literacy
BT LITERACY
RT LITERACY JOB RELATIONSHIPS
WORKPLACE NUMERACY

WORKPLACE NUMERACY (3966)
CL Literacy, numeracy, and adult basic ed.
UF Employable numeracy
Employee numeracy
Job related numeracy
Numeracy in the workplace
Occupational numeracy
BT NUMERACY
RT WORKPLACE LITERACY

WORKPLACE READING (1140)
CL Language and communication skills
UF Job related reading
BT READING
RT FUNCTIONAL READING
TECHNICAL READING

WORKPLACE WRITING (1307)
CL Language and communication skills
UF Job related writing
BT WRITING
RT FUNCTIONAL WRITING
TECHNICAL WRITING

WORLD LITERACY DAY (736)
CL Literacy, numeracy, and adult basic ed.
UF International literacy day
Literacy day
RT LITERACY EVENTS

WRITERS (974)
CL People
NT BEGINNING WRITERS
NEW WRITERS
RT LITERATES
NONWRITERS

WRITING (366)
CL Language and communication skills
SN Use only for a general discussion of the concept; if possible use a more specific term (Creative writing, etc.)
UF Composition
Writing processes
Written expression

NT ASSISTED WRITING
COLLECTIVE WRITING
CONTENT AREA WRITING
CREATIVE WRITING
EXPERIENCE WRITING
EXPOSITORY WRITING
EXPRESSIVE WRITING
FUNCTIONAL WRITING
JOURNAL WRITING
LETTER WRITING
MEMO WRITING
PROCESS WRITING
REPORT WRITING
SPONTANEOUS WRITING
TECHNICAL WRITING
WORKPLACE WRITING

RT HANDWRITING
PREWRITING
READING WRITING RELATIONSHIPS
SPELLING
WRITING ACTIVITIES
WRITTEN LANGUAGE

WRITING ABILITY (1643)
CL Language and communication skills
BT ABILITY
RT WRITING DIFFICULTIES
WRITING DISABILITIES
WRITING SKILLS

WRITING ACROSS THE CURRICULUM (1644)
CL Instructional materials and methodologies
UF WAC
RT LITERACY ACROSS THE CURRICULUM

WRITING ACTIVITIES (1161)
CL Instructional materials and methodologies
UF Writing tasks
RT WRITING
WRITING EXERCISES
WRITING GAMES
WRITING THEMES

WRITING WORKSHOPS

WRITING ANXIETY (1528)
CL Individual characteristics and behaviour
UF Fear of writing
RT WRITING DIFFICULTIES

WRITING ASSESSMENT (1645)
CL Planning, programming and evaluation
BT ASSESSMENT
RT WRITING TESTS

Writing assignments
USE WRITING EXERCISES

WRITING DIFFICULTIES (1647)
CL Language and communication skills
RT HANDWRITING DIFFICULTIES
WRITING ABILITY
WRITING ANXIETY
WRITING DISABILITIES

WRITING DISABILITIES (909)
CL Cognitive and learning processes
UF Dysgraphia
Writing handicaps
RT WRITING ABILITY
WRITING DIFFICULTIES

WRITING EXERCISES (1145)
CL Instructional materials and methodologies
UF Writing assignments
Writing practice
Writing tasks
RT HANDWRITING EXERCISES
WRITING ACTIVITIES
WRITING THEMES

Writing from experience
USE EXPERIENCE WRITING
WRITING GAMES (1144)
CL Instructional materials and methodologies
RT WRITING ACTIVITIES

WRITING PROGRESS (1651)
CL Planning, programming and evaluation
UF Writing improvement
RT WRITING LEVELS

WRITING HANDICAPS
USE WRITING DISABILITIES

WRITING IMPROVEMENT
USE WRITING PROGRESS

WRITING INSTRUCTION (367)
CL Instructional materials and methodologies
BT INSTRUCTION
RT HANDWRITING INSTRUCTION
WRITING METHODS

WRITING RESEARCH (496)
CL Planning, programming and evaluation
RT LITERACY RESEARCH

WRITING SKILLS (68)
CL Language and communication skills
BT SKILLS
RT WRITING ABILITY

WRITING LEVELS (1649)
CL Language and communication skills
RT WRITING PROGRESS

WRITING SKILLS (68)
Writing tasks
USE WRITING ACTIVITIES
WRITING EXERCISES

WRITING METHODS (1029)
CL Instructional materials and methodologies
UF Writing techniques
RT WRITING INSTRUCTION

WRITING TECHNIQUES
USE WRITING METHODS

WRITING TESTS (581)
CL Planning, programming and evaluation
BT TESTS
RT WRITING ASSESSMENT

WRITING THEMES (1148)
CL Instructional materials and methodologies
RT WRITING ACTIVITIES
WRITING EXERCISES

WRITING WORKSHOPS (3612)
CL Instructional materials and methodologies
RT WRITING ACTIVITIES

WRITING ACTIVITIES
USE WRITING
| WRITTEN COMMUNICATION (1662) | Written language comprehension  
| CL Language and communication skills | USE READING COMPREHENSION  
| RT WRITTEN LANGUAGE |  

| Written expression |  
| USE WRITING |  

| WRITTEN LANGUAGE (1653) |  
| CL Language and communication skills |  
| RT HANDWRITING |  
| ORAL WRITTEN LANGUAGE RELATIONSHIPS |  
| SPELLING |  
| WRITING |  
| WRITTEN COMMUNICATION |  

| Written spoken language relationships |  
| USE ORAL WRITTEN LANGUAGE RELATIONSHIPS |  

| Written spoken language variation |  
| USE ORAL WRITTEN LANGUAGE VARIATION |  

| Youth literacy |  
| USE ADOLESCENT LITERACY |  


APPENDIX 6
THE CORE LITERACY THESAURUS
TEST VERSION A (AUGMENTED)

(SAMPLE PAGES)

Note: In the original version of this document, page numbers (1-56) appeared at the bottom of each page. The original page numbers have been taken out to avoid confusion.
CORE LITERACY THESAURUS
TEST VERSION A

PARTICIPANT ID: A-1
SAMPLE TERM RECORDS

1) Non-descriptor record:

Adult literacy programs

USE LITERACY PROGRAMS

Non-descriptor: cannot be used as index term.

Reference to valid descriptor(s) which can/must be used to represent the concept.

2) Descriptor record:

LITERACY PROGRAMS (220)

CL Planning, programming and evaluation

DF planned systematic sequences of instructional activities directed towards the acquisition and/or development of literacy skills, designed for and offered to individuals who are beyond mandatory schooling age

SN Use only for a general discussion of several types of literacy programs; if possible, use a more specific term (Family literacy programs, etc.)

UF Adult literacy programs

BT PROGRAMS

NT COMMUNITY LITERACY PROGRAMS

FAMILY LITERACY PROGRAMS

LIBRARY LITERACY PROGRAMS

URBAN LITERACY PROGRAMS

RT LITERACY INSTRUCTION

NUMERACY PROGRAMS

POSTLITERACY PROGRAMS

Subject descriptor (descriptor's record number). Appears in upper-case letters, and in boldface.

Term class.

Definition: specifies the meaning of the descriptor, in the framework of this thesaurus. Terms in italics and/or underlined are subject descriptors in the same thesaurus, and as such they are defined elsewhere in the thesaurus. Two or three definitions can be attached to a descriptor.

Scope note: gives precise directions for the use of the descriptor.

