Reducing the Use of and Emphasis on Grades in High School Physics Classes

By

Michel Robert Clark

A research paper submitted in conformity with the requirements
For the degree of Master of Teaching
Department of Curriculum, Teaching and Learning
Ontario Institute for Studies in Education of the University of Toronto

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 Canada License

Copyright by Michel Robert Clark, April 2017
Abstract

Grades have been found to undermine student learning. Some teachers have begun a movement to reduce the use of and emphasis on grades in their classrooms. This pedagogy can be characterized as a “reduced-grades” approach to teaching. Common among published adopters of this approach is the use of justification and feedback. Justification is the process through which the teachers justify the reduced use of and emphasis on grades, to their students. Feedback is the information which teachers provide their students on graded assessments, to improve their learning. Feedback is offered instead of grades. All of the literature which describes this approach and its crucial components in detail has been written by practicing teachers. None of them are high school physics teachers. This research project reveals details about the approach in the particular context of the high school physics course. In the reduced-grades physics classroom, justification can be achieved through explanation or practice. Feedback for graded assessments is offered both through practice for and revision of graded assessments. The specific approaches used depend on the educational mandates which shape the circumstances of the teacher. Some mandates may compromise integral aspects of the reduced-grades approach, and thus jeopardize student learning.

Key words: reduced-grades, justification, feedback, physics, assessment
Acknowledgements

Thank you to the reduced-grades teachers — Barnes, Bower, Martin, and Sackstein especially — who have published their work. They have inspired me to conduct this research and more importantly, to revolutionize my teaching practice to better serve my students. Thank you to my advisors for this project — Arlo Kempf, Cristina Guerrero, and Laura Landertinger — whose consistent encouragement, feedback, and engagement helped keep me motivated when I doubted myself. Extending some of my deadlines was also very helpful. Thank you to Garfield Gini-Newman, whose Assessment course greatly informed and helped me expand upon my ideas for this research, and who connected me to my second interviewee on very short notice. Thank you to internet, but especially to Facebook founder Mark Zuckerberg for creating a platform upon which the Teachers Throwing Out Grades group could exist. This is where I found my first interviewee. Thank you to my interviewees for offering their time to participate in this research. Their interesting ideas and insights about the reduced-grades approach will shape my own teaching practice for years to come. Thank you to my cohort who also inspired me to continue with this project by sharing their work and persisting to the end, despite severe jadedness. We are jaded, yet hopeful. Thank you to Mark Thomas for showing me how to properly format my spacing and paragraphs, and thank you to Munira Lila for telling me how to format my citations. Thank you to Patrick Callegaro, Brodie MacLeod, and Matt Vanstone, for inviting me to play board games and share many laughs. These sessions were very therapeutic. Thank you to the various groups of people with whom I went on lunch dates, regularly or not. What a wonderful excuse to spend time with some wonderful people. Thank you to my parents for bringing me into existence, and for showing a modicum of interest in this research project. Thank you to Dottie Claris Achieng’ Omino for editing this project, discussing it with me on a regular basis, and for napping on the couch next to me as I worked to the wee hours of the morning. Thank you to the universe for keeping me alive. Thank you to M83 for your music.
Table of Contents

Abstract...........................................................................................................................................2
Acknowledgements.........................................................................................................................3
Chapter 1: Introduction..................................................................................................................7
  1.0 Research Context...................................................................................................................7
  1.1 Research Problem..................................................................................................................8
  1.2 Research Purpose................................................................................................................10
  1.3 Research Questions..............................................................................................................11
    1.3.1 Subsidiary questions........................................................................................................11
  1.4 Reflexive Positioning Statement...........................................................................................12
  1.5 Preview of the Whole...........................................................................................................14
Chapter 2: Literature Review.........................................................................................................15
  2.0 Introduction..........................................................................................................................15
  2.1 Justification..........................................................................................................................16
  2.2 Evidence of Learning............................................................................................................18
    2.2.1 Descriptive feedback.......................................................................................................18
    2.2.2 Feedback using student conferences..............................................................................21
    2.2.3 Peer feedback and self-assessment...............................................................................23
    2.2.4 Feedback using individual student portfolios...............................................................25
    2.2.5 Using student conferences to determine grades............................................................26
  2.3 Justification and Feedback Using Technology.......................................................................29
  2.4 Conclusion............................................................................................................................32
Chapter 3: Research Methodology...............................................................................................34
  3.0 Introduction............................................................................................................................34
3.1 Research Approach and Procedures.........................................................34
3.2 Instruments of Data Collection...............................................................35
3.3 Participants.........................................................................................36
  3.3.1 Sampling criteria...........................................................................36
  3.3.2 Recruitment procedures...............................................................37
  3.3.3 Participant biographies.................................................................38
3.4 Data Analysis.......................................................................................38
3.5 Ethical Review Procedures.................................................................39
3.6 Methodological Limitations and Strengths..........................................41
3.7 Conclusion..........................................................................................42

Chapter 4: Research Findings.................................................................43
  4.0 Introduction........................................................................................43
  4.1 Similarities and Differences in Approaches to Feedback......................44
    4.1.1 Revision as feedback for graded assessments...............................44
    4.1.2 Practice as feedback for graded assessments...............................49
  4.2 Similarities and Differences in Approaches to Justification..................55
    4.2.1 Explanation as justification.......................................................55
    4.2.2 Practice as justification............................................................58
  4.3 Conclusion..........................................................................................60

