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UMI
LEARNING STYLES AND PERSONALITY TRAITS ASSOCIATED WITH STUDENT SUCCESS AT THE GRADE 9 LEVEL IN AN INDIVIDUALIZED STUDY PROGRAM

by

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A thesis submitted in conformity with the requirements for the Degree of Master of Education
Department of Theory and Policy Studies in Education
Ontario Institute for Studies in Education of the
University of Toronto

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Abstract

The purpose of this study was to identify and evaluate the importance of learning styles and personality traits associated with successful grade 9 students in a self-paced and individualized mastery learning program. The results of the study are intended to assist prospective students and their parents in the evaluation of whether this program is suitable for their needs.

The following conclusions were reached after the analysis of the data:

1. Programmed Instruction, Peer Teaching, Independent Study and Discussion were the preferred learning styles of the subjects in this study.

2. With respect to personality traits, successful students in the individualized program tend to be more abstract-thinking, enjoy high emotional stability, and show low excitability, high conformity and low apprehension.

This has significant implications in many facets of the Individualized Program including curriculum design, the Teacher Adviser role and enrolment considerations.
I offer my heartfelt thanks to Dr. John Davis, who supported me tirelessly in the realization of this dream. Sincere thanks to the students at Mary Ward Catholic Secondary School who participated so enthusiastically in the study. It was a pleasure to work with such a wonderful group of students.

This study is dedicated to my loving family. I thank my wife Rose and my daughter Gabrielle who both support my many undertakings with unconditional love and patience. I also thank my father Mario, my mother Michelina and my sister Rosaria. They have taught me the value of hard work, faith and perseverance.
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CHAPTER I

1.1 RATIONALE FOR THE PROBLEM

Should a youngster be placed in the wrong program for him, his ability to progress academically will be severely hampered (Dunn and Dunn, 1977).

Mary Ward Catholic Secondary School in Scarborough offers its students a program of self-paced, individualized mastery learning also known as Direction 2000. The program is only in its first few years of full implementation and operates in a custom-designed physical plant that is reflective of the ideals of the program. Traditional classrooms have been replaced by subject-specific resource areas and seminar rooms. Students do not follow a fixed daily schedule. Instead, they plan their own school day and move freely between resource areas at self-selected, often irregular intervals according to daily and weekly goals they have planned in consultation with their Teacher Adviser (hereafter, the TA). Every teacher is also a TA. This means that, in addition to their regular duties as a subject teacher, they also meet regularly with a group of approximately 15 students in a mentor-type capacity. A subject teacher in a department is allocated the responsibility of being the lead teacher in one or more courses, as well as being a resource person for other courses offered by that department in the resource area.

Students work on course content using instructional packages commonly known as learning guides. Students progress through the learning guide at their own pace usually in the appropriate resource area, thus availing themselves of the help of the subject teacher, if required. At the end of a learning guide, students are
The Rationale for the Problem

asked to demonstrate mastery of the concepts presented within the learning guide by engaging in an evaluative activity. If successful, the student moves on to the next learning guide. When the student is not successful, s/he and the subject teacher review the unit and address the difficulties encountered by the student. This is followed by another evaluative activity in which the student is again asked to demonstrate a certain level of mastery.

Admittedly, life at Mary Ward has not been easy for some students. In fact, it has become painfully apparent in the program's first few years of existence that some students' needs are simply not being met. These students go on to waste one or two years of their high school career only to discover that the Direction 2000 program is not for them. Other students, however, experience considerable success in the program. This study attempts to identify and evaluate learning styles and personality traits associated with successful students in the Direction 2000 program.

As a subject teacher and Teacher Adviser at Mary Ward, I have had extensive experience in all aspects of the Direction 2000 program. In addition, I have successfully completed graduate courses in the field of Educational Administration and Information Processing. It is my hope that the findings of this study will be used to help students interested in enrolling at Mary Ward and their parents make an informed decision as to how well they suit the Direction 2000 program.
1.2 THE PROBLEM AND ITS SETTING

1.2.1 The Statement of the Problem

The purpose of this study is to identify and evaluate the learning styles and personality traits which are associated with student success at the Grade 9 level in the individualized program of study offered at a Catholic secondary school in Scarborough, Ontario, in order to provide guidance to prospective students and their parents.

1.2.2 The Subproblems

1) **The first subproblem.** The first subproblem is to identify the learning styles associated with student success in the individualized program, as measured by the *Learning Styles Inventory (LSI)* administered to successful Grade 9 students.

2) **The second subproblem.** The second subproblem is to identify personality traits which are associated with student success in the individualized program, as measured by the *IPAT High School Personality Questionnaire (HSPQ)* administered to successful Grade 9 students.

3) **The third subproblem.** The third subproblem is to evaluate the relationship between each reported learning style and personality trait with respect to student success at the grade 9 level in a self-paced mastery learning setting, if any such relationships exist.

4) **The fourth subproblem.** The fourth subproblem is to distinguish between personality traits and learning styles associated with student success in a traditional
high school mode of program delivery as opposed to those in an individualized program, if such differences exist.

1.2.3 The Delimitations

The study will not evaluate any traits associated with student failure.

The study will not evaluate the role of the Teacher Adviser program on student success.

The study will not consider the effect of teaching style on student success.

The study will not consider the effect of socioeconomic status on student success.

The study will not directly evaluate the impact of student success at the elementary level.

The study will not attempt to evaluate the overall effectiveness of the Direction 2000 program.

The study will not attempt to separate and analyze students and their results by gender, age and ethnicity.

The study will not evaluate the second-order, derived factors of the High School Personality Questionnaire.

1.2.4 The Definitions of Terms

Learning styles. Learning styles are the preferred instructional strategies of students as they come in contact with course material.
The Problem and Its Setting

**Personality traits.** Personality traits are characteristics associated with the feelings and customary behaviours of the subjects participating in the study.

**Student success.** Student success will be attributed only to those Grade 9 students who have a cumulative average of 75% with a minimum completion rate of ten of a possible twenty units of study by January 28, 1994.

**Individualized Program of Study.** (also known as the Direction 2000 Program). The Individualized Program of Study (Direction 2000) is the self-paced mastery learning program offered at Mary Ward Catholic Secondary School.

**Teacher Adviser Program.** The Teacher Adviser Program is the mentoring program in place at the school, in which almost every staff member is a mentor to a group of approximately 15 students.

1.2.5 Assumptions

**The first assumption.** The first assumption is that all respondents will answer any questions candidly and honestly.

**The second assumption.** The second assumption is that the identification of any learning style and personality trait associated with student success will serve only as a guide and shall not be used in any way as a formal screening tool by the school's administration or staff.

**The third assumption.** The third assumption is that every prospective student using the results of this study has a reasonable opportunity to develop the characteristics of a successful student identified herein.
The fourth assumption. The fourth assumption is that students will be more successful when they are able to exercise their preferred learning style in the presentation of new curriculum.

1.3 THE IMPORTANCE OF THE STUDY

There are many misconceptions about the Direction 2000 program. Moreover, some Grade 8 teachers and elementary school principals actively counsel students away from Mary Ward. Some students and parents know nothing about the program of study at Mary Ward when they enrol and, thus, have little sense of how to be successful within it. This study will help to identify characteristics of successful students within the program and offer all involved more insight on what may help students experience success at the school. Hopefully, the results of this study will become an integral part of Mary Ward’s formal presentations to students, parents and educators. In so doing, all parties involved can make a more informed decision as to whether or not the Direction 2000 program is suitable for them, their child or their student.

It is important to assert that the results of this study cannot and should not be the overriding factors with respect to making a final decision on suitability to the program; rather it should be considered in concert with other aspects of the student’s academic and social growth.
CHAPTER II

2.1 INTRODUCTION TO THE RESEARCH METHODOLOGY

Two questionnaires were used in this study. Both have already proved to show adequate measures of validity and reliability in previous studies. An item-by-item analysis for each questionnaire is provided in the Learning Styles Inventory (LSI) and High School Personality Questionnaire (HSPQ) manuals listed in the bibliography.

2.2 THE RESEARCH INSTRUMENTS

2.2.1 The Learning Styles Inventory (LSI)

Instruments under consideration for the surveying of preferred instructional styles were scrutinized using four main criteria. First, the most salient aspects of the unique mode of program delivery employed at the school had to be clearly identified in the rubric of learning styles. Second, the survey had to be age appropriate, with normative statistics taken from a large sample. Third, the results of the surveys had to show high measures of reliability and validity. Finally, the preferred questionnaire needed to be easily hand-scored or inexpensively machine-scored.

The Learning Styles Inventory (see Appendix B) was used to measure successful students' instructional preferences as described in Table 2.1.
### Table 2.1. Learning Styles Identified in the Learning Styles Inventory (LSI).

<table>
<thead>
<tr>
<th><strong>Learning Style</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projects</strong></td>
<td>- The pursuit of school-related activities with a group of fellow students.</td>
</tr>
<tr>
<td><strong>Drill and Recitation</strong></td>
<td>- Focus is on the assignment and mastery of clearly-defined content domains. - Information is assessed when the teacher calls upon students individually or in groups to answer questions.</td>
</tr>
<tr>
<td><strong>Peer Teaching</strong></td>
<td>- The degree to which students enjoy being taught school-related material by a classmate.</td>
</tr>
<tr>
<td><strong>Discussion</strong></td>
<td>- The verbal interchange between teacher and students or among students.</td>
</tr>
<tr>
<td><strong>Teaching Games</strong></td>
<td>- Learning new information or rehearsing known subject matter through involvement in classroom games.</td>
</tr>
<tr>
<td><strong>Independent Study</strong></td>
<td>- School activities in which emphasis is placed on students working alone to explore new content areas and to prepare material or reports for presentation to the class.</td>
</tr>
<tr>
<td><strong>Programmed Instruction</strong></td>
<td>- An externally structured approach where students work independently by responding to sets of questions assigned by the teacher.</td>
</tr>
<tr>
<td><strong>Lecture</strong></td>
<td>- Learning situations in which the teacher or another individual perceived as an expert in a particular area organizes and communicates the ideas and concepts to be acquired. - Less verbal interchange than Discussion.</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
<td>- Active involvement in real-world situations as the method by which an understanding of subject matter is acquired. - Involves role-playing and on-the-spot thinking.</td>
</tr>
</tbody>
</table>

The LSI is particularly appropriate for the purposes of this study as it directly tests student attitudes towards the predominant instructional strategies used at Mary...
Ward, namely, independent study, peer teaching, discussion and programmed instruction. (For a complete explanation of each of the instructional preferences, see Appendix C). This indeed was the deciding factor, as the majority of the other questionnaires met the other criteria equally well.