Synonymous term or expression: other concepts/subjects which are expressed by the descriptor, in the framework of the thesaurus. Cannot be used as index terms. Broader term: other valid index term more general in meaning than the descriptor, in the framework of the thesaurus

Narrower terms: other valid index terms more restricted in meaning than the descriptor, in the framework of the thesaurus

Related terms: other valid index terms with which the descriptor is associated, in the framework of the thesaurus.
ACTIVE VOCABULARY (30)

CL Language and communication skills
DF subset of the vocabulary of a language, made of those words and idiomatic expressions that an individual actually uses in oral and written communication

BT VOCABULARY
RT PASSIVE VOCABULARY

ADOLESCENT LITERACY (720)

CL Literacy, numeracy, and adult basic ed.
DF literacy levels and literacy skills of adolescents (between the age of 13 and 17)

UF Youth literacy
BT LITERACY

ADULT BASIC EDUCATION (263)

CL Literacy, numeracy, and adult basic ed.
DF instructional programs and activities, designed for and offered to adults who have not completed high school, with emphasis on general communication skills, literacy skills, and social skills

UF ABE
Basic education
Fundamental education

RT ADULT BASIC EDUCATION CENTRES LITERACY

ADULT BASIC EDUCATION CENTRES (3485)

CL Education: philosophy, system, and facilities
DF physical facilities at which adult basic education services are provided, and where adult basic education programs and activities take place

UF Basic education centres

RT ADULT BASIC EDUCATION LITERACY CENTRES

Adult basic literacy

USE BASIC LITERACY
Writing techniques
USE WRITING METHODS

WRITING TESTS (581)
CL Planning, programming and evaluation
DF techniques, procedures, sets of questions, problems or exercises, used to assess an individual's writing ability and/or writing skills, at a specific point in time
BT TESTS
RT WRITING ASSESSMENT

WRITING THEMES (1148)
CL Instructional materials and methodologies
DF topics suggested by instructors and/or developed by learners for writing activities and writing exercises
RT WRITING ACTIVITIES
WRITING EXERCISES

WRITING WORKSHOPS (3612)
CL Instructional materials and methodologies
DF instructional activities of short duration, designed for and involving the active participation of individuals with common interests in the writing process, which provide them with an opportunity to exchange information, develop solutions to common problems, and/or learn new techniques from writing specialists
RT WRITING ACTIVITIES

WRITTEN COMMUNICATION (1662)
CL Language and communication skills
DF process of transmitting or exchanging ideas, instructions, information, etc., through written language
RT WRITTEN LANGUAGE

Written expression
USE WRITING

WRITTEN LANGUAGE (1653)
CL Language and communication skills
DF system of conventional standardized graphic signs and symbols, with rules for their use to convey meaning
RT HANDWRITING
ORAL WRITTEN LANGUAGE RELATIONSHIPS
SPELLING
WRITING
WRITTEN COMMUNICATION

Written language comprehension
USE READING COMPREHENSION

Written spoken language relationships
USE ORAL WRITTEN LANGUAGE RELATIONSHIPS

Written spoken language variation
USE ORAL WRITTEN LANGUAGE VARIATION

Youth literacy
USE ADOLESCENT LITERACY
APPENDIX 7
THE CORE LITERACY THESAURUS
TEST VERSION S (STRIPPED)

(SAMPLE PAGES)

Note: In the original version of this document, page numbers (1-47) appeared at the bottom of each page. The original page numbers have been taken out to avoid confusion.
SAMPLE TERM RECORDS

1) Non-descriptor record:

Adult literacy programs ⇒ Non-descriptor: cannot be used as index term.
USE LITERACY PROGRAMS ⇒ Reference to valid descriptor(s) which can/must be used to represent the concept.

2) Descriptor record:

LITERACY PROGRAMS (220) ⇒ Subject descriptor (descriptor's record number)
CL Planning, programming and evaluation ⇒ Appears in upper-case letters, and in boldface.
DF planned systematic sequences of ⇒ Term class.
   instructional activities directed towards ⇒ Definition: specifies the meaning of the descriptor, in
   the acquisition and/or development of ⇒ the framework of this thesaurus.
   literacy skills, designed for and offered to ⇒ Terms in italics and/or underlined are subject
descriptors in the same thesaurus, and as such they are
defined elsewhere in the thesaurus.
individuals who are beyond mandatory ⇒ Two or more definitions can be attached to a
schooling age descriptor.
SN Use only for a general discussion of several ⇒ Scope note: gives precise directions for the use of the
types of literacy programs; if possible, use a ⇒ descriptor.
more specific term (Family literacy ⇒
programs, etc.)
UF Adult literacy programs ⇒ Synonymous term or expression: other
concept/subjects which are expressed by the
descriptor, in the framework of the thesaurus. Cannot
be used as index terms.
ABE
USE ADULT BASIC EDUCATION

ABILITY (1529)
CL Cognitive and learning processes
DF combination of natural talent and qualities,
and acquired knowledge and skills, that
allows an individual to carry out
successfully a mental or physical task
with or without instruction
SN Use only for a general discussion of the
concept or of several types of abilities; if
possible use a specific term (Reading
ability, etc.)
UF Aptitude

Able readers
USE FLUENT READERS

ABORIGINAL LANGUAGE LITERACY (719)
CL Literacy, numeracy, and basic adult ed.
DF first language literacy skills in Aboriginal peoples
UF Native language literacy

ABORIGINAL LITERACY PROGRAMS (184)
CL Planning, programming and evaluation
DF literacy programs designed for and offered
to Aboriginal peoples
DF literacy programs designed for and offered
to individuals who need/want to develop
Aboriginal language literacy skills
UF Native literacy programs

ACTIVE VOCABULARY (30)
CL Language and communication skills
DF subset of the vocabulary of a language,
made of those words and idiomatic
expressions that an individual actually
uses in oral and written communication

ADOLESCENT LITERACY (720)
CL Literacy, numeracy, and basic adult ed.
DF literacy levels and literacy skills of adolescents (between the age of 13 and 17)
UF Youth literacy

ADULT BASIC EDUCATION (263)
CL Literacy, numeracy, and basic adult ed.
DF instructional programs and activities,
designed for and offered to adults who
have not completed high school, with
emphasis on general communication
skills, literacy skills, and social skills
UF ABE
Basic education
Fundamental education

ADULT BASIC EDUCATION CENTRES (3485)
CL Education: philosophy, system, and facilities
DF physical facilities at which adult basic
education services are provided, and
where adult basic education programs
and activities take place
UF Basic education centres

ADULT LITERACY (USE LITERACY)

Adult basic literacy
USE BASIC LITERACY

Adult learners
USE LEARNERS

Adult literacy
USE LITERACY

Adult literacy programs
USE LITERACY PROGRAMS

Adult new readers
USE NEW READERS
WRITING PROGRESS (1651)
CL Planning, programming and evaluation
DF significant increase and improvement in an individual's ability to participate in writing activities, complete writing exercises, and perform well in writing tests
UF Writing improvement

Writing reading relationships
USE READING WRITING RELATIONSHIPS

WRITING RESEARCH (496)
CL Planning, programming and evaluation
DF systematic investigation, collection, and analysis of relevant data, to document problems, test hypotheses, and advance general and specialized knowledge about writing

WRITING SKILLS (68)
CL Language and communication skills
DF complex mental and/or physical behaviours developed through learning, practice and repetition, that are called upon by an individual in writing

Writing tasks
USE WRITING ACTIVITIES WRITING EXERCISES

Writing techniques
USE WRITING METHODS

WRITING TESTS (581)
CL Planning, programming and evaluation
DF techniques, procedures, sets of questions, problems or exercises, used to assess an individual's writing ability and/or writing skills, at a specific point in time