Chapter 5: Conclusion.............................................................................63
  5.0 Introduction........................................................................................63
  5.1 Overview of Key Findings and Their Significance.............................63
  5.2 Implications.......................................................................................64
    5.2.1 Implications for movement leaders.............................................65
Chapter 1 - Introduction

1.0 Research Context

Many studies have identified issues which undermine the credibility of grades and effectiveness of grading. For instance, grades have little effect on improving student performance for future tests, and they can be unreliable in so far as the same piece of work can achieve very different grades, depending upon the grader (Schinske & Tanner, 2014). Grading can engender fear of failure and anxiety which might manifest itself through plagiarism (Kohn, 2011). Grades quantify something that is not quantifiable and therefore place too much weight on evaluation factors which are more conducive to quantification (Donovan, 2015). Grades and test scores provide an incomplete picture of student learning to education administrators and policymakers (Bower, 2013). Anonymous grading, the use of standardized learning objectives, and standardized grading rubrics are means offered by Schinske and Tanner (2014) to address the aforementioned problems, which they and Bower (2013) identify in their respective papers. For plagiarism, there exist severe penalties to discourage its occurrence. But for many students, the pressure of achieving high grades outweighs that of being caught cheating, especially if they have gotten away with it before. Still, at least these problems associated with grading have tangible solutions. The problem, which has garnered attention from all of the aforementioned researchers and others, is the effect that grading has on learning.

Grading undermines intrinsic motivation for learning in students (Bower, 2013; Crouch, 2011; Donovan, 2015; Kohn, 2011; Martin, 2011; Schinske & Tanner, 2014; Usher & Kober, 2012). Students focus on achieving high grades rather than learning for its own sake. For instance, students have been shown to disregard descriptive feedback when it is given in conjunction with a grade (Black & Wiliam, 2001; Donovan, 2015; Kohn, 2011). Student engagement is more often
motivated by compliance or competition rather than by an authentic interest in the content. Worst of all, they fail to exercise their creativity for fear of making mistakes and receiving poor grades (Bower, 2013; Kohn, 2011). This problem is especially relevant in the current education climate. There is a movement which places much emphasis on conducting more formative assessments to improve student learning (Black & William, 2001) and on standard-based grading (Ontario Ministry of Education, 2010), where students are evaluated according to what they have learned from a set of defined objectives, rather than in comparison to other students (Brookhart, 2011). Some teachers have been unable to reconcile the two practices and — judging formative assessments as more effective in promoting learning than standards-based grading — have opted to abandon the latter to the greatest extent possible (Barnes, 2015; Bower, 2013; Donovan, 2015; Kohn, 2011; Martin, 2013a; Sackstein, 2014; Sands, 2015). Indeed, it is difficult to fathom the idea of secondary school teachers not grading their students. Yet, some of the most highly regarded institutions in the world (Jaschik, 2012) and many other schools (Kohn, 2011) have done just this for some of the aforementioned reasons. Perhaps this initiative can be applied in the context of public education in Ontario, Canada.

1.1 Research Problem

Many researchers have shown that grades undermine intrinsic motivation for learning in students — or learning for its own sake — and thus make it difficult to achieve what many educators take to be the main goal of education: learning (Barnes, 2015; Bower, 2013; Crouch, 2011; Donovan, 2015; Kohn, 2011; Sackstein, 2015; Schinske & Tanner, 2014; Usher & Kober, 2012). Teachers, administrators, and researchers may well use formative assessments to achieve this end. But, if these educators are not encouraging — or not capable of encouraging — students or other educators to value such learning opportunities, the effort is done in vain. Grades will continue
to take precedence over learning and garner most of the attention from educators and students. Indeed, students often express feeling disconcerted when facing the prospect of receiving no grades whatsoever (Bower, 2013; Sackstein, 2014) — most of their years in school have involved them being graded. As such, it seems that the continued use of grades only serves to hinder progress towards assessing for the sake of improving student learning — this is the primary objective of assessments according to the Growing Success document. Yet, grades are nonetheless mandated in this province (Ontario Ministry of Education, 2010). That being said, Growing Success is a rather progressive educational policy document, especially from the perspective of the American education system where standardized testing has run rampant. For many teachers, this attempt to ensure accountability serves only to hinder learning since so much time is spent teaching to the test (Kempf, 2016). Still, grading is a serious problem for educators who wish to improve learning for their students, but work within a system which is not only conducive to using grades, but also requires them to grade at least several times every year.

The problem itself has been faced by many educators and as such, many solutions have been successfully implemented either independently or in combination with others. For instance, teachers can require students to keep a portfolio of all their work — some of which is peer edited — throughout the year, and they can conference with students at the end of the course to determine a final grade, together (Barnes, 2015; Bower, 2013; Kohn, 2011; Sackstein, 2015). Such practices are aligned with the development of skills, such as self-assessment and critical reflection, espoused in documents that support the value of formative assessments (Black & Wiliam, 2001). It should be noted however that Growing Success explicitly prohibits students from assigning themselves grades (Ontario Ministry of Education, 2010) so in using this approach, teachers must tread carefully. Certainly, these are means which teachers in Ontario might employ to reduce their use of and emphasis on grades. But there may be other means — or nuances to the aforementioned methods
— to discover in lieu of interviewing teachers. These means and nuances are the subject of my research project. Though there is already much information about this reduced-grades approach to teaching in the form of blogs and books — as evidenced in my references, my research will be novel in so far as it will add to the growing but wanted academic literature on this budding movement. Indeed, much of what can be found in academic research is mostly concerned with formative assessments, which are no doubt important. But, perhaps the effectiveness of these tools are not exercised to their full potential without the reduced use of and emphasis on grading. So, more research on the reduced-grades approach might contribute to research on formative assessment. Considering the nascence of the movement, there is very little research available about the approach in certain academic contexts, like the high school physics classroom for instance. All results and considerations will be made with the context of the Ontario classroom and curriculum in mind.