2.2.2 The IPAT High School Personality Questionnaire

The IPAT High School Personality Questionnaire (HSPQ) was used to measure personality traits (see Appendix D). While there were many personality questionnaires to choose from, the HSPQ stood out for four reasons. First and most importantly, the results are easily interpretable by the layperson. Other questionnaires were too technical for the scope of this study, if one recalls that this may become a tool to be used by parents and students. Second, it is age-appropriate. No other survey under consideration related directly to high school students. Third, testing "personality by source-trait (simple structure)... require(s) less testing time and administrative cost" (Cattell & Butcher, 1968, p. 327). Finally, the test is machine-scored to ensure greater accuracy while "computer-based interpretation also provides an in-depth analysis of the HSPQ profile in narrative form" (Cattell et al., 1984, p. 6) with high values of reliability and validity. The personality traits measured by the HSPQ are found in Table 2.2.

---

1 Institute for Personality and Ability Testing, Inc (Champaign, Illinois)
### Table 2.2. Personality Factors Measured in the HSPQ.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Factor Name</th>
<th>Low Score</th>
<th>Description</th>
<th>High Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Warmth</td>
<td>Cool, Reserved, Impersonal</td>
<td>Warm, Outgoing, Friendly</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Intelligence</td>
<td>Concrete-Thinking, Less Intelligent</td>
<td>Abstract-Thinking, More Intelligent</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Emotional Stability</td>
<td>Affected by Feelings, Emotionally Less Stable</td>
<td>Emotionally Stable Mature</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Excitability</td>
<td>Phlegmatic, Undemonstrative</td>
<td>Excitable, Impatient, Demanding</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Dominance</td>
<td>Submissive, Humble, Mild</td>
<td>Dominant, Assertive, Aggressive</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Cheerfulness</td>
<td>Sober, Restrained, Prudent</td>
<td>Cheerful, Enthusiastic, Impulsive</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Conformity</td>
<td>Expedient, Disregards Rules</td>
<td>Conforming, Conscientious, Moralistic</td>
<td></td>
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<tr>
<td>H</td>
<td>Boldness</td>
<td>Shy, Threat-Sensitive, Timid</td>
<td>Bold, Venturesome, Uninhibited</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Sensitivity</td>
<td>Tough-minded, Self-Reliant</td>
<td>Tender-minded, Sensitive</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Withdrawal</td>
<td>Vigorous, Goes Readily With Group</td>
<td>Withdrawn, Guarded</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Apprehension</td>
<td>Self-Assured, Secure, Self-Satisfied</td>
<td>Apprehensive, Guilt-Prone</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>Self-Sufficiency</td>
<td>Group-Oriented, A &quot;Joiner&quot;</td>
<td>Self-Sufficient, Prefers Own Decisions</td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>Self-Discipline</td>
<td>Undisciplined, Self-Conflict, Lax</td>
<td>Self-Disciplined, Controlled</td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>Tension</td>
<td>Relaxed, Tranquil, Composed</td>
<td>Tense, Frustrated, Overwrought</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.2.3 Measures of Reliability and Validity

The instruments used in this study and considered for use in the study were all commercially-produced instruments. As such, they had all undergone tests for reliability and validity.
2.3 THE COLLECTED DATA

2.3.1 Subproblem One

The first subproblem is to identify the learning styles associated with student success in the individualized program, as measured by the Learning Styles Inventory administered to successful Grade 9 students.

Successful grade 9 students were selected (as per the definition of "student success" in the Definitions of Terms on page 6) from the student population at Mary Ward C.S.S. After agreeing to participate in the study and obtaining parental consent (see Appendix E), they were administered the LSI. From this, information relating to their instructional preferences was gathered.

2.3.2 Subproblem Two

The second subproblem is to identify personality traits which are associated with student success in the individualized program, as measured by the IPAT High School Personality Questionnaire (HSPQ) administered to successful Grade 9 students.

The same group of successful grade 9 students from the student population at Mary Ward C.S.S. were administered the HSPQ. From this, information relating to their personality traits was gathered.
2.3.3 Subproblem Three

The third subproblem is to identify the relationship between each reported learning style and personality trait with respect to student success at the Grade 9 level in a self-paced mastery learning setting, if any such relationship exists, as measured by the frequency at which the characteristic is reported by the students.

The results of the two surveys were analyzed with respect to correlations between reported learning styles and personality traits of successful students in the Individualized Program setting.

2.3.4 Subproblem Four

The fourth subproblem is to distinguish between personality traits and learning styles associated with student success in a traditional high school mode of program delivery as opposed to an individualized program, if any such differences exist.

The results of the two surveys were compared and contrasted with the findings in the review of the related literature. As the review reflects only upon the personality traits and learning styles data gathered from students in traditional-type high schools, this data will be related to the data gathered in this research study. Discrepancies in the data may indicate differences in the factors relating to student success, depending on the mode of program delivery.
2.4 SAMPLE AND SAMPLING PROCEDURES

All students who met the criteria for student success as outlined in the Definitions section (1.2.4) were potential subjects of this study (i.e. respondents for the LSI and HSPQ) and were asked to participate in the study. To select the potential subjects, all Grade 9 February report cards were screened to find students that met the criteria. The preliminary sample size \( n \) was 60. The final \( n \) was 59 due to one student dropping out of the study because of scheduling conflicts. There were 37 girls and 22 boys who participated in the study from a wide range of socio-economic and ethnocultural groups.

2.5 PROCEDURES FOR CONDUCTING THE STUDY

The principal was approached in September of 1993 for permission to conduct the study. In February 1994, before interim report cards were signed by the principal, the grade 9 reports were separated and analyzed. Potential subjects of the study were identified according to the criteria for student success established above (see 1.2.4 Definitions of Terms - Student Success). All students who met the criteria were gathered in a central location and apprised of the study. They were asked to participate in the study and parental consent forms (see Appendix E) were distributed. Potential subjects were given 3 days to return the permission form indicating either a willingness to participate or a refusal to participate. Upon parental consent to participate in the study, subjects were issued a project Student Number which was used as identification instead of their name, so as to ensure their
Procedures for Conducting the Study

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anonymity when data were reported.

The two questionnaires to be completed by the students were administered on two separate occasions, within one week of each other. The LSI was administered on the first testing day and the HSPQ was administered on the second testing day. All subjects answered the questionnaires in the same room and at the same time. No time limit was imposed. Upon completion of each questionnaire, the HSPQ was hand-scored and the LSI answer sheets were mailed to the appropriate institution to be scored.

Individual results were kept in a locked cabinet and were not shared with or communicated to anyone. After the data analysis was completed, all individual results were destroyed. A summary of the results will be available to all participants, school teaching staff and administration at the completion of the study.

2.6 METHODS OF DATA ANALYSIS

2.6.1 Subproblem One: Learning Styles

Computer analysis of the LSI yielded 14 different pages of printout for the group of students being tested. The results of principal interest to this study are the average scores of students in relation to each instructional mode. These figures are found on page 1 of the printout (see Appendix F). Since responses are recorded on a five point Likert-type scale, every score has a potential range of 1 - 5, where a score of 3.51 - 5 is considered to be in the Pleasant Range. A score of 1 to 2.49 denotes a score in the Unpleasant Range. A score 2.50 to 3.50 is deemed to be
neither pleasant nor unpleasant. Consider the following example:

<table>
<thead>
<tr>
<th></th>
<th>Student Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects (PR)</td>
<td>2.88</td>
</tr>
<tr>
<td>Simulation (SI)</td>
<td>2.66</td>
</tr>
<tr>
<td>Drill and Recitation (DR)</td>
<td>2.75</td>
</tr>
<tr>
<td>Peer Teaching (PT)</td>
<td>3.76</td>
</tr>
<tr>
<td>Discussion (DI)</td>
<td>3.90</td>
</tr>
<tr>
<td>Teaching Games (TG)</td>
<td>3.80</td>
</tr>
<tr>
<td>Independent Study (IS)</td>
<td>3.66</td>
</tr>
<tr>
<td>Programmed Instruction (PI)</td>
<td>2.42</td>
</tr>
<tr>
<td>Lecture (LE)</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Student number 60 finds four learning styles to be in the pleasant range - Peer Teaching, Discussion, Teaching Games and Independent Study. When the results of all the subjects are statistically analysed, the most crucial statistics for the purposes of this study are the sample mean and standard deviation.

If we assume a high positive correlation between learning style preference and academic success, then an examination and identification of the top few sample means in the pleasant range will reveal the first common set of characteristics of this group of successful students.

The results are also checked against another page on the computer printout entitled "Students Who Find Each Approach in the Pleasant Range" (see Appendix G). Comparing totals of the number of people under each heading will also highlight preferred methods of instruction and reinforce the conclusions of the first part of the analysis.
2.6.2 **Subproblem Two: Personality Traits**

Hand-scoring of the HSPQ relates individual results to established norm tables. The norm table used for this survey was Table B.18, Norms for Males and Females, Form A (HSPQ Manual, p.89), reprinted below.