WRITING THEMES (1148)
CL Instructional materials and methodologies

DF topics suggested by instructors and/or developed by learners for writing activities and writing exercises

WRITING WORKSHOPS (3612)
CL Instructional materials and methodologies
DF instructional activities of short duration, designed for and involving the active participation of individuals with common interests in the writing process, which provide them with an opportunity to exchange information, develop solutions to common problems, and/or learn new techniques from writing specialists

WRITTEN COMMUNICATION (1662)
CL Language and communication skills
DF process of transmitting or exchanging ideas, instructions, information, etc., through written language

Written expression
USE WRITING

WRITTEN LANGUAGE (1653)
CL Language and communication skills
DF system of conventional standardized graphic signs and symbols, with rules for their use to convey meaning

Written language comprehension
USE READING COMPREHENSION

Written spoken language relationships
USE ORAL WRITTEN LANGUAGE RELATIONSHIPS

Written spoken language variation
USE ORAL WRITTEN LANGUAGE VARIATION

Youth literacy
USE ADOLESCENT LITERACY
APPENDIX 8
SAMPLE COLLECTION

DOCUMENT #1

ED321593

Abstract: This book is an account of the development and implementation of the University of Massachusetts English Family Literacy Project, presented as a curriculum guide for others who may be involved in developing English-as-a-Second-Language and family literacy programs for immigrants and refugees. An introductory section describes the program, the process of writing the guide, and the intended audience and purpose of the guide, and offers questions and guidelines for group discussion of curriculum content and related issues. The guide is designed and recommended for use by a group rather than by individuals. Subsequent chapters address the following topics: (1) what constitutes family literacy; (2) the participatory approach to curriculum development; (3) determining program structure; (4) examining the process that occurs within the classroom; (5) involving students in the process of uncovering themes and issues as an integral part of classroom interaction (6) developing curriculum around themes using a variety of techniques, procedures, and activities; (7) using literacy to address real issues and make changes in the social context through collective effort; and (8) determining what counts as student progress. A list of over 130 resources is included. (MSE) (Adjunct ERIC Clearinghouse on Literacy Education)

DOCUMENT #2

ED323344

Abstract: This guide is written for college students, faculty, administrators, and staff who would like to get involved in literacy work. Following an introduction, chapter 2 provides basic information about literacy in the United States. Chapter 3 uses a question and answer format to tell how to start a campus program. Chapter 4 discusses how to work with learners, community literacy programs, and other community organizations and agencies. Chapter 5 gives program ideas, including: tutoring; testing learners; learner orientation; tutor orientation and training; learning materials production; recruiting volunteers and learners; providing child care, transportation, and other support services; fundraising; public relations; conferences and meetings; and award ceremonies. Chapter 6 suggests integrating college curriculum and the
provision of services to literacy programs. Chapter 7 concentrates on recruiting learners and tutors and promoting the program. Chapter 8 gives overall advice about training and supervising literacy work. Developing funds is the subject of chapter 9. Existing programs at 13 colleges are described in chapter 10. Chapter 11 is intended to give readers a sense of the variety of issues that concern people who work with and study literacy. Chapter 12 contains information on how to contact 21 organizations that are considered resources for literacy work. The document concludes with a 17-item bibliography and a list of 6 related publications. (CML)

**DOCUMENT #3**

ED324441

Literacy in the Workplace: A Whole Language Approach.

Abstract: The personnel director of a local industry requested reading help from Central Missouri State University for several employees. After several meetings, a workplace literacy program that used the whole language approach supplemented by direct instruction in word recognition skills was developed. Two types of tests were written. One, a vocabulary test, required the participant to identify 40 industry- or safety-related words instantly and out of context. The terms were drawn from Occupational Safety and Health Administration forms, technical manuals from the company, and the book entitled "Occupational Literacy" (Rush et al., 1986). The second test used the Cloze procedure as a simple and relatively accurate way to assess background knowledge necessary for general comprehension. Participants spent the first day of the program getting acquainted, browsing through magazines and newspapers for interesting articles, learning the VAKT (visual, auditory, kinesthetic, and tactile) method of study, writing journals, and having individual conferences with the instructor to set goals. Days 2-5 were spent reading self-selected materials, continuing word study routines established the first day, and using an informal reading inventory to begin individualized assessment. Ongoing procedures continued and expanded these activities with the aim of enabling participants to meet personal reading goals, build confidence and motivation, increase speaking and writing skills, and increase volume of reading and reading for pleasure. Appendices contain vocabulary development activities, word study procedures, screening instruments, a lesson plan, information on naturalistic assessment of reading, and lists of materials. (Includes 14 references). (CML)

Place identifier: Missouri

**DOCUMENT #4**

ED324469

A Collaborative Adult Literacy Training Workshop for Tutors and Students: The Student-Tutor Orientation.

Abstract: A pilot tutor training project, the Student-Tutor Orientation (STO), was designed to meet the need for making whole-language concepts of reading and writing instruction accessible to tutors as well as students through hands-on experience and for establishing a collaborative tutoring relationship in which students share in decision making. Together, tutors and students
at a literacy program in a large Northeastern city learned the new concepts and strategies such as the language experience method. Use of materials relating to student goals and interests was emphasized, with instruction on how to make difficult but interesting texts accessible through such strategies as student listening and duet reading. Writing was stressed from the beginning, using invented spelling if necessary. After a year’s use, in which 11 STOs were given and 97 tutor-student pairs trained, the approach seems to be superior to the agency’s former training methods in several respects. Retention of tutors after training and hours of service surpassed those of a comparable series of the Center for Literacy’s training a year ago. Tutors expressed increased confidence, and tutors and students reported more goal-related materials used and more writing done. Staff members requested STOs for their areas, stating that they felt the STOs produced better tutoring. Students were enthusiastic about their progress and their gains in self-esteem. (Author/KC)

DOCUMENT #5
ED326713
Working with Beginners.

Abstract: The reading instructor working with adult "beginners" needs to have an open mind, be willing to be imaginative and adventurous, and think positively. The basic approach requires the instructor to build beginners' confidence; encourage beginners to participate fully, think for themselves, and learn to learn; involve beginners in planning; and provide for social breaks. Since beginners have a great deal to learn, it is well worth spending time and effort on memory aids, such as a reference file; memory joggers; regular review; and building on what has been done before. Some suggestions for review include starting points or using what students already know; language experience; and using signs and notices. Supplemental reading materials that can be used with beginners include short texts from everyday reading and specially written easy readers. Teachers of beginners should consider shared reading if the student selects a too difficult text. Phonics and writing can also be used as reading aids and helps. Much individual support is needed to give beginners a good start, so volunteers should be enlisted to achieve the right balance between support and developing independence. (YLB)

DOCUMENT #6
ED327696

Abstract: A project was developed to teach literacy to adult students over 40 years old, using job-related materials in a computer-assisted approach with volunteer tutors. The project used the Penn State Adult Literacy Courseware, consisting of six computer-based modules and an Apple IIIGS microcomputer. Volunteer teachers already working with adult students at the test site were recruited for participation in the project and trained in using the courseware. Adult students reading at a sixth-grade level or below who were unemployed or underemployed were
targeted for the program. Tutors helped students work on modules that met their needs and interests. Throughout the project and at the end, 13 students and 14 tutors were asked about their attitudes and impressions of the project. Evaluation indicated that tutors and students showed positive attitudes and interest in the courseware. Many volunteer tutors were able to use the computers and courseware with their students by the end of the project, and students showed gains in reading and writing ability. Many student/tutor pairs were still working with the computers/courseware at the end of the project and planned to continue. The project proved, however, that learning to use computers takes time as well as support for tutors and students. (Sixteen appendices contain responses to the student attitude, student closeout, tutor attitude, and tutor closeout surveys; tutor guidelines; a 29-page program manual; a 35-page tutor's guide to the courseware; responses to the advisory board questionnaire; and guidelines for creating courseware lessons.) (KC)

DOCUMENT #7

ED329655
Different Strokes for Different Folks.