1.2 Research Purpose

The purpose of this research is twofold. First, the research will provide further insight into the practice of reduced grading adopted by many, but certainly not the majority, of teachers. Specifically, it will investigate the practice in the context of curriculum and policy which stresses the importance of formative assessments but also requires some form of grading. As mentioned above, it is not that this information does not exist, but it is certainly wanting. This is true in the context of academic research — especially with respect to high school physics teachers. Hence the second purpose of the study: I want to learn more about the implementation of this practice in the described context because I am learning to become a teacher. Thus far, most of the research depicts this method in a positive light. So, as of now I am seriously considering adopting it into my teaching
practice. Minimal grading, formative assessments and a lot of descriptive feedback will be integral components of my teaching philosophy and practice.

Proponents of this movement seem to suggest that the benefits of implementing the practice far outweigh any detriment. I tend to agree with many of the claims that they make about the negative effects of grades. So, I am currently very interested in further researching this method to better understand the benefits claimed by its proponents. Since I may eventually be teaching in Ontario — where giving grades is mandated by the Ministry of Education — I would like to better understand how I might implement and help students reap the benefits of the reduced-grades method, despite having to grade students. Since I believe in this approach, part of my motivation consists of contributing whatever modest work I can to the growing body of research about teachers reducing their use of and emphasis on grades. I am learning to become a teacher for physics so it would be beneficial to learn of particular considerations for the reduced-grades approach in this specific context. In achieving this purpose, a new source of information — about a topic that is already quite difficult to unearth — becomes available. Following are the specific questions that my research will seek to answer.

1.3 Research Questions

How can high school physics teachers reduce the use of and emphasis on grading in their teaching practice if they are required to provide grades according to standards outlined in the curriculum? What are the pedagogical implications of removing or reducing the use of grades in high school physics classrooms?

1.3.1 Subsidiary questions. What can high school physics teachers do to help students transition from a traditional grades classroom to a reduced-grades classroom? What means can these teachers use to justify the shift to their students? What kind of feedback is given to students in
a reduced-grades high school physics classroom? How is it structured? What role do portfolios play in a reduced-grades high school or physics classroom? What would a reduced-grades physics classroom look like within the Ontario education system? What challenges might a teacher face that are particular to, or especially significant in, this context?

1.4 Reflexive Positioning Statement

I once thought that grades were the most important thing in my life; I always loved getting grades just for the sake of seeing a number between eighty and one hundred on my assignments. What I did not realize until recently was how unimportant and irrelevant grades actually are in learning, and in the grand scheme of life. I wish I had known this as a youngster in elementary school; I vividly recall crying because I received a failing grade on a dictation; another time I cried because I got a D-plus on a science test. I don’t remember being upset about not knowing the correct answers and I am certain that I would have been relieved had I by chance guessed the answers correctly. At university, I was on many occasions relieved to receive mediocre grades because I simply did everything I could during the test to get partial marks — I probably deserved to fail and I certainly don’t remember much of what I was supposed to learn. I learned to take tests well: I cram information into my head shortly before tests; I remain composed throughout, no matter my performance; I use all of the time allotted; I write down everything I can remember wherever I think it is relevant; I remind myself of how insignificant the test actually is and laugh at my situation. Really, I have a method and this is what I learned best. In any case, the point is that I valued grades too highly. The point of education is not to achieve good grades but rather, it is to learn certain disciplines. More importantly, it is to learn how to become a better learner. This is a firm belief of mine — and by no means is it an extreme one.
I developed this belief while obtaining my undergraduate degree in philosophy. Towards the end of my studies, I learned that nothing is of much importance unless I decide it to be — especially grades. As such, I accepted being deducted late marks — something that I had never done before — in order to hand in what I thought was an assignment of better quality. I had finally taken the time that I needed to truly learn of that about which I wrote. I can proudly say that I remember very much from, and cite to this day, one of the lowest graded essays that I wrote; I was not in it just for the grades. At times, I sacrificed learning and experienced a lot of anxiety for the sake of achieving higher grades. But I turned a corner. I did not comply with instructions just for the sake of grades in the same way that I had always done before. I cared more — but still not enough — about learning than I did about my grades. I just needed grades to get into this program at OISE.