**Table 2.3. HSPQ Norms for Males and Females, Form A.**

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5-9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raw Score</td>
<td>Sten Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0-3</td>
<td>4-5</td>
<td>6-7</td>
<td>8-9</td>
<td>10</td>
<td>11-12</td>
</tr>
<tr>
<td>B</td>
<td>0-2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>C</td>
<td>0-1</td>
<td>2</td>
<td>3</td>
<td>4-5</td>
<td>6</td>
<td>7-8</td>
</tr>
<tr>
<td>D</td>
<td>0-3</td>
<td>4-5</td>
<td>6</td>
<td>7-8</td>
<td>9-10</td>
<td>11-12</td>
</tr>
<tr>
<td>E</td>
<td>0-2</td>
<td>3</td>
<td>4-5</td>
<td>6</td>
<td>7-8</td>
<td>9-10</td>
</tr>
<tr>
<td>F</td>
<td>0-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7</td>
<td>8-9</td>
<td>10-11</td>
</tr>
<tr>
<td>G</td>
<td>0-4</td>
<td>5</td>
<td>6-7</td>
<td>8-9</td>
<td>10-11</td>
<td>12</td>
</tr>
<tr>
<td>H</td>
<td>0-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7</td>
<td>8-9</td>
<td>10-11</td>
</tr>
<tr>
<td>I</td>
<td>0-1</td>
<td>2</td>
<td>3-4</td>
<td>5-7</td>
<td>8-10</td>
<td>11-13</td>
</tr>
<tr>
<td>J</td>
<td>0-2</td>
<td>3</td>
<td>4-5</td>
<td>6</td>
<td>7-8</td>
<td>9-10</td>
</tr>
<tr>
<td>Q</td>
<td>0-2</td>
<td>3-4</td>
<td>5</td>
<td>6-7</td>
<td>8-9</td>
<td>10-11</td>
</tr>
<tr>
<td>Q₂</td>
<td>0-2</td>
<td>3</td>
<td>4-5</td>
<td>6</td>
<td>7-8</td>
<td>9-10</td>
</tr>
<tr>
<td>Q₃</td>
<td>0-3</td>
<td>4</td>
<td>5-6</td>
<td>7-8</td>
<td>9-10</td>
<td>11</td>
</tr>
<tr>
<td>Q₄</td>
<td>0-3</td>
<td>4</td>
<td>5-6</td>
<td>7-8</td>
<td>9-10</td>
<td>11-12</td>
</tr>
</tbody>
</table>

*(Based on age 14.5 years, N = 734)*

Each subject's raw scores were converted to Standardized Ten-Point (or Sten) scores. A sten score of 5.5 denotes the mean response in the norm table. The range of sten scores was from 1 to 10. In the preparation of the final norm tables for the HSPQ, all scores were age-corrected to 14.5 years (HSPQ Manual, 79), which relates almost perfectly to our sample of grade 9 students in the middle of their academic year.
The main purpose of this analysis is to establish common characteristics through group analysis. The individual scores were transferred to a table and statistics were calculated for each personality factor. One sample t-tests were used to determine whether the calculated sample means were statistically significant i.e. whether they were significant departure from the large sample means reflected in the published norm table. The means were then plotted onto a blank hand-scoring sheet (see Appendix H) and discussed.

2.6.3 Subproblem Three: Correlations

To identify the relationships between each reported learning style and personality trait with respect to student success at the Grade 9 level in a self-paced mastery learning setting, if any such relationships exist, a 23x23 correlation matrix was developed, correlating all the combinations of learning styles and personality traits. Significant correlations were identified and discussed.

2.6.4 Subproblem Four: Distinguishing between Student Success in a Traditional Program and An Individualized Program of Study

To further clarify the results of this study, it must be determined as to whether the learning styles and personality traits identified in this study relate in a special way to the mode of program delivery offered at the school under examination. As stated earlier, there are no published reports identifying learning styles and personality traits associated with student success in an individualized study program. There are
however, many studies relating these two factors to student success in traditional schools with traditional modes of program delivery. By comparing and contrasting the results of this study to those published studies, it becomes clear whether a successful student is a successful student, regardless of the mode of program delivery. Results of this comparison will be discussed.

Throughout this presentation of methods of data analysis, every identified learning style and personality trait is evaluated and, where possible, an explanation is offered with respect to why such a characteristic seems to be important for student success in the Direction 2000 program, based on its current framework.
CHAPTER III

3.1 REVIEW OF RELATED LITERATURE

In order to address the problem of identifying and evaluating learning styles and personality traits associated with student success in the Direction 2000 program, two critical areas will be reviewed. The first is learning styles associated with student success. This was very fashionable in the 1970's, and much of the literature reviewed originates from studies conducted in that decade. The second is personality traits associated with student success. Personality testing was particularly popular in the 1950's up until the early 1970's. The literature relating these two areas and self-paced mastery learning will also be reviewed.

It is important to note, however, that all but one of the sources for this review dealt with student success independent of the mode of program delivery. Because of the novelty of the Direction 2000 program and individualized, self-paced education in general, there were no resource materials dealing with this specific mode of program delivery and the learning styles and personality traits associated with student success within such a program. In fact, it is safe to assume that the large majority of the data which was collected in the following studies was gathered from traditional high school environments.

3.2 LEARNING STYLES AND STUDENT SUCCESS

A common theme in the review of the related literature with respect to learning styles was that no learning style was identified as increasing student
success when compared to another learning style. Every student prefers to learn in different ways. As for learning styles associated with student success, it has been suggested that there is value to being flexible with respect to learning style, "thereby reducing to some extent, the pre-emptiveness of habitual thought" (Ingenkamp, 1969, p. 338). Curry (1990) states that "the best learning style for benefiting from instruction is to avoid depending on any single style or any style-like consistency in approach" (p. 5). There seems to be no particular learning style which has been tied to student success. If this is indeed the case, the study that forms the basis for this paper should reveal no strong relationship between one particular instructional preference and student success.

It seems, in general, advantageous when one is flexible with respect to learning style, that the educational system should promote proficiency in as many learning styles as possible. Ingenkamp (1969), however, warns of the potential danger of our efforts to foster this multiplicity of learning styles, thereby preventing the child "from soaring in the unfettered application of his preferred style in a particular field" (Ingenkamp, 1969, p. 338).

Learning styles have been described and categorized in many different ways. Kolb (1976) identified four different ways that people organize and process information. He classified people as convergers, divergers, assimilators and accommodators. Dunn, Dunn and Price (1989) considered the conditions under which students prefer to learn, namely, conditions related to the immediate environment, emotionality, sociological needs and physical needs. Keefe and Monk (1989) have concentrated on four higher-order factors: cognitive skills, perceptual
responses, study and instructional preferences. Renzulli and Smith (1978) were concerned mainly with the student's instructional preferences. Their Learning Styles Inventory (LSI) is used in this study because Direction 2000 is, in effect, a different system of program delivery. Some instructional preferences identified in the LSI can be clearly related to the major methods of curriculum presentation in the Direction 2000 model. The LSI was described in the methodology section (Chapter 2).

Over the years, learning style inventories have been used primarily by teachers to better address the needs of their students and improve classroom instruction (Curry, 1990; Enochs et al., 1984; Renzulli & Smith, 1978). Conscientious teachers generally test for their students' learning styles to tailor their instruction to the class dynamic. In the case of this study, however, there is a predominant style of program delivery in the Individualized Program already in place. This study attempts to identify a preference among successful students within it for the major instructional strategies employed, if such a preference exists.

David E. Hunt (NASSP, 1979), in his Conceptual Level matching model, has identified a scale which categorizes people into three developmental stages, and may be useful when applied to the Individualized Program. According to Hunt, as conceptual level increases, self-responsibility also increases. The continuum is more clearly illustrated in Figure 3.1.
Figure 3.1. Development of Conceptual Level. (NAASP, 1979, 29)

<table>
<thead>
<tr>
<th>Developmental Stages</th>
<th>Conceptual Level</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage C: Independent</td>
<td>High</td>
<td>Stage C: Inquiring, self-assertive, questioning, have more alternatives available</td>
</tr>
<tr>
<td>Stage B: Dependent</td>
<td></td>
<td>Stage B: Concerned with rules, dependent on authority, categorical thinking</td>
</tr>
<tr>
<td>Stage A: Unsocialized</td>
<td>Low</td>
<td>Stage A: Concrete, impulsive, poor tolerance for frustration</td>
</tr>
</tbody>
</table>

In this model, the Paragraph Completion Method (Hunt, Butler, Noy and Rosser, 1978) is used to measure the Conceptual Level described in Figure 3.1.

The student is asked to write his response to a topic, e.g., “What I think about the rules...” in two or three sentences to describe his own feelings about the topic. He writes on six or eight topics, requiring no more than 20 minutes... Scoring is not concerned with the content, e.g., what he thinks about the rules, but the structure of his response... The result is a general indication of his learning style expressed in terms of how much structure he requires to learn best. (NAASP, 1979, 30)

Structure is a dichotomous notion in the Individualized Program paradigm. Curricular structure is high. The learning guide is a highly-structured, prescriptive tool used to direct learning in a very specific fashion. Choice of assignments is often available, but even this choice is commonly structured. Conversely, temporal structure is generally lower. A student does plan a schedule on a daily basis in consultation with the Teacher Adviser, but there is room for much flexibility, even from hour to hour. Temporal structure increases as the Teacher Adviser and student notice difficulties
in time management.

The amount and type of structure desired by a student is a crucial quality when considering an individualized study program. For students in the Individualized Program, the lack of temporal structure may be an obstacle for students in Stages A and B, at least initially. Once this structure-dependent characteristic is diagnosed by the Teacher Adviser, however, more temporal structure can be imposed, addressing many of the difficulties encountered by a student in Stage B, for example. For students working in Stage A, it is more difficult, though not impossible, to address their temporally-structural needs. Much depends on the nature of the difficulty for the student in Stage A. If the difficulty is organization and study skills, this can be addressed more readily than, for example, a persistent unwillingness to go to resource areas according to a schedule.

Structure and the need for structure relate both to learning style and personality traits and will be discussed later in this review (Section 3.4).

### 3.3 PERSONALITY TRAITS AND STUDENT SUCCESS

As was the case in the learning styles literature, there seems to be no universally-acknowledged set of personality traits. As such, there are many personality inventories available to researchers, depending on the scope of their studies. Some measure motivational states. Others measure personality "style" (i.e. degree of independence, impulse control and introversion), self-concept, behaviour or manifestations of pathology. Many of these inventories seek to account for
Numerous studies have been conducted to attempt to relate personality traits with both successful and unsuccessful academic performance. The large majority of these studies, however, involve college and university students. As a systematic-type of classification of the traits simply does not seem to exist, results of studies are highlighted below using the different nomenclature specific to each study. To show the relevance of each study to this investigation, the results outlined below will be paralleled to similar designations as found on the HSPQ, if possible. The description of each factor measured in the HSPQ Manual was used to try to match like terms. (For a description of each HSPQ factor, see Appendix A.) It must be noted, however, that some terms may not be as easily interpretable and interchangeable as others.

Taylor (1964) describes high achievers as showing directed anxiety, positive self-value, realistic goal orientation and low independence-dependence conflict. They also respect authority, have positive interpersonal relations and are academically oriented (p. 77). On the HSPQ, this would translate into high self-discipline (factor Q3) scores, high self-sufficiency (factor Q2) scores, high emotional stability (factor C) scores, high conformity (factor G) scores, high warmth (factor A) scores and high abstract-thinking (factor B) scores.