Abstract: This manual, together with the continuing education or inservice teacher workshops for learning the Systematic Integrated Teaching/Learning Approach (SITLA), can help teachers use different approaches to work effectively with a population of adults 18 years and older who are enrolled in special education classes, college-based developmental skills courses, job training classes, vocational schools, and other educational programs, and specifically have serious deficiencies in reading, writing, mathematics calculations, verbal skills, and abstractions. The manual contains four sections. The first section describes characteristics of people who process information simultaneously, rather than sequentially. It explains that physiological difficulties prevent some adult learners from learning to read and write properly. Integrated learning involves learning in which seeing, hearing, speaking, doing, and experiencing are continuously interrelated. The next section illustrates the systematic integrated teaching/learning approach in practice. Selected portions of national television news broadcasts are videotaped for classroom use and include photocopies of newspaper accounts of the same topic. Television news presentations and newspaper reports provide the teacher with relevant material from which class assignments are generated. Through video viewing, choral reading, discussion, dictation, self check, homework, and follow through, reading and writing skills are successfully learned. The third section explains the use of materials that can be manipulated to provide experiences that help students understand and make connections between math problems and number symbols. The fourth section asserts that attitudes are caught not taught. These adult learners must be helped to discover that they are intelligent people who can learn to read, write and compute when the way in which they are taught matches their learning style. (NLA)
**DOCUMENT #8**

**ED379499**

From Parent to Child. Final Performance Report for Library Services and Construction Act Title VI Library Literacy Program.

**Abstract:** Prince George's County (Maryland) Memorial Library System received a grant to develop and implement a parenting-literacy project for the women in the County Correctional Center. The project's goal was to help the incarcerated female parent develop her own and her child's literacy skills. Eighty-eight women with children aged 5 and under or who were pregnant or the principal caregiver participated in one of four 6-week-long workshops. Through the workshops, the women were introduced to experiences and techniques they could use to influence and participate in their children's learning through language development/reading activities and to increase their own literacy and parenting skills. An evaluation form administered at the end of each cycle showed a 98 percent approval rating for the project. The literacy skills assessment results demonstrated that the women were not functionally illiterate. They were enthusiastic about the reading activities for themselves as well as for their children. (Following the 11-page report, appendixes provide the following: a detailed description of the video series, Footsteps, that was used to present parenting issues, concerns, and techniques; evaluation form; program brochure; interviews with program completers; and copies of news articles and annual report.) (YLB)

**Place identifier:** Maryland

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**DOCUMENT #9**

**ED333436**

Sources of Difficulty in the Processing of Written Language. Report Series 4.3.

**Abstract:** Ease of language processing varies with the nature of the language involved. Ordinary spoken language is the easiest kind to produce and understand, while writing is a relatively new development. On thoughtful inspection, the readability of writing has shown itself to be a complex topic requiring insights from many academic disciplines and research techniques that are still not well developed. It would be wrong to conclude that writing is easiest to process when it is most like ordinary spoken language, or that more easily processed writing is "better" than more difficult language. A comparison of a passage from Henry James' "The Ambassadors" with one from Edith Wharton's "Ethan Frome" serves to illustrate some differences between written and spoken language. For example, differences in language and culture can hinder a reader's efforts to decipher a written text, as can unclear verbal references, insertion of new information, and negation. A listener's or reader's interest in a piece of language can be heightened through involvement (causing the listener or reader to feel caught up in what is expressed) and detachment (shifting attention from the actor to the object being acted upon). The arrangement and structure of paragraphs affects comprehension. Because writing can serve different purposes, it would be wrong to assign an absolute scale of values to the features that affect message processing. (Nineteen references are attached.) (SG)
**DOCUMENT #10**

ED340262


**Abstract:** The Library Rural Literacy Outreach Program targeted to ten rural communities in the Fresno County, California, Free Library district is reported. The sites were chosen based on inquiries from volunteers in those communities and support for the program by the branch library staff. Goals of the program were to provide literacy services to adult learners needing basic skills or English as a Second Language skills and to solicit community commitment to participate in the program. Among the outcomes of the program are the following: (1) existing literacy tutorials were supported through inservice programs; (2) literacy materials were purchased to expand and enrich existing collections; (3) 40 volunteers were recruited from the ten targeted areas; (4) tutor-training workshops were provided; (5) adult learners needing literacy services were recruited; (6) trained tutors were matched with adult learners in the rural communities; and (7) the progress of tutorials was monitored through written reports from tutors. Program difficulties were the result of low attendance in spite of high interest, limited shelf space for new library acquisitions, and the reluctance of some tutors to be matched immediately with an adult learner. Attachments to this report include a press release on the program, a newspaper recruitment article, tutor reports, and a sample list of learner goals. (LB)

**Place identifier:** California

**DOCUMENT #11**

ED358747

Developing Native Language Literacy in Language Minority Adults. ERIC Digest.

**Abstract:** Adult education programs must increasingly serve non-native speakers of English, many of whom are neither literate in their native language nor in English. It is suggested that first language literacy promotes second language acquisition and that literacy skills in the native language are likely to transfer to the second language. This digest defines the central cognitive and psycholinguistic tenets inherent in the native language literacy approach and provides, social, cultural, and political justification for the approach. Instructional delivery models for initial literacy and other literacy program models are described. It is concluded that more research on the results of the different approaches to teaching English-as-a-Second-Language literacy skills is needed. Such research should consider not only the pedagogical and linguistic factors involved in the education of adults, but also the social and political implications of bilingualism and biliteracy with regard to equal opportunities and full participation in society. (Adjunct ERIC Clearinghouse on Literacy Education) (LET)

Abstract: Census data, enrollment statistics, and selected studies/reports regarding adult literacy and literacy education in British Columbia (Canada) were examined to determine the nature and scope, need for, and cost of literacy activities and programs in British Columbia. According to 1986 census data, 17% of British Columbia's adult population lack sufficient literacy skills to cope with everyday demands. The annual costs of adult illiteracy in British Columbia were estimated at $10 billion. New or expanded literacy programs and support services were deemed necessary to empowering undereducated adults, and the special needs of minority groups and the need for research and evaluation, interministerial collaboration, and ongoing monitoring of literacy were designated special areas of concern. Among the study recommendations were the following: (1) community colleges should become community catalysts to improve levels of adult literacy; (2) business, labor, community organizations, libraries, Native organizations, colleges, and schools should collaborate to develop and implement a community-based literacy strategy; and (3) government investment in adult literacy should be increased by 100% for 1990-91 and by lesser amounts for the next 4 years. (Twenty-one references are cited. Appended are the following: 1986 census data for British Columbia; summary of services, needs, and enrollment by college region; and lists of exemplary programs and practices in Canada.) (MN)

Place identifier: British Columbia


Abstract: The main objective of the seventh regional workshop was to provide training experience to participants from Unesco member states in the development of instructional neo-literate materials and the expansion of participation in literacy activities to the needs of the rural people, particularly women. The final report begins with an account of the proceedings of the workshop, which was attended by 23 participants and observers representing 12 countries. Introductory materials include the proceedings, which present the objectives of the workshop together with its officers and orientation, outline the activities of the participants, and list the recommendations made by the participants for the Asian Cultural Center for Unesco (ACCU), member states, and Unesco. The first of four major sections contains group reports on a field survey which was conducted by the participants to determine the needs of women and girls in three villages, and reports on the preparation and field-testing of materials prepared by the three groups. Interview questions and the instructional materials developed by the groups—two booklets and a poster, two posters and a game, and flip charts, a slide kit, and a poster—are included in the reports with a profile of each participating village and a description of the field
test. The second section contains the text of reports from Unesco and ACCU, together with country reports from China, Indonesia, India, Iran, Laos, Malaysia, Papua New Guinea, Pakistan, the Philippines, Thailand, and Viet Nam, and reports from resource people from Unesco, Nepal, and Thailand. The third section contains national follow-activity plans prepared by teams of participants in the workshop. The annex and appendix include general information, a schedule of the workshop, a list of participants, and the addresses given by various officials in the opening session.