Because of my focus on getting exceptional grades, I seldom stepped outside of my comfort zone; I was scared. Actually, I am still scared of making mistakes and taking risks — I was even scared about what would happen when I received my grade for this very piece of work. This is something which has been with me since I have been going to school. I am not blaming grades for this tendency to overthink situations and reluctance to act — for my insecurities, but I am certain that being so concerned with grades only helped reinforce these insecurities. I used to always comply with teachers so that I could get the grade. I was not enthralled in the act of learning — and this is perhaps the fault of my teachers just as much as it is mine. But, I want to offer all of these things to my students. I want them to make mistakes and fail; I want them to learn just for the sake of learning; I want them to be in the moment and enjoy what they are doing. The proponents of the reduced-grades approach to teaching have given me reason to believe that this practice — which contributes to all of my aforementioned problems — is an important step in providing better education to students. As such, I want to study it in more depth so that I might better understand its merit and lack thereof, in hopes of perhaps learning how I might one day teach well.
1.5 Preview of the Whole

Above, I have posed specific questions about the reduced-grades approach to teaching, in the context of high school physics. To address these research questions, I have conducted a qualitative research study using purposeful sampling to interview two teachers about how they managed to employ a reduced-grades approach to teaching in their classes despite being mandated to provide standard-based grades. In chapter two I review the literature in the areas of reduced-grades practices and the pedagogical implications of this shift. In chapter three I elaborate on the research design. In chapter four I report my research findings and discuss their significance in relation to the existing research literature. In chapter five I identify the implications of the research findings for my own teacher identity and practice, and for the educational research community more broadly. I also articulate a series of questions raised by the research findings, and point to areas for future research.
Chapter 2 - Literature Review

2.0 Introduction

From the outset, I identified my position with respect to grades: personal experience and researched literature indicate numerous detrimental effects of grades on students. Thus, I set out to determine how the harmful effects of this longstanding educational tool can be mitigated, or better yet eliminated. In my research I discovered teachers who have reduced their use of and emphasis on grades — either completely or partially — in an effort to undermine these effects. This chapter contains a review of the literature which exists about these teachers and their methods.

My purpose is twofold: first, to present and describe in great detail the key components of a reduced-grades classroom; second, to understand what these same components might look like in the context of a high school physics classroom. Although discussing the effects of these changes on students is enticing, the sample of students affected by these changes is too small to provide results worth discussing. The information within this chapter and it's cited works are sufficient for teachers who want to employ the reduced-grades approach to teaching in their own classrooms. The comprehensive frameworks for implementation are taken from some of the most prominent adopters of this method.

Having made my way through an education system littered with grading, it was at first difficult for me to imagine running an entire class with a reduced use of and emphasis on grades. Fortunately, many teachers have already started down this path and even better, they have shared their experiences and successes in an effort to facilitate the transition for others, such as myself. From researching the leaders of this movement, I have discerned that the reduced-grades classroom consists of two fundamental components: justification and evidence of learning.
2.1 Justification

Students are accustomed to variations in pedagogy from one teacher to another. However, something which usually varies little, is the use of and emphasis on grades. Teachers who endeavour to teach in a reduced-grades classroom have a responsibility that many others do not: they have to justify their approach to grading. For Starr Sackstein, a high school English and Journalism teacher in New York, the first classroom task consists of disclosing this move to the students in an attempt to incite discussion and reflection. Among other things, students need to understand that making mistakes and failure are part of the learning process, something which traditional grading practices tend to discourage. This wholesome approach to learning is based on mastery.

To explain mastery learning, Sackstein (2015) offers the analogy of learning to ride a bicycle, where at first we use training wheels, then we take them off and fall, then we get up and try again, then we can ride without them (proficiency), and finally we can ride different bikes or different distances (mastery). In this approach, assessments of learning are not final. Instead, students have multiple opportunities to demonstrate their learning. In turn, the idea of high grades constituting high achievement — or learning — is challenged as well. Allowing students to contemplate and discuss these ideas and others which undermine grades are crucial to garnering their trust and support (Sackstein, 2015). Joe Bower, a former middle school teacher in Alberta, echoes these statements. He recalls the first time that he neglected to mark an assignment for the sake of de-emphasizing grades: the students felt cheated because in their view, the purpose of writing the assignment was to score a grade. From this, he came to the realization that students needed to consider questions similar to those which he had raised through his research. They needed to question the use of grades and understand the justification behind their near abandonment (Bower, 2013). Although these initial discussions are important, Sackstein stresses their recurrence throughout the year; it takes much time and effort to overcome the effects of a practice which has been adopted so widely. To help
students shift mindsets, she notes the importance of using a vocabulary which focuses on growth and improvement, rather than grades. For instance, if students ask her about their grades, she would ask them about what they have learned. That way, the student focuses on the learning process rather than the outcome. See Figure 1 below for sentences and words which help students focus on their learning, rather than grades (Sackstein, 2015).

<table>
<thead>
<tr>
<th>Grades Vocabulary</th>
<th>No-grades vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>grading</td>
<td>assessing</td>
</tr>
<tr>
<td>score</td>
<td>assess</td>
</tr>
<tr>
<td>“What grade did I get?”</td>
<td>“What did I learn?”</td>
</tr>
<tr>
<td>“This is wrong.”</td>
<td>“Try another way.”</td>
</tr>
<tr>
<td>problem</td>
<td>challenge, opportunity</td>
</tr>
<tr>
<td>judgment or criticism</td>
<td>feedback</td>
</tr>
<tr>
<td>get good grades</td>
<td>achieve proficiency or mastery</td>
</tr>
</tbody>
</table>

*Figure 1.* This figure provides examples of vocabulary which are prompt students to focus on grades or learning.