Sinha (1970) found that high achievers displayed lower anxiety levels, showed more persistence, greater independence, greater sensitivity to others and were more introverted and conscientious. On the HSPQ, this would translate into a low anxiety score (a second-order factor), high perseverance (factor G), high
Personality Traits and Student Success

independence scores (a second-order factor) and high warmth of character (factor A) scores.

In studies relating to high-risk students, Ochroch and Dugan (1986) have correlated the success of this category of students with high scores on self-esteem, assertiveness and internal locus of control measures (p. 95). On the HSPQ, this would translate into high self-sufficiency (factor Q2) scores, high excitability (factor D) scores and high self-discipline (factor Q3) scores. One of the most comprehensive analyses relating academic achievement to personality traits was undertaken by Lavin (1965). He found that independence and impulse control were positively related to academic performance. Introversion was positively related to success at the college level only (Lavin, 1965, p. 90). Lavin also made a distinction between general anxiety and test-taking anxiety, which is crucial to the Individualized Program in that it is the cause of so much of the struggle of some students. General anxiety was not a useful predictor of academic success while test-taking anxiety showed a small negative relation with academic performance (Lavin, 1965, p. 87).

Finally, the research suggests that the high achiever has greater cognitive flexibility, is less hostile, and is less defensive about revealing personal inadequacy than is the lower achiever (Lavin, 1965, p. 100). In addition, there seemed to be no appreciable differences between males and females when relating personality traits and academic achievement.

Relating Lavin's findings to the HSPQ, one would observe high independence scores, low extraversion scores (both second-order factors) and high self-discipline (factor Q3) scores. In addition, high abstract-thinking (factor B) scores, high
conformity (factor G) scores and low anxiety scores (a second-order factor) would also be the norm for the high achiever.

Another significant study in relation to this investigation was described by Cattell and Butcher (1968). The data were collected using the HSPQ, the same questionnaire used in this study. The factors which appeared most to influence school achievement as a whole were (in approximately descending order of importance): high persistence (factor G), high self-sufficiency (factor Q3), low factor E (denoting a submissive trait), high warmth of character (factor A), high self-discipline (factor Q3) and low factor D scores (denoting phlegmatic temperament).

All of the above information is summarized in Tables 3.1 and 3.2.

Some authors guarded against accepting the results of these personality inventories without qualification. Jensen (1958) stated that "it is difficult to say what part of the student's failure may be attributed to intellectual factors and what part to personality traits" (p. 497). Lavin (1965) acknowledged the importance of social conditions on academic performance. It was clear that measures of personality were not considered flawless measures of explaining academic achievement.
TABLE 3.1. SUMMARY OF RELEVANT PRIMARY HSPQ FACTORS BY AUTHOR.

<table>
<thead>
<tr>
<th>HSPQ 1st FACTOR</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>O</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAYLOR (1964)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hi</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td>Hi</td>
<td>Hi</td>
</tr>
<tr>
<td>SINHA (1970)</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCHROCH &amp; DUGAN (1986)</td>
<td></td>
<td></td>
<td></td>
<td>Hi</td>
<td>Hi</td>
<td></td>
<td></td>
<td>Hi</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAVIN (1965)</td>
<td>Hi</td>
<td></td>
<td></td>
<td>Hi</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATTELL &amp; BUTCHER (1968)</td>
<td>Hi</td>
<td>LO</td>
<td>LO</td>
<td></td>
<td></td>
<td>Hi</td>
<td></td>
<td>Hi</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 3.2. SUMMARY OF RELEVANT SECOND-ORDER HSPQ FACTORS BY AUTHOR.

<table>
<thead>
<tr>
<th>HSPQ 2nd FACTOR</th>
<th>EXTRAVERSION</th>
<th>ANXIETY</th>
<th>TOUGH POISE</th>
<th>INDEPENDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAYLOR (1964)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINHA (1970)</td>
<td></td>
<td>LO</td>
<td></td>
<td>Hi</td>
</tr>
<tr>
<td>OCHROCH &amp; DUGAN (1986)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LAVIN (1965)</td>
<td></td>
<td>LO</td>
<td>LO</td>
<td>Hi</td>
</tr>
<tr>
<td>CATTELL &amp; BUTCHER (1968)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4 LEARNING STYLES, PERSONALITY TRAITS, STUDENT SUCCESS AND SELF-PACED MASTERY LEARNING

There seems to be a lack of literature relating learning styles, personality traits, student success and self-paced mastery learning. One explanation undoubtedly lies in the fact that there are very few self-paced mastery learning programs presently in existence.

Another possible explanation is based on the theory which underlies mastery learning as articulated by Guskey (1986), Whiting & Render (1984) and others. They claimed that mastery learning is based on the belief that all children can learn when provided with conditions that are favourable for their learning. If this indeed is true, this study could reveal no strong relationships between learning styles and student success, and similarly, between personality traits and student success. However, the effect of self-pacing, as found in the Individualized Program under study and as it relates to this claim, is largely unknown.

The only literature that seemed to link most of the areas of this study is attributed to Dunn and Dunn (NASSP, 1979). They have listed some pertinent facts relating to teaching via instructional packages, which occurs in the Individualized Program. It must be noted, however, that learning guides in the Individualized Program are employed in a system with no common deadlines, which would place them in a slightly different context than that which is described by Dunn and Dunn. Table 3.3 highlights the characteristics of the type of person whom these authors feel would thrive or not thrive using instructional packages.
**TABLE 3.3. METHODOLOGIES AND SUITABLE LEARNING STYLES.**  
(NASSP, 1979, 120-121)

<table>
<thead>
<tr>
<th>METHOD</th>
<th>BRIEF DESCRIPTION</th>
<th>LEARNING STYLE CHARACTERISTIC TO WHICH IT Responds</th>
<th>LEARNING STYLE CHARACTERISTIC TO WHICH IT DOES NOT Respond</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRAMMED LEARNING</td>
<td>PRESENTS MATERIAL IN A HIGHLY STRUCTURED SEQUENCE WHERE EACH SECTION BUILDS UPON THE ONE IMMEDIATELY PRECEDING IT.</td>
<td>MOTIVATION, PERSISTENCE, RESPONSIBILITY, AND A NEED FOR STRUCTURE: A NEED TO WORK ALONE, A VISUALLY-ORIENTED STUDENT.</td>
<td>A LACK OF MOTIVATION, PERSISTENCE OR RESPONSIBILITY; A NEED FOR FLEXIBILITY OR CREATIVITY; A NEED TO WORK WITH PEERS OR ADULTS.</td>
</tr>
<tr>
<td>INSTRUCTIONAL PACKAGES</td>
<td>1. EACH PACKAGE FOCUSES ON A SINGLE CONCEPT. 2. MULTISENSORY 3. FEEDBACK AND EVALUATION ARE BUILT IN. 4. LEARNING IS PRIVATE AND AIMED AT INDIVIDUAL LEARNING STYLES.</td>
<td>A NEED FOR SOUND OR STRUCTURE: A NEED TO WORK ALONE; ALL PERCEPTUAL STRENGTHS.</td>
<td>A LACK OF RESPONSIBILITY, A NEED FOR PEER OR ADULT INTERACTIONS.</td>
</tr>
</tbody>
</table>

It is unclear as to whether the multisensory descriptor used in the description in Table 3.3 is pervasive to every instructional package. Dunn and Dunn list four senses e.g., typewritten script, audio tape, Kinesthetic Game and tactual activities, which are used to learn the contents of the package. These same types of activities are used in the Individualized Program. However, they are dispersed throughout the entire course as opposed to being employed in every single learning package. Many of the conclusions drawn are still valid with respect to the Individualized Program.
A similar type of analysis relating to Programmed Instruction is provided in Table 3.3.

Dunn and Dunn recognize the need for structure (in this case, curricular structure) and independence as common characteristics associated with success in both modes of program delivery. The language used by the authors in Table 3.3 must be clarified, however, especially as it relates to this study. In the column "learning style characteristic to which it responds", the need for structure, independence, motivation, persistence and responsibility relate strongly to personality characteristics identified in the HSPQ. If related to the HSPQ, these students would show high conformity (Factor G), high dominance (Factor E) and low sensitivity (Factor I).

Notwithstanding this lone description, which is the closest to the scope of this paper, there is a severe lack of literature relating to this type of self-paced, mastery learning program, with respect to any realm of educational endeavour. As this type of program is adopted by more and more educational communities, the amount of information will undoubtedly increase. Until then, it is extremely difficult to assess whether any learning style or personality identified herein is inextricably linked to student success in this particular program as opposed to a traditional secondary school program.
CHAPTER IV

4.1 THE RESULTS

In this chapter, the results of the data collection and analysis are presented and discussed.

4.2 LEARNING STYLE PREFERENCES

Computerized scoring of the Learning Styles Inventory yields a multi-page report, with a very detailed account of each subject and their learning style preferences and dislikes. For the purposes of this study, the focus will be group results. As such, the most important results which pertain to this group of students are found on page one of the printout (see Appendix F).

TABLE 4.1. LEARNING STYLE CUMULATIVE DATA (N=59). (ABBREVIATION)

<table>
<thead>
<tr>
<th>Learning Style Preference</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECTS (PR)</td>
<td>3.66</td>
<td>0.63</td>
</tr>
<tr>
<td>SIMULATION (SI)</td>
<td>3.40</td>
<td>0.97</td>
</tr>
<tr>
<td>DRILL AND RECITATION (DR)</td>
<td>2.82</td>
<td>0.71</td>
</tr>
<tr>
<td>PEER TEACHING (PT) [2]</td>
<td>3.97</td>
<td>0.65</td>
</tr>
<tr>
<td>DISCUSSION (DI) [4]</td>
<td>3.79</td>
<td>0.56</td>
</tr>
<tr>
<td>TEACHING GAMES (TG)</td>
<td>3.64</td>
<td>0.80</td>
</tr>
<tr>
<td>INDEPENDENT STUDY (IS) [3]</td>
<td>3.81</td>
<td>0.84</td>
</tr>
<tr>
<td>PROGRAMMED INSTRUCTION (PI) [1]</td>
<td>3.99</td>
<td>0.45</td>
</tr>
<tr>
<td>LECTURE (LE)</td>
<td>3.51</td>
<td>0.63</td>
</tr>
</tbody>
</table>

An examination of the sample average and standard deviation elucidates their
Learning style preferences (see Table 4.1). The top four learning style preferences are Programmed Instruction (average = 3.99), Peer Teaching (average = 3.97), Independent Study (average = 3.81) and Discussion (average = 3.79). Independent Study has a comparatively large standard deviation of 0.84, as compared to the standard deviations of the other three learning styles, which range from 0.45 to 0.65. The lower standard deviations indicate more consistency in individual results, whereas the higher standard deviation means that the spread of results among subjects is larger.