**DOCUMENT #14**

ED349503  
Strategies for Improving Adult Reading Performance.

Abstract: This project report explores the potential of using the strategies and methods of the Reading Recovery Program to teach adult nonreaders. The following assessment procedures assist the tutor in determining the student's reading level: letter identification, reading vocabulary, concepts about print, writing vocabulary, dictation, and text reading. The reading and writing activities presented in this booklet emphasize reading for meaning through text reading and learning strategies that incorporate all three cuing systems. Writing activities include learning letters, sentence writing, additional sentence writing, and spelling words. The following reading activities are included: new readings; analyze student's reading; questioning strategies—meaning substitution, visual error, grammatical or structural error, and omissions and insertions; reread for fluency; and model good reading behaviors. Additional activities include sight words and varied activities. Four handouts are provided. (NLA)

**DOCUMENT #15**

ED349006  

Abstract: Library literacy programs may be on-going or short-term, formal or informal, large or small. Librarians need to be aware of these programming options and select the program appropriate to their community's literacy needs and the resources the library can make available. This manual is designed to assist librarians in considering options and services and as a guide to program planning and implementation. It provides a generic program plan and an action plan; describes the overall steps needed to plan and implement a library literacy program; provides a planner's checklist; presents examples of small-scale and short-term activities; describes funding options and lists potential sources; describes student recruitment activities and teaching methods; lists sources of literacy materials; describes staffing options and the training of volunteer tutors; and provides suggestions on site selection, record management, and program evaluation. The five appendices include an explanation of low literacy skill levels; a job description for a volunteer tutor; characteristics of adult learners; guides for making libraries accessible to adult learners; and programming ideas for developing literacy awareness on college campuses. (Includes 36 references.) (KRN)
APPENDIX 9
LETTERS SENT TO FIS STUDENTS
Dear FIS student,

My name is Michèle Hudon. I am a doctoral candidate at the Faculty of Information Studies (FIS), working in the area of thesaurus design and use under the expert supervision of Professor Nancy Williamson. I am particularly interested in the nature and amount of semantic information provided with subject descriptors in a thesaurus. The title of my dissertation is: *The effects of integrating terminological definitions in thesauri on interindexer terminological consistency.*

I have now reached one of the final stages in my research. At this point, I need to collect data on the usefulness of various elements of semantic information in a core thesaurus created as a prototype for this project. To do so, I will soon be conducting an indexing session, under laboratory conditions, with a group of volunteers from the FIS student population.

This letter is addressed to all students who have completed at least four (4) courses at FIS. Prior indexing experience and knowledge of thesaurus structure and use are not required for participation. Quality and accuracy of indexing will not be evaluated. The names of the participants will not be linked to the results of their indexing work, and will not appear in my discussion of findings.

With this letter, I am soliciting your participation in this scheduled indexing session. Here is what is involved:

1) preliminary independent reading of a list of approximately 350 terms which constitute the controlled indexing vocabulary (20-30 minutes);

2) active participation in a two and a half hour indexing session during which, following a brief introduction and explanation of your task, you will be asked to assign appropriate descriptors to a set of twelve (12) documents already summarized in an informative abstract. The indexing will be done from the abstracts rather than from the full text of documents, and the descriptors will be selected from the prototype thesaurus.

All volunteers will receive a $10 gift certificate from the U. of T. Bookstore as compensation, and as a token of my appreciation.

If you wish to volunteer, please send a message to: hudon@fis.utoronto.ca (BEFORE 5 P.M. [date]). Indicate which one(s) of the following periods would be most convenient to you. Although it would be preferable to run only one indexing session, two distinct sessions will be organized if necessary. I will be in touch for further details as soon as I get your message.

1) [date / time 1]
2) [date / time 2]

Thank you in advance for your most valuable contribution to this project and to research at FIS.

Michèle Hudon
[Phone number at FIS] [Phone number at home]
hudon@fis.utoronto.ca
Dear fellow doctoral student,

As many of you already know, I am working on a doctoral research project in the area of thesaurus design and use, under the expert supervision of Professor Nancy Williamson. I am particularly interested in the nature and amount of semantic information provided with subject descriptors in a thesaurus. The title of my dissertation is: *The effects of integrating terminological definitions in thesauri on interindexer terminological consistency.*

I have now reached one of the final stages in my research. At this point, I need to collect data on the usefulness of various elements of semantic information in a core thesaurus created as a prototype for this project. To do so, I will soon be conducting an indexing session, under laboratory conditions, with a group of volunteers from the FIS student population.

A similar letter has been addressed to all Masters students who have completed at least four (4) courses at FIS. Prior indexing experience and knowledge of thesaurus structure and use are not required for participation. Quality and accuracy of indexing will not be evaluated. The names of the participants will not be linked to the results of their indexing work, and will not appear in my discussion of findings.

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1) [date / time 1]
2) [date / time 2]

Thank you in advance for your most valuable contribution to this project and to research at FIS.

Michèle Hudon
[Phone number at FIS] [Phone number at home]
hudon@fis.utoronto.ca
APPENDIX 10
DATA COLLECTION FORM: THE INDEXING WORKSHEET

Note: The worksheet was originally printed on size 8 ½ x 14 in. paper. The format has been reduced to fit this page.

Abstract: The main objective of the seventh regional workshop was to provide training experience to participants from Unesco member states in the development of instructional non-literate materials and the expansion of participation in literacy activities to the needs of the rural people, particularly women. The final report begins with an account of the proceedings of the workshop, which was attended by 23 participants and observers representing 12 countries. Introductory materials include the proceedings, which present the objectives of the workshop together with its officers and orientation, outline the activities of the participants, and list the recommendations made by the participants for the Asian Cultural Center for Unesco (ACCU), member states, and Unesco. The first of four major sections contains group reports on a field survey which was conducted by the participants to determine the needs of women and girls in three villages, and reports on the preparation and field-testing of materials prepared by the three groups. Interview questions and the instructional materials developed by the groups—two booklets and a poster, two posters and a game, and flip charts, a slide kit, and a poster—are included in the reports with a profile of each participating village and a description of the field test. The second section contains the text of reports from Unesco and ACCU, together with country reports from China, Indonesia, India, Iran, Laos, Malaysia, Papua New Guinea, Pakistan, the Philippines, Thailand, and Viet Nam, and reports from resource people from Unesco, Nepal, and Thailand. The third section contains national follow-up plans prepared by teams of participants in the workshop. The annex and appendix include general information, a schedule of the workshop, a list of participants, and the addresses given by various officials in the opening session.