Redirecting the focus of students from grades to learning, growth, and improvement, takes time. Bower identifies several phases of weaning students off of grades. Early in the process, some students miss the reassurance of achievement offered by grades. To resolve this issue, he would collaborate with each student individually to determine an informal grade. Although it takes time for students to cease relying on the judgement of teachers for peace of mind, he has seen learning eventually prevail for its own sake (Bower, 2013). To help accelerate this process, Sackstein (2015) involves students in the process of creating assignments. Kohn (2011, 31) refers to such assessments as “authentic” since they allow students to meet defined learning outcomes on their own terms. Even if amendments to student proposed criteria are required in order to meet required criteria, students will have a say in how and what they are learning. Sackstein (2015) and David
Martin (2013a) — a calculus teacher in Alberta — prefer to have their students engage in long-term projects to learn in-depth, rather than covering a wide breadth of knowledge with short assignments. Combining depth of learning with choice engages students so that they can grow, improve and appreciate learning for its own sake, without grades (Sackstein, 2015).

Kohn (2011) argues that the harmfulness of grades is only understood once they have been completely abandoned. So, taking a leap of faith — albeit a leap backed by a lot of research — is tantamount to recognizing the benefits of this movement. Teachers are thus perhaps best advised by Sackstein (2015), who pleads for them to trudge forward in the face of adversity for in time, the students will reap the benefits. That being said, adopters of this approach identify numerous other factors that prompt students to revolt against the move away from grades. Since these factors exist outside of the classroom and beyond the immediate control of teachers, they fall outside the scope of my research.

2.2 Evidence of Learning

Reducing the use of and emphasis on grades involves de Voiding students of their most convenient and well-trusted indicator of learning. Without grades, students and other interested parties (parents, administration, other teachers, etc.) seemingly have no access to reports of student achievement and progress. This would be a redeeming quality for grades, were it not for the existence of feedback.

2.2.1 Descriptive feedback. Feedback is information about student learning which students use in order to improve their learning. There exist different approaches to offering students feedback, but the one chosen by the researched teachers is descriptive — or more specifically narrative. Narrative feedback is provided using full sentences or paragraphs, rather than using grades, and creates somewhat of a story about what has been achieved. Whereas grades return
almost no information to students, well-designed narrative feedback provides a wealth of information that can be used by students and teachers to improve learning. Not surprisingly, the styles of narrative feedback vary from one teacher to another. Mark Barnes — a middle school teacher in the United States — has developed a particular framework which he has coined SE2R, or “Summarize, Explain, Redirect & Resubmit”. This framework provides a clear understanding of what narrative feedback is meant to achieve in the context of mastery learning. Following these four steps, teachers begin by summarizing student work. This helps situate both the student and teacher when they refer to that piece of feedback; it describes the assignment that was attempted. Next comes the explanation. Here, teachers provide evidence to explain the level of mastery that the student has achieved (Barnes, 2015). What level of mastery the student has achieved depends on their\(^1\) demonstration of the given learning outcomes. Both Barnes and Sackstein stress the importance of making these outcomes clear to the students. In fact, they encourage teachers to develop these outcomes in collaboration with the students by allowing them time to reflect and discuss these outcomes with their peers, and then re-wording them in more student-friendly language (Barnes, 2015; Sackstein, 2015). Though Martin (2013a) does not develop the outcomes with his students, he too converts them into student friendly language. Barnes (2015) and Sackstein (2015) also emphasize the importance of showing students examples of mastery work so that they know what it looks like to satisfy these outcomes — to achieve mastery.

With both the student and teacher in agreement about the learning outcomes, the teacher can provide evidence directly from the piece of work to highlight which outcomes were met, which were not, and which require improvement. If the student has mastered all of the learning goals, then they do not proceed to the redirection step; they have demonstrated mastery. If the teacher deems that their work requires improvement, they will offer advice or prompts which encourage the student to

\(^1\) Throughout the research paper, identifying a student using a singular noun will employ “their” rather than “his” or “her”, and “they” rather than “he” or “she”. For the sake of inclusiveness, I use non-gendered language.
address particular aspects of the work which do not yet demonstrate mastery. Teachers provide this feedback to the students and they have an opportunity to revise their work with special attention to the highlighted details. Finally, they resubmit their work and the process begins anew. To be clear, the feedback will include a sentence at the end which requests the student to resubmit their work, once it has been revised. For concrete examples of what a teacher might write for each step, see the example provided by Barnes (2015) himself, in Figure 2 below.

**Summarize:** You wrote a 400-word blog post comparing the character Katniss Everdeen from the novel *The Hunger Games* to the character as portrayed by Jennifer Lawrence in the movie version.

**Explain:** You clearly identified two similarities between Katniss from the novel and the actor who portrayed Katniss in the movie, and you properly use the words *savagery* and *eviscerate* in your narrative. You’ve also provided an opinion of why the actor is a good choice. I didn’t notice any identified differences in your post, though. Did you see any? This was item 3 on the guidelines.

**Redirect:** Please return to the post and identify two differences between Katniss in the novel and Katniss as she is portrayed in the movie. Be sure to provide details that support these definitions.

**Resubmit:** When you finish, let me know that you’ve made changes in the blog post.

*Figure 2.* This figure offers an example of the SE2R feedback method used to assess a specific piece of student work.

The *SE2R* model of feedback was constructed in an attempt to remain objective and unbiased in the process of evaluating student work; Barnes (2015) sought to eliminate any hint of personal judgement from his work. For his part, Bower reminds teachers that providing personally judgemental feedback is usually received as reward or punishment, rather than advice. Since reward or punishment can provoke emotional responses from students, they can distract students from the information that teachers give them to improve their learning — the fundamental purpose of feedback (Bower, 2013). Jane Jones and Dylan Wiliam stress that feedback should not be emotionally provoking for exactly this reason (Jones & Wiliam, 2008). With this in mind, Bower has created a feedback process which resembles that used by Barnes (2015). It consists of making
observations, offering suggestions for improvement and then asking reflective questions (Bower, 2013).