4.3 LEARNING STYLE PREFERENCES: DISCUSSION

While the Learning Styles Inventory was developed to help teachers identify and address learning style preferences in their classes, these group results will be used to determine how well these successful students enjoy the predominant methods of program delivery employed in the Individualized Program. If one considers the explanation of each learning style as outlined in the Learning Styles Inventory manual (see Appendix C), the major instructional approaches that form the basis of the individualized program are programmed instruction, independent study, peer teaching and discussion. It must be noted, however, that all approaches highlighted in the LSI are found to a certain degree in all courses, depending on how well the approach lends itself to the curriculum.
The unique system of program delivery places the learning guide as the backbone of curriculum delivery. The learning guide (see Appendix I for an example) is a prescriptive and comprehensive step-by-step guide to mastering a set of educational objectives, which are clearly stated in the first few pages of the package. Staff at the school spend countless hours in the development and revision of these guides for all courses offered at the school. The revision process is particularly exhaustive. This involves evaluating the material presented in the guide. Teachers primarily use direct and indirect feedback from students to diagnose shortcomings in the unit and continually make improvements to the guide. The learning guide most closely resembles the learning style identified in the LSI as Programmed Instruction. An example of the test item that measures this learning style preference in the Inventory (see Appendix B) is item number 22, “Learning new material by having the teacher present all the information.”

The statistics for this learning style (average=3.99, standard deviation=0.45) clearly indicate that students in this study enjoy this way of learning new material. In fact, the statistics show that none of the students surveyed find this approach to be unpleasant (see Table 4.2), meaning that they all scored 2.5 or higher in the Programmed Instruction category. No other category showed this unanimous sentiment. The abbreviation key may be found in Table 4.1.
Learning Style Preferences: Discussion

Table 4.2. Number of Students Who Find Each Approach in the Unpleasant Range (N=59).

<table>
<thead>
<tr>
<th></th>
<th>Pr</th>
<th>Si</th>
<th>DR</th>
<th>PT</th>
<th>Di</th>
<th>TG</th>
<th>IS</th>
<th>P1</th>
<th>LE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>13</td>
<td>20</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

On the higher end of the scale, there was one score of 4.86 and 3 scores of 4.71. The number of students who scored 3.5 or higher in the Programmed Instruction category was higher than any other learning style preference (see Table 4.3). Of the 59 students surveyed, 49 found Programmed Instruction to be a pleasant or very pleasant style of learning.

Table 4.3. Number of Students Who Find Each Approach in the Pleasant Range (N=59).

<table>
<thead>
<tr>
<th></th>
<th>Pr</th>
<th>Si</th>
<th>DR</th>
<th>PT</th>
<th>Di</th>
<th>TG</th>
<th>IS</th>
<th>P1</th>
<th>LE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>41</td>
<td>35</td>
<td>10</td>
<td>43</td>
<td>38</td>
<td>34</td>
<td>39</td>
<td>49</td>
<td>32</td>
</tr>
</tbody>
</table>

4.3.2 Discussion and Peer Teaching

The learning guide, while providing the backbone to the curriculum, cannot effectively deliver a complete learning experience on its own. Discussion and peer teaching are also integral parts of the learning experience in the Individualized Program. The physical surroundings encourage this exchange. Students regularly consult with both teachers and other students in their daily learning environment. Resource areas replace classrooms in the Individualized Program. The areas are assigned departmentally. For example, all Social Science courses are done in the
Social Sciences resource area; all Science courses are done in the Science area, etc. Typically, these resource areas range in size from one to three traditional-sized classrooms. With the absence of bells and a personalized daily schedule, each student will visit 3 to 6 areas on average per school day. All resource areas are staffed by teachers who are available for assistance. Every teacher is charged with the formal teaching and marking in 1 or more courses in the department. Typically, however, every teacher will have some familiarity with all courses offered in the department and act as a resource for all students who are in the resource area. For example, a student may need a clarification of an instruction in a learning guide. A student may also need another example to help clarify the concept being presented in the learning guide. This is the type of help offered to students by the teachers in the resource area. These interchanges most closely conform to the Discussion category in the LSI. An example of an Item in the LSI that tests for this learning style includes "hearing the ideas of other students during class discussion of some topic" (Item 18). In this program, a discussion in a resource area would closely emulate that which would be heard in a regular classroom, only a much smaller scale.

The fluid motion in and out of areas means that there is always a heterogeneous group of students working in the resource area at all times. A Grade 9 Math student may be sitting beside an OAC Calculus student who may be working next to a Grade 11 Business Math student. Often, students will ask other students for help and engage in peer teaching. Another common occurrence is that students in the same course find study partners and work on course work together, also
Learning Style Preferences: Discussion

engaging in peer teaching. This happens both in resource areas and outside the school. Items contributing to the identification of this approach are found in Table 4.4.

**TABLE 4.4. ITEMS CONTRIBUTING TO THE IDENTIFICATION OF THE PEER TEACHING FACTOR.**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>HAVING A CLASSMATE TEACH YOU HOW TO DO SOMETHING SHE/HE IS ESPECIALLY GOOD IN.</td>
</tr>
<tr>
<td>3</td>
<td>HAVING A FRIEND HELP YOU LEARN MATERIAL YOU ARE FINDING DIFFICULT TO UNDERSTAND.</td>
</tr>
<tr>
<td>30</td>
<td>LEARNING NEW INFORMATION OR HOW TO SOLVE A PROBLEM FROM ANOTHER STUDENT IN YOUR CLASS.</td>
</tr>
</tbody>
</table>

The statistics for Peer Teaching (average = 3.97, standard deviation = 0.65) show a strong preference by this group of students for this approach. However, unlike Programmed Instruction, there are 2 subjects who find this approach to be rather unpleasant, with individual scores of 2.33 and 2.00. On the high end, there are 43 students who find this approach to learning pleasant or very pleasant (see Table 4.2). One subject scored 5.0 on the preference scale and 18 others scored 4.50 or higher, the highest number of scores of 4.50 or over in all learning styles. Therefore while the range of scores was slightly higher for this learning style, the average still translated into a pleasant approach for most students.

The fourth highest average (3.79) was found for the Discussion category (standard deviation=0.56). An examination of Table 4.3 reveals that one student
Learning Style Preferences: Discussion

found this approach to be rather unpleasant (2.38), while 38 found the approach to be in the pleasant range. Scores ranged from 2.38 to 5.00.

4.3.3 Independent Study

Items in the LSI that measure the subject's preference for Independent Study include "working independently on a project [or assignment] you choose yourself" (Item 50), "preparing, on your own, to make a presentation to the class" (Item 13), "reading a book [learning guide] in order to learn all about some topic" (Item 17) and "studying on your own to learn new concepts" (Item 4). (Because some of the terminology in the items does not suit the Individualized Program setting very accurately, the Direction 2000-specific terminology is mentioned in brackets). While many supports are available to the student working on curriculum in the Individualized Program, much of the work is done alone. There are very few negative implications surrounding this fact. For the large majority of students, successful completion involves many steps, most of which are completed independently. Ideally, upon picking up a learning guide from the resource area, the student immediately reads the objectives of the unit and roughly plans how long each section of the guide will take to complete and what resources are necessary for the unit. Many sections involve reading or research on a topic, or engaging in some type of practical exercise to prepare for an evaluative activity. These initial activities are most often done independently, though the student is free seek assistance at any time from one of her peers or a teacher.
The evaluative activity may vary in the degree of collaborativeness. Most evaluations are done alone, though an increasing number are being done with others. Often there is a choice of doing it alone, or with a partner, or in a group. There is enough flexibility inherent in the system that an assignment designed for completion by one student can be adapted to become an assignment for 2 or more, and vice-versa.

In the author's experience, there are slightly more instances of students wanting to modify the assignments designed for work in pairs or groups into assignments that they can work on alone than the opposite case. One of the reasons for this may be the incredible variety of daily schedules that students plan on a day to day basis. Another explanation for this tendency is due to the fact that there is such heterogeneity in terms of where students are in courses. There always seems to be at least one student who has paced herself so far ahead of everyone else that, when she comes to a point in a guide where a group assignment is prescribed, there is no one to work with for that assignment. The same explanation holds for those who are working at a much slower pace than the rest of the pack.

Group dynamics and student comfort level with those at that point in the learning guide are also a factor. When the number of people at a specific point in a learning guide is small and if the student feels unable to work well with the other group members, he will sometimes ask to work on a modified assignment that he can do alone. Other students find working in a particular group frustrating or feel that the others are not contributing sufficiently and will ask for a modification in the assignment so they may work on their own.
Learning Style Preferences: Discussion  40

This cycle of learn-practise-evaluate repeats itself within the unit until a final evaluative activity tests for mastery of the concepts presented in the unit. Indeed, there are times when a whole learning guide is done independently, without any consultation with a peer or a teacher. This practice is frowned upon by teachers and Teacher Advisers alike. Courses at Mary Ward need not be correspondence courses. There are support systems in place to enhance that which is in the learning guide. Seminars, for example, provide assistance where those elements of the curriculum do not lend themselves particularly well to the learning-guide format. Regular consultation with the subject teacher is strongly encouraged and is even assigned unit credit in some instances. Help sessions after school are available; practice tests are readily available and other interactive support systems are utilized to supplement the work in the learning guide.

Though the instances of completing a unit in its entirety alone are relatively few, there is a significant amount of work in the guide that the student completes independently, though always within a structured framework: the learning guide.

The statistics relating to Independent Study show it to be a pleasant approach to learning new material (average = 3.81) among these subjects, though the relatively high standard deviation (0.84) denotes less consensus on this finding than in the other three learning styles highlighted to this point. Six people found the approach to be in the unpleasant range, the lowest score being 1.56. Conversely, the number of people finding the approach in the pleasant range was 39, with 4 subjects scoring 5.00 and 16 subjects scoring 4.50 or over, a second-highest ranking after peer teaching.
4.3.4 Relating the Data to Individualized Program Features

In section 4.3, four major approaches to learning surveyed in the LSI were identified as best resembling what the Individualized Program employs most frequently: Programmed Instruction, Peer Teaching, Discussion and Independent Study, in no particular order of importance. The results of the statistical analysis show a complete concordance with this initial observation. The same four learning styles were identified as this sample's preferred approaches to learning new material.