Abstract: The main objective of the seventh regional workshop was to provide training experience to participants from Unesco member states in the development of instructional non-literate materials and the expansion of participation in literacy activities to the needs of the rural people, particularly women. The final report begins with an account of the proceedings of the workshop, which was attended by 23 participants and observers representing 12 countries. Introductory materials include the proceedings, which present the objectives of the workshop together with its officers and orientation, outline the activities of the participants, and list the recommendations made by the participants for the Asian Cultural Center for Unesco (ACCU), member states, and Unesco. The first of four major sections contains group reports on a field survey which was conducted by the participants to determine the needs of women and girls in three villages, and reports on the preparation and field-testing of materials prepared by the three groups. Interview questions and the instructional materials developed by the groups—two booklets and a poster, two posters and a game, and flip charts, a slide kit, and a poster—are included in the reports with a profile of each participating village and a description of the field test. The second section contains the text of reports from Unesco and ACCU, together with country reports from China, Indonesia, India, Iran, Laos, Malaysia, Papua New Guinea, Pakistan, the Philippines, Thailand, and Viet Nam, and reports from resource people from Unesco, Nepal, and Thailand. The third section contains national follow-up activity plans prepared by teams of participants in the workshop. The annex and appendix include general information, a schedule of the workshop, a list of participants, and the addresses given by various officials in the opening session. (DB)

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<td>3. INSTRUCTIONAL MATERIALS</td>
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<td>6. LITERACY REPORTS</td>
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<td>8.</td>
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</tbody>
</table>
APPENDIX 11
PRELIMINARY INSTRUCTIONS TO PARTICIPANTS

Note 1: These instructions were originally printed on size 8 ½ x 14 in. paper. The format has been reduced to fit this page.

Note 2: These instructions were distributed to all volunteers three days prior to the indexing session.
PRELIMINARY INSTRUCTIONS TO PARTICIPANTS

1. TEST COLLECTION:

The test collection consists of twelve (12) abstracts, substituting for original full-text documents in the fields of Adult literacy and Adult basic education. In what follows, the abstracts are called "indexable documents" or simply "documents". A complete set of all twelve abstracts will be given to each participant at the beginning of the indexing session.

2. INDEXING VOCABULARY:

A copy of the *Core Literacy Thesaurus (CLT)* will be provided to each participant at the beginning of the indexing session. CLT contains 367 valid descriptors and 243 non-descriptors. CLT descriptors and non-descriptors are listed in the enclosed Core Literacy Thesaurus Lexicon (appendix 1).

Only those terms appearing as valid descriptors in CLT are authorized for use as index terms. In CLT, valid descriptors are in upper-case letters, are boldface, and are followed by a descriptor's number (in parentheses). Non-descriptors, in lower-case letters and followed by a USE reference, are not to be used as index terms.

Sample term records from CLT are appended to this instruction sheet (appendix 2). The thesaurus provided to each participant at the start of the indexing session will give some or all of the semantic information described (i.e. CL=class, DF=definition, SN=scope note, UF=use for, BT=broader term, NT=narrower term, RT=related term). The semantic information provided with a descriptor specifies its meaning. It is used by the indexer to identify appropriate descriptors in given indexing situations.

No names (individual, geographical, etc.) are to be used as descriptors.

3. WHAT TO INDEX?

In each document, all concepts/subjects relating to Adult literacy or Adult basic education must be translated into appropriate descriptors found in CLT.

4. SPECIFICITY OF INDEXING:

Each concept/subject selected for indexing must be represented by the most precise appropriate descriptor available in CLT.

The use of such general descriptors as LITERACY or LITERACY PROGRAMS must be avoided when more specific descriptors identifying "types of literacy" (e.g. FRENCH LANGUAGE LITERACY) or "types of literacy programs" (e.g. WOMEN'S LITERACY


5. NUMBER OF DESCRIPTORS PER DOCUMENT:

A minimum of four (4) descriptors (mandatory descriptors) must be assigned to each document. The first one of the mandatory descriptors is considered the main descriptor (see 5A. below). Up to four (4) additional descriptors (supplementary descriptors) can be assigned to each document.

A maximum of eight (8) descriptors can thus be assigned to each document.

5A. THE MAIN DESCRIPTOR:

The first one of the mandatory descriptors is considered the main descriptor. This descriptor is the most important one in the representation of the original text. The main descriptor is the one that would be used, if only one index term could be assigned to the document being indexed.

6. USING THE INDEXING WORKSHEET:

An indexing worksheet is provided for each document in the test collection. Document titles and abstracts are pre-printed on the worksheets.

On each worksheet:

a. write your participant id. code (individual participant id. codes will be assigned randomly at the start of the indexing session);

b. print clearly the selected main descriptor in the appropriate section;

c. print clearly the main descriptor's record number;

d. print clearly the next three (3) mandatory descriptors, each accompanied by its descriptor’s number;

e. print clearly up to four (4) supplementary descriptors, each accompanied by its descriptor’s number.

Sample worksheets are appended (appendix 3).

7. TIME ON TASK:

You are given two (2) hours (120 minutes) to index the twelve (12) abstracts which constitute the test collection.
Note: These documents were distributed to participants at the start of the indexing session.
INSTRUCTIONS TO PARTICIPANTS

Task description:

1) to identify concepts and/or subjects relating to Adult literacy in each one of the abstracts. A concept related to Adult literacy would be: Literacy, Literacy skills. A subject would be: Literacy skills of women working in factories.

2) to select in your thesaurus the most appropriate specific descriptors to express these concepts and subjects. YOU DO THIS TO THE BEST OF YOUR KNOWLEDGE AND JUDGMENT.

3) Remember: a concept/subject can be represented by one descriptor only (concept is Family - thesaurus descriptor is FAMILIES), or by more than one descriptor (subject is Families living in urban core areas - thesaurus descriptors would be FAMILIES and INNER-CITIES).

Time on task:

You have an average of ten minutes to work on each abstract. You will be made aware of the passage of time at 30 minute intervals; the amount of time remaining will be put on the board.

The indexing aids:

A. The thesaurus:

1) The Core Literacy Thesaurus contains 367 descriptors and 243 non-descriptors, arranged in one single alphabetical order. [see appendix 1 - Sample thesaurus page]

2) You use the thesaurus to select appropriate descriptors to represent the concepts or subjects that you have identified in the abstract. IMPORTANT: IN THE THESAURUS, ALL TERMS THAT ARE IN UPPER CASE CAN BE USED FOR INDEXING, ALL TERMS THAT ARE IN LOWER CASE CANNOT BE USED FOR INDEXING.

3) Like any traditional information indexing and retrieval thesaurus, the thesaurus you are working with contains semantic information to help you decide whether you should use a descriptor or not to represent a certain concept. In your thesaurus, you will find some or all of the semantic information described in the appended sample record [see appendix 2 - sample term records].
4) Remember: when two descriptors are related, it does not mean that both must be used as descriptors. The relationship is there to help you make a decision, making you aware, for example, that a more specific descriptor is available to represent a concept/subject.

B. The indexing worksheet [see appendix 3 - sample indexing worksheets]:

1) Note that your participant code has been pre-printed on the worksheets and on the participant profile form.

2) You can mark abstracts while you read them if this helps you. Whatever is on the top part or the verso of the worksheet is not subject to observation or evaluation.

3) Assign a minimum of four (4) descriptors to each abstract. These are the mandatory descriptors, the ones that are absolutely needed. It is essential that the first descriptor be the most important one, in your own judgment.