Though Martin does not mention having a formalized feedback structure like Barnes (2015), he has measures in place which involve the redirection and resubmission steps from SE2R. For student summative assignments and projects, he gives students feedback specific to the targeted learning outcomes. The outcomes in question are what he calls the “rocks” of the course — most important learning outcomes with respect to future student achievement as identified by him and his peers. So, if the students have demonstrated mastery of the outcomes, he notes “outcome demonstrated” on the assessment and otherwise, he notes “need to learn”. Those who still need to learn have an opportunity to demonstrate their mastery at a later time. Although there is no limit to the amount of times that students can attempt to demonstrate mastery, most students demonstrate mastery after going through the process only once. So, this process gives students the freedom they need to make mistakes and learn from them, without penalty (Martin, 2013a). Learning is no longer a cycle of high stakes evaluations (Sands, 2015).

**2.2.2 Feedback using student conferences.** Barnes has noticed that sometimes, narrative feedback does not reach the students; usually they have either misunderstood the feedback or neglected to read it, citing too much feedback too frequently. In either case, he discovered that feedback could be either clarified or administered strictly through conversation. In the case of a misunderstanding, teachers discuss with the student how to make the given feedback actionable. In the case of neglect, teachers are giving feedback again, but this time through conversation (Barnes, 2015). Although they might conduct these conversations differently, Sackstein (2015), Bower (2013), and Barnes (2015) maintain that oral feedback should be given on a daily basis. This is also the preferred method for Martin (2013a), who offers his students feedback on assignments through a number of conversations — whatever is needed for them to demonstrate mastery. He is in effect
conferencing with them. For her part, Sackstein (2015) refers to these conversations as conferences. Considering the number of students in a class, it can be difficult to conference with every student on a daily basis, but she offers advice to make the practice efficient. To start, conferences should not exceed five minutes in length — often they can be shorter. Keeping these conferences brief requires students to prepare themselves in advance. To prepare, they must think of with which questions they need help. Meanwhile, teachers review feedback that they have recently given them in order to focus the discussion on their specific learning needs. Follow-up discussions should occur within the same week and those who require extra time can receive it outside of class. Other students should spend conference time working on assignments, either in groups or individually. Once all is said and done, all students have had the opportunity to conference with their teacher. For Sackstein, this is perhaps the most important component of the no-grades classroom (Sackstein, 2015).

If the feedback must be recorded somewhere, Barnes created a shorthand notation for SE2R which reduces the amount of work for both teachers and students. Regardless of whether the feedback is written or oral, it follows the SE2R structure. See Figure 3, an example of shorthand notation for SE2R. Note that the left column includes the shorthand notation that teachers would place on the actual work. The students could then refer to the column on the right to see what the shorthand notation actually means, in detail (Barnes, 2015).

<table>
<thead>
<tr>
<th>Note</th>
<th>Activity: Reflection Critique</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;300</td>
<td>You have completed your critique according to guidelines, but it is less than 300 words. Please lengthen it and resubmit it.</td>
</tr>
<tr>
<td>&gt;500</td>
<td>You have completed your critique according to guidelines, but it is more than 500 words. Please cut unnecessary portions of the critique and resubmit.</td>
</tr>
<tr>
<td>DM</td>
<td>You wrote a 300 — 500 word critique, with a properly used vocabulary word, but you did not include an example of a key detail that demonstrates understanding of our model</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>REDUCED-GRADES PHYSICS CLASS</strong></td>
<td></td>
</tr>
</tbody>
</table>

critique. Please add a key detail to your post and resubmit.

| DU | You wrote a 300-500 word critique, with a properly used vocabulary word, but your example of a key detail that demonstrates understanding of our model critique is unclear. Please explain how the detail you supplied indicates the author’s understanding of the model critique and resubmit. |
| V  | You wrote a 300-500 word critique, with an example of a key detail that demonstrates understanding of our model critique, but you left out a properly used, highlighted vocabulary word from our student word bank. Please add a vocabulary word to your post and resubmit. |
| M  | You wrote a 300-500 word critique, with an example of a key detail that demonstrates understanding of our model critique. You include a properly used, highlighted vocabulary word from our student word bank. You have mastered this activity, according to our guidelines. Well done. |

Figure 3. This figure shows the shorthand notation for the SE2R feedback method.

2.2.3 Peer feedback and self-assessment. Using the SE2R feedback method — or similar narrative feedback methods — might seem rather time consuming at first glance. In fact, Sackstein (2015) argues that teachers do not have enough time to consistently provide the quality feedback that every single student needs in order to achieve mastery. However, in the classroom focused on learning, rather than grades, students are more likely to see themselves as allies (Bower, 2013). Therefore, teachers have access to an underutilized but abundant resource: students (Barnes, 2015; Bower, 2013; Sackstein, 2015). Narrative feedback can be administered both in writing and through conversation, so students have the potential to use either kind of feedback method with their peers. Having received feedback from teachers using both mediums, they have prime examples of how to provide conversational and written peer feedback. It is advisable nonetheless to provide them with a template — such as SE2R — for them to structure their feedback in a manner which benefits their peers (Barnes, 2015; Sackstein, 2015). In the absence of a specific framework, or simply for the sake of involving student choice in the matter, Sackstein suggests allowing students to collaborate in order to identify standards for effective feedback, and then using that model in their peer exchanges. She notes that although corrections may be necessary, students require ample
opportunity to master the process of giving feedback; as such it should be practiced on a daily basis (Sackstein, 2015). Barnes (2015) agrees and adds that regular discussions about the feedback system are crucial to getting students on board with the shift from grades to learning.