However powerful these results may seem, a closer examination of the complete data set reveals other interesting results (see Figure 4.1). If one considers that a score of 3.51 to 5 denotes that the students find the approach to be in the pleasant range, one notices in Table 4.1 that all but two of the calculated averages (Simulation at 3.40 and Drill and Recitation at 2.82) are in the pleasant range.
Moreover, none of the averages fall below 2.50, which denotes a score in the unpleasant range. The average of the nine average LSI scores is 3.62. This has very serious ramifications upon any conclusions that can be drawn based on the analysis of the data.

Therefore, while students find the 4 identified learning styles to be their most pleasant approaches to learning new material, they have identified 3 other approaches which are also within the pleasant range. They have found Simulation and Drill and Recitation to be neither pleasant nor unpleasant. They have identified no approach as being unpleasant. One wonders then, if learning style truly is associated with student success in the Individualized Program. If the four identified learning styles were clearly found to be the only pleasant approaches, then the results could have been more conclusive. It seems that this group of students seems to enjoy most of the approaches to learning identified in the survey. These students potentially then do quite well in any learning environment to which they were subjected (except for those heavily laden with Simulation and Drill and Recitation).

It is, however, logical to conclude that the congruence of the data to the major approaches employed is significant to the success that students experience in the Individualized Program.
4.4 PERSONALITY TRAITS

In analysing the data collected in the High School Personality Questionnaire (HSPQ), it is important to remember that there are norm tables which allow us to compare this group to a larger random sample. Because of this, we can analyse personality trait trends of the group, as well as draw a comparison between the group and a larger random sample which represents the population at large.

It is important to note that, in the author's opinion, a few of the personality traits would stand out as being more important to success in the Individualized Program compared to success in a traditional system of program delivery. For example, a high Factor H (denoting boldness) score would greatly enhance a student's chance of success for many reasons. As the HSPQ Manual indicates, a high Factor H score denotes boldness, uninhibitedness and the ability to take stress. Dealing with stress successfully at certain times of the year is absolutely crucial because, for these students, meeting certain deadlines is important. While the deadlines in the Program are usually self-determined in consultation with the TA, there are a few deadlines imposed by the school, for various reasons. One such deadline is the January exemption deadline (see Appendix L). The terms of this exemption deadline were the terms for defining student success for this study.

High-achieving students like those surveyed all want to be granted exemptions from their final exams. Some students find themselves doing double their usual work in the weeks and month before this exemption deadline, increasing their stress level. In the author's opinion, most often it is the student who is able to
Personality Traits

remain focused and not be overtaken by stress who is successful at achieving exemption status.

This factor, along with a high Factor $Q_2$ score (denoting self-sufficiency), would be advantageous to the student, given the way in which students in the program get the help they need when completing their course work. A high Factor $Q_2$ score means that the student is self-sufficient, resourceful and prefers her own decisions. Resourcefulness is a definite necessity in this Program. The most efficient method of getting help on an aspect of the curriculum with which one is experiencing difficulty is to actively seek out the help. If this is not done, help will still eventually come, but later.

Consider the case of a rather timid student who is having difficulty with verb conjugations in a Grade 9 French course. After having read the explanation in the textbook and the guide, and having attended the seminar on verb conjugations recently, the student is still experiencing difficulty with the concept. She struggles on her own, hesitating for some reason to seek the help of the teacher in the resource area. This has lengthened the time that it has taken for her to master this concept, fourfold. Her self-confidence is diminished and extends to other units, affecting her performance throughout.

In contrast, another student experiencing difficulty as soon as she encounters the new concept in the learning guide immediately approaches the teacher in the resource area for help. After a very enlightening discussion, a few extra practice questions and a few pleasantries, the difficulty is resolved. Confidence is restored and anxiety is minimized.
This is only one advantage of having high Factor $H$ and Factor $Q_2$ scores. Diagnosing and addressing difficulties quickly, especially when a student is proactive, is a good personality trait to have in the Individualized Program. Those who lack these qualities do eventually get help, though it comes after the TA has diagnosed the problem. This usually happens in the course of a TA meeting, which happens, on average, once every two weeks. Test anxiety is a notorious difficulty for some students in the Individualized Program. Upon the successful completion of a unit of study, the student engages in some type of evaluative activity. Often, this evaluative activity is the traditional paper and pencil test. A student has five days to write the unit test after having successfully completed the learning guide, without incurring a late writing penalty. Of all the struggles in the Individualized Program for both students and Teacher Advisors, test anxiety is the most formidable. It is a particular concern for those who are preoccupied with high marks. When students delay test-taking on a regular basis, their pace becomes slow and their stress levels increase. Given this undeniable fact, it is the opinion of the author that successful students would score low on Factor $O$: Apprehension. A high Factor $O$ score denotes an apprehensive, worrying and anxious personality. The opposite and more desirable condition for the Individualized Program is that of a person who is self-assured, secure and has no fears. This may limit test-taking anxiety.

Finally, a high Factor $Q_3$ score, denoting high self-discipline, would seem to be a desirable quality for a student in this type of program. In a typical classroom, there is a certain amount of "spoon-feeding", especially with respect to urging and defining daily and weekly goals. In the Individualized Program, these critical aspects
are largely left to the individual student. Meeting the planned goals is the key. In a regular program, teacher-set deadlines inherently imply a firmer notion of finality. Self-imposed goals in the Individualized Program seem always renegotiable to some extent. It is this constant renegotiation that could lead to failure for some.

4.4.1 High School Personality Questionnaire (HSPQ) Data

Scoring of the High School Personality Questionnaire (HSPQ) is based on a standard ten (or sten) scale from 1 to 10, where a score of 1 reflects the opposite personality trait from a score of 10. For example, when testing for Factor A: Warmth, a sten score of 1 denotes a cool, reserved, impersonal personality while a sten score of 10 denotes a warm, outgoing, easy-going personality. Individual sten scores were tabulated and the sample means and standard deviations were found (see Table 4.5). To verify whether the calculated mean was significantly different, a one sample t-test (test value = 5.5) was performed. The analyses to follow will focus both upon group characteristics and whether these variations differ from the norm group. Appendix H is a visual representation of the results along the continuum for each personality factor, using an original HSPQ Test Profile sheet.
Table 4.5. One-Sample T-Tests for HSPQ Factors.

<table>
<thead>
<tr>
<th>Trait (Factor)</th>
<th>Mean</th>
<th>SD</th>
<th>2-Tail Signif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Warmth</td>
<td>5.49</td>
<td>2.40</td>
<td>.978</td>
</tr>
<tr>
<td>B: Intelligence</td>
<td>6.73</td>
<td>1.73</td>
<td>.000</td>
</tr>
<tr>
<td>C: Emotional Stability</td>
<td>6.56</td>
<td>1.78</td>
<td>.000</td>
</tr>
<tr>
<td>D: Excitability</td>
<td>4.92</td>
<td>1.83</td>
<td>.017</td>
</tr>
<tr>
<td>E: Dominance</td>
<td>5.93</td>
<td>1.87</td>
<td>.082</td>
</tr>
<tr>
<td>F: Cheerfulness</td>
<td>4.94</td>
<td>2.40</td>
<td>.084</td>
</tr>
<tr>
<td>G: Conformity</td>
<td>6.31</td>
<td>1.69</td>
<td>.001</td>
</tr>
<tr>
<td>H: Boldness</td>
<td>5.31</td>
<td>2.55</td>
<td>.559</td>
</tr>
<tr>
<td>I: Sensitivity</td>
<td>5.90</td>
<td>1.82</td>
<td>.098</td>
</tr>
<tr>
<td>J: Withdrawal</td>
<td>5.34</td>
<td>1.76</td>
<td>.485</td>
</tr>
<tr>
<td>O: Apprehension</td>
<td>4.98</td>
<td>1.95</td>
<td>.047</td>
</tr>
<tr>
<td>Q2: Self-Sufficiency</td>
<td>5.88</td>
<td>2.13</td>
<td>.175</td>
</tr>
<tr>
<td>Q3: Self-Discipline</td>
<td>5.58</td>
<td>1.77</td>
<td>.742</td>
</tr>
<tr>
<td>Q4: Tension</td>
<td>5.15</td>
<td>1.71</td>
<td>.124</td>
</tr>
</tbody>
</table>

For all calculations, test value = 5.5, N = 59, degrees of freedom = 58

4.4.2 HSPQ Data - Group Scores

From the statistics calculated in Table 4.5, it can be seen that this group seems to be more abstract-thinking than concrete-thinking (high Factor B score). This conforms to the opinions of Taylor (1964) and Lavin (1965). It is interesting to note here that Factor B is interpreted as the intelligence factor (see Table 2.2). Of the five groups of authors listed, only two rate high intelligence as a distinguishing factor in the student success argument. The group is emotionally stable (high Factor
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C) and it conforms to procedure (high Factor G). Emotional stability is noted as an important factor by Taylor (1964), however it is not mentioned by any of the other authors. A high degree of conformity (high Factor G) is, however, cited by four of the five authors in the review of literature.

All other factors fall in the middle of the range. This contradicts the findings of the authors studied in Chapter 3 on many fronts. First, two of the five authors mention high Factor A scores denoting a warm personality. The sample mean of 5.49 and rather large standard deviation of 2.40 denotes that these measurements were normally distributed around the mean and that no discernible departure from the norm was detectable.

Two of the five authors mentioned the tendency of high Factor D scores in successful students, denoting high excitability. No such trend was evident here as the sample mean for this trait was 4.92. Again a rather high standard deviation (1.83) saw most students place themselves in the middle of the continuum.

Finally, three of the four authors placed an emphasis on self-sufficiency (Factor Q2), and four authors espoused self-discipline (Factor Q3) as assisting in student success. This group of successful students scored in the middle of the continuum on both counts with a Factor Q2 score of 5.88 (sd=2.13) and a Factor Q3 score of 5.58 (sd=1.77).