Assign up to four (4) supplementary descriptors to each abstract, if appropriate.

Minimum 4 descriptors per abstract
Maximum 8 descriptors per abstract

4) Remember: if two descriptors are needed to describe one concept/subject, they count on your worksheet as two independent descriptors.

5) GOLDEN RULE: DESCRIPTORS MUST BE AS SPECIFIC AS POSSIBLE. A DOCUMENT WHICH DISCUSSES APPLES IS INDEXED WITH THE DESCRIPTOR APPLE, NOT WITH THE DESCRIPTOR FRUIT.

6) Only the terms appearing as descriptors in the thesaurus can be used for this exercise. If you identify a concept/subject that you think should be indexed, but you do not find a specific or even a generic descriptor to express it, just leave it.

7) On the indexing worksheet, each descriptor must be accompanied by a descriptor’s record number. This number is found in the thesaurus, in a set of parentheses following the descriptor.

Once the task is completed:

Gather the twelve worksheets, your thesaurus, your profile form, and deposit into the designated box.
### SAMPLE THESAURUS PAGE

#### LITERACY SERVICES (772)
- **CL**: Literacy, numeracy, and adult basic education
- **NT**: COMMUNITY LITERACY SERVICES
  - **LIBRARY LITERACY SERVICES**

#### LITERACY SKILLS (43)
- **CL**: Literacy, numeracy, and adult basic education
- **DF**: General term which collectively represents reading, writing and numeracy skills
- **UF**: Limited literacy skills
- **BT**: SKILLS
- **RT**: NUMERACY SKILLS

#### LITERACY SPECIALISTS (986)
- **CL**: People
- **DF**: Individuals involved in literacy research
- **BT**: LITERACY WORKERS

#### LITERACY STANDARDS (768)
- **CL**: Literacy, numeracy, and adult basic education
- **DF**: Predetermined levels of literacy skills needed for the successful completion of specific tasks, as established by official organizations, professional associations, etc.
- **RT**: LITERACY REQUIREMENTS

#### LITERACY STRATEGIES (770)
- **CL**: Literacy, numeracy, and adult basic education
- **UF**: Literacy practices
- **RT**: LITERACY METHODS

#### LITERACY SURVEYS (773)
- **CL**: Literacy, numeracy, and adult basic education
- **RT**: LITERACY STATISTICS

#### LITERACY STUDENTS (545)
- **CL**: Literacy, numeracy, and adult basic education
- **BT**: TESTS
- **RT**: LITERACY ASSESSMENT NUMERACY TESTS

#### LITERACY THEORY (774)
- **CL**: Literacy, numeracy, and adult basic education
- **UF**: Theory of literacy
- **RT**: LITERACY PHILOSOPHY

#### LITERACY TEACHERS (769)
- **CL**: Literacy, numeracy, and adult basic education
- **RT**: LITERACY TUTORS

#### LITERACY INSTRUCTORS (769)
- **CL**: Literacy, numeracy, and adult basic education
- **RT**: LITERACY TUTORS

#### LITERACY TUTORS (769)
- **CL**: Literacy, numeracy, and adult basic education
- **RT**: LITERACY TUTORS
APPENDIX 13
PARTICIPANT PROFILE FORM

Note: This form was distributed to all participants at the start of the indexing session.
PARTICIPANT PROFILE

Participant id.: ______  Indexing session: ______

1) Are you currently enrolled

in the Masters program ______  in the doctoral program ______

2) If you are enrolled in the Masters program, which one(s) of the following FIS courses have you already completed or are you currently taking?

- Introduction to bibliographic control (LIS 1320 / formerly LIS 1530) ______
- Classification theory (LIS 2142 / formerly LIS 2610) ______
- Advanced classification (LIS 2143 / formerly LIS 2615) ______
- Subject approach to information (LIS 2144 / formerly LIS 2620) ______
- Major subject heading and classification systems (LIS 2171 / formerly LIS 2605) ______

3) Do you have any indexing experience (excluding class assignments)?

Yes ______ (please check below all that apply)  No ______

Please describe briefly:

4) Do you have any thesaurus design or thesaurus use experience (excluding class assignments)?

Yes ______ (please check below one or both if applicable)  No ______

Thesaurus design ______  Thesaurus use ______
Please describe briefly:

5) Do you have knowledge or experience in the fields of Adult literacy or Adult basic education?

Yes ______ (please check below one or both if applicable)  No ______

Academic/Research experience ______  Work experience ______
Please describe briefly:
APPENDIX 14
AUTHORIZATION FROM THE OFFICE OF RESEARCH SERVICES
AND CONSENT FORM
PROTOCOL REFERENCE #2061

October 16, 1996

Professor N. Williamson
Faculty of Information Studies
140 St. George Street
University of Toronto

Dear Professor Williamson:

We are writing to advise you that Professor P. Solomon has extended approval to the research study entitled, “The Effects of Integrating Terminological Definitions in Thesauri on Interindexer Consistency”. The approved consent form is attached.

During the course of the research, any significant deviations from the approved protocol (that is, any deviation which would lead to an increase in risk or a decrease in benefit to human subjects) and/or any unanticipated developments within the research should be brought to the attention of the Office of Research Services.

Best wishes for the successful completion of your project.

Yours sincerely,

Susan Pilon
Executive Officer
Human Subjects Review Committee

cc: Dean L. Howarth
    M. Hudon
CONSENT FORM

The purpose of the study is to assess the potential usefulness, at the time of descriptors selection, of specific elements of semantic information in an information indexing and retrieval thesaurus. The task of the participant in this study is to assign subject descriptors chosen in a prototype thesaurus to a set of twelve abstracts substituting for full-text source documents in the field of Adult literacy. Sets of descriptors assigned will not be evaluated for accuracy and/or completeness.

Please sign below if you agree with the following statements:

1. I have freely volunteered to participate in this study.
2. I have been informed in advance as to what my task will be and what procedures will be followed.
3. I have been given the opportunity to ask questions, and have had my questions answered to my satisfaction.
4. I understand that the information that I provide will be treated confidentially, and that my identity will not be revealed in the reporting of the study results.
5. I am aware that I have the right to discontinue participation in this study at any time.

Name (please print): ________________________________________________________________

Signature: ______________________________________________________________________

Date: ________________
APPENDIX 15
TERM CODING SHEETS - ALL DESCRIPTORS

(SAMPLES)
### Group: C (n=8) Document: #1 Making meaning, making change.

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<th>USES</th>
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### Term coding sheets - all descriptors

**Group: A (n=8) Document: #1 Making meaning, making change.**

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TERM CODING SHEETS - MAIN DESCRIPTORS

(SAMPLES)
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**Group: C (n=8) Document: #2 Literacy action. A resource book for colleges and universities**

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**Group: C (n=8) Document: #3 Literacy in the workplace: a whole language approach**

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**Group: A (n=7) Document: #3 Literacy in the workplace: a whole language approach**

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### Group: S (n=9) Document: #2 Literacy action. A resource book for colleges and universities

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### Group: S (n=9)

**Document: #3 Literacy in the workplace: a whole language approach**

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APPENDIX 17
INDEXER-PAIR CONSISTENCY - ALL DESCRIPTORS
**Group: C (n=8)**

**Document: #1 Making meaning, making change. A guide to participatory curriculum ...**

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**Group: C (n=8)**

**Document: #2 Literacy action. A resource book for colleges and universities ...**

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**Group: C (n=8)**

**Document: #3 Literacy in the workplace: a whole language approach**

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**Group: C (n=8)**

**Document: #4 A collaborative adult literacy workshop for tutors and students ...**

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**Group: C (n=8)**
*Document: #5 Working with beginners*

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**Group: C (n=8)**
*Document: #6 Older displaced workers write to read: a computer-assisted ...*

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Indexer 1, 2, 3, 4, 5, 6, 7, 8, and 9 correspond to different indexer-pair consistency descriptors.
Group: C (n=8)
Document: #7 Different strokes for different folks

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Group: C (n=8)
Document: #8 From parent to child. Final performance report for library services ...