For Sackstein (2015), feedback is most effective when it is informed by student reflection; coupling observation of student work with student thinking gives teachers everything they need to provide accurate and useful feedback. As such, she makes reflection an integral component of her classroom. The students reflect about everything from the content based work they are doing to their experience learning how to provide feedback, and even about their own reflections (Sackstein, 2015). For the authentic assessments that teachers such as Sackstein use to stimulate interest in learning, Kohn (2011) suggests having students reflect on the creation process of these assessments too. To help students develop this skill, Sackstein stresses the importance of engaging students in conversations about the benefits of reflection, showing them a concrete example of mastery reflection, having them practice it every single day and finally, giving them feedback about the quality of their reflections. Using the information collected from student reflections, teachers are better able to communicate with each individual — not only the outspoken ones — and facilitate learning for the entire class. This is especially important when assessing the learning of different members in a group project. Although students will eventually reap the benefits of this practice, they may not appreciate it until their growth becomes apparent to them (Sackstein, 2015); ironically, this cannot become apparent to them without the habit of reflection.

Although Barnes speaks less of reflection, he does note that reflection can be prompted by asking students simple questions — which is fundamental to the redirection component of SE2R, and to conducting self-assessments. He also makes a point of thinking aloud — verbally practicing reflection — in the classroom while planning and problem-solving in order to model the practice of critical thinking and reflection to students (Barnes, 2015). For him, Bower, and Sackstein, the goal
of teaching is to create independent learners (Barnes, 2015; Bower, 2013; Sackstein, 2015); in others words, teachers seek to help students become learners capable of self-assessment so, in effect, they are capable of giving themselves feedback. Sackstein begins by reiterating that students must be aware of the learning outcomes if they are to assess themselves accurately; they need a guide or checklist with all of the topics to master. She suggests using single-point rubrics with all of the relevant learning outcomes and setting aside space dedicated to identifying their level of proficiency, in order to guide their assessment. Of course, involving the students in the development of the rubric is advised. Any fair self-assessment will involve use of their work and received feedback to determine their growth and current level of mastery (Sackstein, 2015). While Barnes offers less in terms of explicit instructions for student self-assessment, he stresses that learning to self-assess is fundamental to abandoning reliance on traditional grading as an indication of learning. To facilitate student development or this skill, he maintains that students who learn to value feedback and self-assessment should be celebrated (Barnes, 2015). For Bower (2013) it's quite simple, a class centered on student autonomy, choice, creativity and initiative will foster the growth of independent learners, capable of self-assessment.

2.2.4 Feedback using individual student portfolios. Feedback and the iteration of work to which it refers constitute evidence of student learning. Throughout a course, so much work is done and feedback given that it is impossible to summarize this evidence briefly. At this point, the process of grading may strike teachers as very convenient; but the teachers researched here are reducing emphasis on grades as much as possible. So, reporting student achievements to other stakeholders (guardians, administration, etc.) and even having students review their past work can be an issue. Hence, the advent of the individual student portfolio. This type portfolio is like any other; it is a collection of student work and related feedback. Kohn (2011, 29) defines it as “a way to thoughtfully gather a variety of meaningful examples of learning for the students to review.”
Despite the straightforward functioning of this tool, Sackstein emphasizes the importance of having students discuss and reflect upon the values of maintaining a portfolio; otherwise they may not take it seriously. Furthermore, it is advisable to have them consider and agree upon what constitutes an accessible and effective portfolio. Since they will not be keeping all of their artefacts, they will have to make decisions about what pieces should be included (Sackstein, 2015). Kohn (2011) notes that these portfolios are authentic only in so far as they are filled with authentic work — so not worksheets for instance.

One crucial component of portfolios that cannot be overlooked is the inclusion of mistakes and failures. These experiences help students track their growth and better understand learning as a process of informed trials and informative errors (Bower, 2013). Sackstein also stresses that each piece be accompanied by a reflection — a sort of justification for its inclusion. To facilitate such decisions and justifications, she mentions that specific criteria must be developed for inclusion in the portfolio — e.g. connects to other courses, demonstrates mastery, demonstrates growth, and etc. To consolidate the process, she advises having students present their portfolios to the class (Sackstein, 2015). For Barnes (2015), the portfolio provides the most transparent picture of student growth. He likes to include a resolution piece where students explain how they responded to the feedback provided for a particular artefact. He also requires a reflection piece with every artefact, akin to that required by Sackstein (2015). It functions to develop the ability to conduct self-assessments. He recommends that time be set aside at least once per week for students to update their portfolios (Barnes, 2015). Although it is not as concise as a grade or narrative feedback, students have created something which others can view to assess their growth and mastery as learners of certain content and skills.