This is a fairly weak record of conformity of this data set to those of the authors cited in Chapter 3. In some respects, the findings validate the non-conformity of the authors with respect to a lack of a common set of personality traits that are associated with student success. No authors unanimously agreed on any
one personality trait that was categorically associated with student success. The highest level of unanimity was with respect to high conformity and self discipline, where 4 of the 5 authors judged these factors to be important. The results of this study tend to refute this evidence, as both these scores tend to fall in the middle of the two continua. The unique features of the Individualized Program must also be considered when attempting to account for the differences between the traits identified in the literature review and those observed in this study.

4.4.3 HSPQ Data: Group Means Compared To Norm Tables

The Norm Tables from the HSPQ manual used in this comparison originate from large sample studies of the HSPQ on random samples of males and females, aged 14.5 years. The author's non-random sample of 59 successful male and female students, with an average age of 14.5 years was used as the testing group. The results of the one sample t-test were used to establish significant differences of the means of the two groups under consideration. A sample mean was considered significantly different if the 2-Tail Significance value was 0.05 or less, denoting that the result would happen by chance only 5% of the time or less. The population mean (or test value) was 5.5.

Five factors were judged to have significantly different means compared to the larger population sample. Factor B (2-Tail Significance = 0.000) measuring concrete and abstract thinking shows a clear departure from the population mean. The sample mean (6.73) is not only the highest sample mean, it is also the sample
mean that is furthest away from the population mean of 5.5. According to the description of Factor B (see Appendix A), these students are more abstract-thinking and more intelligent than the general student population. They have a high general mental capacity. They are insightful, are fast-learning and intellectually adaptable. While there seems to be no doubt that these qualities would help a student be successful in any system of program delivery, only two of the six authors reviewed cited this trait as a predictor for student success.

Factor C: Emotional Stability scored 0.000 in 2-Tailed Significance, denoting a significantly higher mean than the population mean. According to Appendix A, the sample is emotionally stable, mature, calm and faces reality. They show restraint in avoiding difficulties and do not worry as much as their counterparts. These factors contribute indirectly to reducing test taking anxiety, which improves overall success in the Individualized Program. Maturity also implies ability to commit to studies faithfully, treat self-imposed goals seriously and balance social issues with academic responsibilities. Of the authors reviewed in Chapter III, only Taylor (1964) has cited this factor as a characteristic shared by successful students.

The next personality trait which the sample showed to be significantly different than the population mean was more enigmatic to the author. The sample’s 2-Tail Significance rating (.017) for Factor D: Excitability demonstrates this group’s phlegmatic nature. According to Appendix A, they are undemonstrative, deliberate, placid and inactive. Better descriptors are found if one contrasts with those describing excitability. Using this frame of reference, the sample is patient, not excitable and not easily distracted. They do not show many nervous symptoms.
With respect to test-taking anxiety associated with nervousness, the author has never noticed a discernable difference in successful students over the years with respect to their excitability. The author has seen excitable successful students as well as stoical successful students. Other authors have discerned this difference as well. Ochroch and Dugan (1986) identified high excitability as a common trait among successful students, whereas Cattell and Butcher (1968) state that low excitability is a shared characteristic of this group.

Low excitability would certainly be an asset when moving from resource area to resource area. Some students are drawn in by the dynamism of the hallways at times. Because of the constant flow of bodies throughout the school, excitable students may be more apt to be side-tracked when travelling from one resource area to another, thereby wasting curricular time, causing increased stress levels later on when they try to meet exemption deadlines, etc. It is noteworthy to restate, however, that the author has never considered the excitability factor to be a defining factor for student success, based on his personal experience at the school.

The high Factor G: Conformity score presents an expected observation related to the question of student success. Some of the descriptors listed in Appendix A for a high conformity score include rule-bound, persevering, consistently ordered, concerned about moral standards and rules and emotionally disciplined. In the Individualized Program, adaptation to the way things are done is crucial to a student’s success. In fact, those who are not successful within it are quick to cite the system as their major downfall.

The inability to work within the system in place is possibly the most prevalent
reason for a student’s exodus from the Program. For some, the freedom is overwhelming. Despite the efforts of the TA to restrict temporal freedom, some are simply overtaken by a non-academically oriented peer group and concentrate on everything but their studies. This is something that the TA can attempt to address immediately and repeatedly. Admittedly, some students will simply refuse all attempts to help correct their inadequate progress. After engaging in all the intervention at her disposal, there is nothing else the TA can do and students are left to their own devices.

High conformity was cited by four of the five authors reviewed as a personality trait associated with successful students. It surely is a common factor to student success in any educational program. Indeed, successful people in any walk of life need to conform to certain systems to progress within them. Conformity is especially crucial in the Individualized Program. It is absolutely mandatory if a student is to have any opportunity of being even mildly successful.

The final personality trait showing a significantly different mean from the norm was Factor O: Apprehension. The score was significantly lower than the average which denotes a self-assured, self-confident, resilient and rudely vigorous character (see Appendix A). None of the authors reviewed made mention of this factor as a personality trait related to student success. Relating to the Individualized Program, low apprehension is especially useful because it may assist a student in seeking help more quickly and easily. It also helps to reduce test-taking anxiety. A student experiencing difficulty in the Program who is apprehensive and does not seek the help of his Teacher Advisor, his teachers or his peers could seriously affect
his pace, and thus compromise his progress. Some get so frustrated trying to figure things out on their own that they get discouraged and give up. Conversely, those who seek help immediately move through the curriculum at a much more steady pace and experience more success, both in pacing and in marks.

4.4.4 Other Primary Factor Discrepancies

In Chapter III, Table 3.1 summarized the relevant HSPQ factors identified by other authors in their estimation of common personality traits of successful students. Two factors were identified by a majority of the authors reviewed that were not significant in the statistics for this sample.

Three of the authors cited high Factor Q2 scores, denoting self-sufficiency, resourcefulness and a preference for one’s own decisions. The calculated sample average for this factor was 5.88 (sd = 2.13). Four of the authors identified a high Factor Q3 rating, signifying self-discipline, self-respect and the ability to exact will power. The sample average for this factor was 5.58 (sd = 1.72). Ostensibly, these characteristics are logical components of a successful student in any study program. Resourcefulness is particularly useful in the Individualized Program especially when a student experiences difficulty. Self-discipline is also seemingly a desirable personality trait in a system where so much depends on taking responsibility for your own education. The results from this sample group indicate that this is not necessarily the case.
4.5 CORRELATION DATA

The calculation of a Pearson correlation coefficient \((r)\) is an attempt to identify relationships between learning styles and personality traits, if any exist. A correlation coefficient of +1 indicates that as one score increases the other increases. A correlation coefficient of -1 indicates that as one score increases, the other decreases. A score of 0 indicates no correlation between the two sets of data. The calculation of correlation coefficients yields a 23x23 matrix for the data set in this study (see Appendix K).

A subset of the positive and negative correlations \((r \leq -0.400 \text{ and } r \geq 0.400, 2\text{-tail significance }= 0.01)\) from this matrix is presented in Table 4.4. It is important to note that correlation coefficients do not identify causal relationships. That is, one condition does not necessarily cause the other. It also does not take into account the fact that some other factor underlies both. The only conclusion one can reach is that of association. For example, a perfect positive correlation of \(x\) and \(y\) denotes that a high \(x\) goes together with a high \(y\) (or vice-versa).

The main purpose of the correlation data presented in Table 4.6 is to determine whether there is a relationship (positive or negative) between learning styles and personality traits in general. The other purpose of this set of statistics is to determine whether any of the learning style preferences identified in section 4.2 and any of the personality traits identified in section 4.4 as significant with respect to student success relate to each other in any significant way.
Table 4.6. Statistically Significant Correlations of the Data Set. (N=59)

<table>
<thead>
<tr>
<th>Learning Style/Personality Trait Pairing</th>
<th>Correlation Coefficient (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Warmth / F: Cheerfulness</td>
<td>0.436</td>
</tr>
<tr>
<td>A: Warmth / Q₂: Self-sufficiency</td>
<td>-0.444</td>
</tr>
<tr>
<td>C: Emotional Stability / D: Excitability</td>
<td>-0.444</td>
</tr>
<tr>
<td>C: Emotional Stability / H: Boldness</td>
<td>0.542</td>
</tr>
<tr>
<td>C: Emotional Stability / O: Apprehension</td>
<td>-0.487</td>
</tr>
<tr>
<td>C: Emotional Stability / Q₄: Tension</td>
<td>-0.413</td>
</tr>
<tr>
<td>Discussion / Projects</td>
<td>0.452</td>
</tr>
<tr>
<td>Discussion / Simulation</td>
<td>0.445</td>
</tr>
<tr>
<td>E: Dominance / I: Sensitivity</td>
<td>-0.438</td>
</tr>
<tr>
<td>F: Cheerfulness / H: Boldness</td>
<td>0.526</td>
</tr>
<tr>
<td>F: Cheerfulness / Q₃: Self-discipline</td>
<td>-0.458</td>
</tr>
<tr>
<td>H: Boldness / O: Apprehension</td>
<td>-0.609</td>
</tr>
<tr>
<td>H: Boldness / Q₄: Tension</td>
<td>-0.414</td>
</tr>
<tr>
<td>Lecture / Programmed Instruction</td>
<td>0.508</td>
</tr>
</tbody>
</table>

The first important observation is that there were no statistically significant correlations between any preferred learning style and personality trait. Practically speaking, two subjects could share independent study as a preferred learning style, yet be on either end of the continuum with respect to, for example, personality Factor D: Excitability or any other personality factor.

A strong correlation between learning styles and personality traits might allow us to infer that both of these measurable qualities were related when discussing
Correlation Data

student success in the individualized program. The absence of any such correlation suggests that these two qualities are discrete and unrelated. It is also unclear as to which of these qualities - personality traits or preferred learning styles - is most important in the determination of student success. The lack of correlation between personality traits and preferred learning styles is certainly unexpected given the consistently high scores observed in Factor B: Abstract-Thinking and Programmed Instruction, for example.

Relating personality factors to each other, there are some significant correlations with respect to some of the observations made in section 4.4. Factor C: Emotional Stability correlates negatively with both Factor D: Excitability and Factor O: Apprehension. This is an affirmation to the earlier observations. However, there are other correlations with Factor C: Emotional Stability (i.e. positively with Factor H: Boldness and negatively with Factor Q: Tension) which are not as evident in section 4.4. Similarly, the strongest correlation (positive or negative) in the entire study is between one of the study's identified factors, Factor O: Apprehension and a non-identified factor (Factor H: Boldness), with a correlation value of -0.609.