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**Indexer-pair consistency - all descriptors**

**Group: C (n=7)**

*Document: #9 Sources of difficulty in the processing of written language*

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**Group: C (n=8)**

*Document: #10 Fresno County library rural literacy outreach program. Final performance report ...*

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**Document: #11 Developing native language literacy in language minority adults**

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### Group: C (n=8)

**Document: #12 Opening the doors to lifelong learning: empowering undereducated adults.**

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Document: #1 Making meaning, making change. A guide to participatory curriculum ...

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Group: A (n=8)
Document: #2 Literacy action. A resource book for colleges and universities ...

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**Group: A (n=7)**

**Document: #3 Literacy in the workplace: a whole language approach**

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**Group: A (n=8)**

**Document: #4 A collaborative adult literacy workshop for tutors and students ...**

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**Indexer-pair consistency - all descriptors**
**Group: A (n=7)**  
*Document: #5 Working with beginners*

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**Group: A (n=7)**  
*Document: #6 Older displaced workers write to read: a computer-assisted ...*

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Indexer: A (n=7)

Document: #5 Working with beginners

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Indexer: A (n=7)

Document: #6 Older displaced workers write to read: a computer-assisted ...
### Group: A (n=8)

**Document: #7 Different strokes for different folks**

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### Group: A (n=8)

**Document: #8 From parent to child. Final performance report for library services ...**

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Indexer-pair consistency - all descriptors
Group: A \( (n=8) \)

Document: #9 Sources of difficulty in the processing of written language

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Group: A \( (n=8) \)

Document: #10 Fresno County library rural literacy outreach program. Final performance report ...

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**Document: #11 Developing native language literacy in language minority adults**

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**Group: A (n=8)**  
**Document: #12 Opening the doors to lifelong learning: empowering undereducated adults.**

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**Indexer-pair consistency - all descriptors**
Group: $S$ (n=9)

Document: #1 Making meaning, making change. A guide to participatory curriculum ...

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Group: $S$ (n=9)

Document: #2 Literacy action. A resource book for colleges and universities ...

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**Document: #3 Literacy in the workplace: a whole language approach**

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**Document: #4 A collaborative adult literacy workshop for tutors and students ...**

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Group: S (n=9)
Document: #5 Working with beginners

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Group: S (n=9)
Document: #6 Older displaced workers write to read: a computer-assisted ...

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Group: S (n=9)
Document: #7 Different strokes for different folks

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Group: S (n=9)
Document: #8 From parent to child. Final performance report for library services ...
Group: S (n=9)
Document: #9 Sources of difficulty in the processing of written language

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Group: S (n=9)
Document: #10 Fresno County library rural literacy outreach program. Final performance report ...

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**Group: S (n=9)**

**Document: #11 Developing native language literacy in language minority adults**

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**Group: S (n=9)**

**Document: #12 Opening the doors to lifelong learning: empowering undereducated adults.**

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APPENDIX 18
INDEXER-PAIR CONSISTENCY - MAIN DESCRIPTORS

417
Group: C (n=8)  
Document: #1 Title: Making meaning, making change. A guide to participatory curriculum...

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Group: C (n=8)  
Document: #2 Title: Literacy action. A resource book for colleges and universities...

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Group: C \( (n=8) \)

**Document: #3 Title: Literacy in the workplace: a whole language approach**

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Group: C \( (n=8) \)

**Document: #4 Title: A collaborative adult literacy workshop for tutors and students...**

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### Group: C (n=8)

**Document: #5 Title: Working with beginners**

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### Group: C (n=8)

**Document: #6 Title: Older displaced workers write to read: a computer-assisted...**

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**Group: C (n=8)**
**Document: #7 Title: Different strokes for different folks**

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**Group: C (n=8)**
**Document: #8 Title: From parent to child. Final performance report for library services...**

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Group: C (n=8)
Document: #9 Title: Sources of difficulty in the processing of written language

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Group: C (n=8)
Document: #10 Title: Fresno County library rural literacy outreach program ...

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Group: C (n=8)

Document: #11 Title: Developing native language literacy in language minority adults

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Group: C (n=8)

Document: #12 Title: Opening the doors to lifelong learning: empowering undereducated adults.

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Group: A \( (n=8) \)
Document: \#1 Title: Making meaning, making change. A guide to participatory curriculum...

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Group: A \( (n=8) \)
Document: \#2 Title: Literacy action. A resource book for colleges and universities...

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### Group: A (n=7)

**Document: #3 Title: Literacy in the workplace: a whole language approach**

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### Group: A (n=8)

**Document: #4 Title: A collaborative adult literacy workshop for tutors and students...**

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Indexer-pair consistency - main descriptors
Group: A (n=7)
Document: #5 Title: Working with beginners

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Group: A (n=7)
Document: #6 Title: Older displaced workers write to read: a computer-assisted...

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Indexer-pair consistency - main descriptors
Indexer-pair consistency - main descriptors

Group: A \( (n=8) \)
Document: #7 Title: Different strokes for different folks

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Group: A \( (n=8) \)
Document: #8 Title: From parent to child. Final performance report for library services...

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**Group: A (n=8)**

**Document: #9 Title: Sources of difficulty in the processing of written language**

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**Group: A (n=8)**

**Document: #10 Title: Fresno County library rural literacy outreach program ...**

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**Document: #11 Title: Developing native language literacy in language minority adults**

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**Document: #12 Title: Opening the doors to lifelong learning: empowering undereducated adults.**

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Group: S (n=9)
Document: #1 Title: Making meaning, making change. A guide to participatory curriculum...

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Group: S (n=9)
Document: #2 Title: Literacy action. A resource book for colleges and universities...

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**Document: #3 Title: Literacy in the workplace: a whole language approach**

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**Group: S (n=9)**

**Document: #4 Title: A collaborative adult literacy workshop for tutors and students...**

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Indexer-pair consistency - main descriptors

**Group: S (n=9)**

**Document: #5 Title: Working with beginners**

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**Group: S (n=9)**

**Document: #6 Title: Older displaced workers write to read: a computer-assisted...**

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Indexer-pair consistency - main descriptors

**Group: S (n=9)**

**Document: #7 Title: Different strokes for different folks**

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**Group: S (n=9)**

**Document: #8 Title: From parent to child. Final performance report for library services...**

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**Group: S (n=9)**  
**Document: #9 Title: Sources of difficulty in the processing of written language**

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**Group: S (n=9)**  
**Document: #10 Title: Fresno County library rural literacy outreach program ...**

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Group: S (n=9)
Document: #11 Title: Developing native language literacy in language minority adults

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Group: S (n=9)
Document: #12 Title: Opening the doors to lifelong learning: empowering undereducated adults.

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REFERENCES AND BIBLIOGRAPHY


*Canadian Literacy Thesaurus. Thésaurus canadien d’alphabétisation*. 1996. 2nd ed. Toronto, ON: Canadian Literacy Thesaurus Coalition.