In comparing the top four learning style preferences identified in the study (Programmed Instruction, Peer Teaching, Independent Study and Discussion), none of these showed any strong correlations with each other. Discussion, however, did show a significant positive correlation with both Projects ($r = 0.452$) and Simulation ($r = 0.445$). Programmed Instruction exhibited a positive correlation with Lecture
The correlation data, though adding little to reinforce the original statistical observations, did significantly conclude that the two measured qualities in this study, personality traits and learning styles, are most likely unrelated to each other or relate to each other insignificantly in the context of student success in the Individualized Program of study.

4.6 SUMMARY OF OBSERVATIONS

The main purpose of this study has been to identify learning style preferences and personality traits associated with student success at the grade 9 level in an individualized study program. With respect to learning styles, the observations seemed to agree with the major instructional modes employed in the program. The personality traits which showed any significance did not necessarily adhere to the wide variety of personality traits identified in the literature review. One possible explanation for this was that in this study, results were gathered in relation to a non-traditional type of program delivery. Other studies performed by the authors reviewed were conducted using subjects in a traditional type of high school program.

The data suggest that successful grade 9 students share the characteristics outlined in Figure 4.2. It is important to note that there was no significant correlation between learning styles and personality traits, either specifically or in general.
**Figure 4.2. The Successful Grade 9 Student in the Individualized Program.**

**Learning Style Preferences**  
Programmed Instruction  
Peer Teaching  
Independent Study  
Discussion

**Personality Traits**  
Abstract-thinking  
High Emotional Stability  
Low Excitability  
High Conformity  
Low Apprehension
CHAPTER V

5.1 IMPLICATIONS OF THE STUDY

The observed results of this study engender many questions, some of which are easily answered and others which require further investigation. One of the challenges is to use the results to improve the present conditions at the school, if this is possible. As such, the results of this study can provide some hints on what learning style preferences and personality traits are shared by successful students. By extension, it can enlighten the situation for critical players in the school and what they can do to help students develop these character traits. It can also help teachers plan for learning opportunities to help the average student share in those types of assignments that have proven to be successful and enjoyable for another group of students.

5.1.1 The Learning Guide

Teachers in the Individualized Study Program always seek to improve their instructional materials and constantly revise course learning guides. Ostensibly, the results of this study do not address any of their immediate course revision concerns because revisions usually focus on how to help the student who is not progressing very well. Teachers may, however, draw on the fact that Peer Teaching and Discussion seemed to be some of the stronger learning style preferences of successful students and might encourage the weaker students to work in a more group-oriented manner and consult with others more. In fact, revised learning
guides can reflect this by shifting the focus from a preponderance of individually-based activities to a greater number of collaborative activities. The individualized schedule seemingly would facilitate this proliferation of group work. Teachers in the school know, however, that student schedules can vary so widely on a daily basis that it is sometimes impossible for a group of students to find a mutually convenient time to meet and work on an assignment. There is indeed a delicate balance that must be struck in this regard. The most formidable challenge is to find the balance. This can only happen through the constant revision processes which the staff at the school engages in year after year.

Where personality traits are concerned, the observed strongest personality traits suggest that when a student is more relaxed and follows a routine, there are better results. The challenge to teachers is to ensure that their instructional materials are clear and unambiguous and, where possible, that they follow a similar pattern so that the student knows what to expect more or less from learning guide to learning guide. It also seems important to make sure that there is adequate preparation and no surprises in any tests that may be included in the evaluation scheme in the learning guide. This could help students who are now apprehensive, unable to conform and less emotionally stable, to move in the opposite direction. In the author's opinion, the staff at the school have done a commendable job in trying to ensure that the learning guides and the evaluative materials address all the concerns with respect to personality traits.
5.1.2 The Teacher Adviser (TA) Role

Most teachers at the school (the author included) agree that the single most important influence in the life of a student in the Individualized Program is the TA influence. This is especially true for the student who is struggling. Teacher Advisers could use the results of this study to address some of learning styles being employed by their advisees, and encourage them to form a peer study group and seek more help from other students and the teacher.

Where personality traits are concerned, the TA could pinpoint reasons for unsatisfactory progress or even lapses in progress from the rubric developed for the successful student in Figure 4.2. There is now some evidence that high emotional stability, for example, is associated with student success and that if the student, for any reason, is particularly vulnerable to emotional instability, that would be an area of concern that the Teacher Adviser could help address.

5.1.3 Implications for Schools Wishing to Adopt this Mode of Delivery

The Individualized Program attracts many visitors, both locally and from across the world. A small number of these people may be interested in setting up an Individualized Program in their own jurisdiction. The results of this study could be shared with these people for planning purposes. This is especially crucial for the first few years of this program's life, when invariably prospective students will not really know what to expect. The picture of a successful student from a very similar program may help some students understand whether the program is really suitable
for them. The Individualized Program under examination in this study suffered from severe growing pains, particularly from students having mistaken ideas of what it took to be successful in such a different program. It should be stressed to these people that, as in all standardized tests, the results of this test should be used as diagnostic tool, and that it is one small part of a bigger package of information and strategies used to provide the optimal learning experience for students.

As was discussed earlier, this information is also helpful for teachers writing new curricula for the program. As the information is helpful for the revision process, it is even more helpful when it is available for the first draft of the learning materials.

5.1.4 Is the School Better Suited to be a Magnet School or Community School?

Magnet schools offer a specialized curriculum with a distinct focus in one or more particular areas. Their enrolment boundaries are unlimited, and funding transfers from co-terminus boards are not a problem because there are usually no schools within those boards that offer a similar program of study. At present, there are only two schools in the school board governing the school researched in this study that are considered magnet schools. One school has a performing arts focus and the other has a choral music focus. In its early stages, some of the faculty at the school in this study gathered information on whether or not it could qualify as a magnet school and extend its boundaries for purposes of enrolment. It was determined that it did not qualify as a magnet school since the content being delivered was a traditional complement of courses and only the mode of instruction
differed. Mode of instruction, therefore, was not a distinguishing factor in separating magnet schools from community schools.

It is agreed that students must have special abilities to achieve even average results in the two magnet schools described above. Can the same be said for those in the Individualized Program, and if so, should the criteria for a magnet school be changed to reflect this? The learning style preferences data suggest that programmed instruction, peer teaching, independent study and discussion are the top four learning style preferences for successful students. They also indicate, however, that most of the learning styles tested for in the LSI lie within the pleasant range, suggesting that these students may do well in any other traditional program. While students prefer the four learning styles identified above, this may be a function of the extra practice they received in these four learning styles in the first few months of their secondary school career. A more telling statistic might be that of the learning style preferences of these successful students at the end of their Grade 8 year. One wonders whether the results would have been significantly different based on their experiences in Grade 8.

Where personality traits are concerned, it is again difficult to draw comparisons and contrasts of this school with traditional schools because there seems to be no widely accepted grouping of personality traits of successful students.

Even if the definition of a magnet school were amended to take the mode of program delivery into account, the results of this study prove inconclusive to the question of whether the school under investigation would qualify as a magnet school.
5.2 POSSIBLE DIRECTIONS FOR FURTHER STUDY

In some respects, it might have been more helpful to do a thorough investigation based on why students are unsuccessful in the individualized program and approach the whole issue of informing prospective parents and students from that perspective. There was an investigation of a group of such students after the third year of the school’s adoption of the Individualized Program model. Unfortunately, the study was not at all scientific and it seemed that other motives were at work. The comments were not constructive and took on an accusatory tone. Moreover, the great majority of claims as to why these students were unsuccessful were unfounded.

A more scientific investigation of learning styles and personality traits of unsuccessful students along with the results of this study could provide more information for the prospective parent. It would also help the faculty address whatever shortcomings (if any) were found in curriculum design and the execution of their TA duties. Admittedly, such a study would be more difficult to have approved by everyone who would share in the approval process, for many reasons. It would be useful information nonetheless.

To determine flexibility of learning style preference and adaptability, it would be helpful to administer the LSI to students in their Grade 8 year and then repeat the testing in their Grade 9 year, using a different form of the instrument. If, in general, the same level of student success was maintained, even under a different system of program delivery, this could indicate that these students seem to be high
achievers, regardless of the mode of program delivery.

Another extension of this study would be to follow the subjects through their high school careers and to observe whether they remain successful. They could also be re-administered a different form of each instrument and compare the results with their Grade 9 results. This could be a predictor of academic success over a longer time period, and of how personality traits and learning style preferences of successful students evolve.

An examination of the list of subjects reveals that four years after the study was completed, eleven of the fifty-nine original subjects no longer are part of the Individualized Program. Reasons for leaving the Program vary. In most instances, a negative experience precipitates a change in schools. No further investigations were made as to why these students left the school and whether they were successful in their final year at the school. Undoubtedly, this would be an interesting follow-up investigation that could shed further light on factors that may alter the student's success.

A very useful extension of this investigation could be to survey a group of students who would not meet the criteria used to define a successful student for this study, but would have met the criteria in their Grade 10 year, for example. It would have been especially useful to use the two instruments to survey the students concurrently with the sample group for this study, and then to re-test the students a year later. The results of both studies could be used to map out a progression of learning style preferences and personality traits. It could enhance our results or cast doubt upon them, depending on the results.
A more complete study would have resulted if other variables were studied concurrently with learning style preferences and personality traits. These other variables include socio-economic grouping, ethnocultural differences and considerations of gender. If an extension of this study were done including these factors, however, there would have to be much sensitivity in the analysis of results, an analysis that could be difficult for some groups in our society to accept.

In short, though the results of the study were useful in a fairly limited context, there are many ways in which the information presented in this paper could be enhanced and prove more useful to the original goal - to provide guidance for prospective students and their parents and to help them make an informed decision as to whether the Individualized Program meets their learning needs.

5.3 CONCLUSIONS

The study showed that successful Grade 9 students in the Individualized Program shared many similar learning style preferences and personality traits. This, along with other information, could provide useful information to prospective students and their parents considering the Individualized Program as a viable option for their secondary schooling. The results can also be used by teachers and teacher advisers to improve their curricula and diagnose difficulties in the progress of both successful and unsuccessful students. It can also provide some guidance for those jurisdictions considering the implementation of a program similar to the Individualized Program.
The information presented in this study, however, must be used as a part of a more complete set of considerations for all the target groups. It cannot be considered in isolation and some of the other parts of this complete picture were outlined in the section on possible directions for further study.
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Appendices

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