2.2.5 Using student conferences to determine grades. Research has demonstrated that operating a classroom without grades is entirely feasible. Unfortunately, teachers neither have the
privilege of dictating nor the authority to dictate all the terms of their practice. In some school boards, it is impossible to abandon grades completely. For instance, there exists a mandate in Ontario which requires teachers to provide students with grades at certain junctures in the course or semester. Teachers who use the reduced-grades approach within such a context face a seemingly daunting challenge. They must use grades without letting the emphasis of the course turn to grades. This can be achieved by simply involving students in the grading process. That is, students have a say in the grade they receive, beyond simply submitting their work. Teachers trying to implement this tactic in Ontario ought to tread lightly, since policy precludes students from having input into their final grade (Ontario Ministry of Education, 2010). For their part, Barnes, Bower, and Sackstein have each adopted the practice of conferencing with students in order to determine some of their grades — including final grades. For all of them, the conferences are similar to the conversations about learning that they have with students on a regular basis. From the beginning of the course, it is made aware to students that they will be conferencing with them to determine an appropriate grade. As mentioned before, students are consistently made aware of the learning outcomes meant to be achieved throughout the course. The preparation for the conference is somewhat of an assignment in itself. Students are expected to present evidence of having achieved some or all of the learning outcomes on the given list. The evidence itself is usually obtained from the artefacts in their portfolios. Basically, the idea is that they prepare a presentation of some sort — be it oral, written, etc. — to justify the grade that they have given themselves (Barnes, 2015; Bower, 2014; Sackstein, 2015). In similar fashion, Martin uses student conferences to co-create midterm grades with his students. But for the final grades, he weighs all of the assignments differently and calculates a grade — he acknowledges that this approach is less than ideal (Martin, 2013a).

During these conferences, Sackstein stresses the importance of listening closely to the student and their justification during the presentation. Then, if anything is left unclear, teachers can
intervene with a question for clarification. In the event that teachers determine the assessment of the student to be inaccurate, they can attempt to negotiate a different grade or simply give them the grade (Bower, 2014; Sackstein, 2015). In their respective experiences, Sackstein (2015), Bower (2013), and Barnes (2015) have had most students present grades that accurately reflected their learning achievements. For Sackstein (2015) and Barnes (2015), this includes students who ended up failing the course. However, Sackstein does note having students give themselves grades that they do not actually deserve. She maintains that the students simply need a frank conversation about the matter; teachers need to call their bluff. Asking clarification questions during the conferences can facilitate this process. After this conversation and clarification, should a student still earnestly insist on a grade which misrepresents their learning, she recommends giving them the grade since in the end, grades mean little in terms of telling anyone what the student has learned (Sackstein, 2015). When it comes to students giving themselves inaccurate grades, Bower (2013) operates in similar fashion. Unfortunately, Barnes does not discuss students who give themselves inaccurate grades. But since many practices of the no-grades classroom help students develop the skills and acquire the understanding they need to conduct accurate self-assessments; he adds that students have an idea of how grades work and given their ability to self-assess, they can translate what they have learned into a grade which fits the traditional scheme (Barnes, 2015). Martin (2013a) also cites students awarding themselves justifiable grades, most of the time. With these considerations in mind, deference to students for final grades seems not all that frightening.

For students who lack confidence in their self-assessments, further assistance may be required to arrive at an accurate grade. Given the large class sizes teachers may have, Sackstein recommends creating and sticking to a schedule. Now, the emphasis on listening is particularly important so that teachers do not usurp the authority of the student during the conference; the last thing they want to do is undermine student self-assessment, lest it lose its worth (Sackstein, 2015).
On his end, Barnes (2015) stresses the importance of setting aside enough days to complete all of the conferences. Since these grades will be reported to parents and administration, it is important that both teachers and students have the necessary amount of time to meet. That being said, students will at this point have become accustomed to some level of conversation and conferencing about learning. As such, Barnes treats these particular meetings as goal-setting sessions, just like the others. In the end, the students have effectively decided what grade they deserve — so the mandate to report grades is satisfied — but even more importantly, they have demonstrated their willingness and ability to self-assess their learning and are now better situated in their growth and further learning. To help teachers understand how the grades relate to the learning outcomes, he explains that a student having achieved mastery in all areas would receive somewhere between B and A. If they have achieved mastery in less than 60% of the learning outcomes, then they would get a D or an F. Throughout this process, Barnes reminds teachers that they are wise to practice those skills which they are trying to develop in their students, so that their practices remain well-informed and well thought out (Barnes, 2015). That is, just as teachers have their students assess themselves, so too should teachers with respect to their pedagogy.

2.3 Justification and Feedback Using Technology

As I have presented it, the process of running a classroom without grades is possible without the use of technology. However, with all of the resources available to facilitate this practice, teachers are ill-advised to ignore them entirely. Indeed, Barnes, Bower, and Sackstein have used a variety of these resources in their classrooms. For Barnes, his experience has indicated to him that students prefer working online to working on paper or in person. Furthermore, there is no excuse for perpetuating archaic practices when so many online resources are available (Barnes, 2015). From the very beginning of the course, in order to assist with the transition in mindset, Sackstein
started a *YouTube* channel on which she reiterated the justification for reducing the use of and emphasis on grades and tracked its implementation. Students could access these videos at any time. When it comes to taking observations in class, she suggests taking pictures or recording videos, instead of or in conjunction with writing them down. That way, there is a visual prompt to rekindle memories of what was observed. In accordance with the numerous and ongoing conversations that she seeks to sustain with her students, she recommends using Twitter hashtags to extend discussions beyond the classroom. When students use tags for discussions in class it allows others to locate and thus contribute to the discussion as well. Teaching students how to use hashtags is important, assuming of course that they do not already know. For works which can benefit from receiving peer feedback, she has students write in an online blog. These websites can be accessed online, at any time, by teacher and students alike (Sackstein, 2015).

Barnes facilitates student work online by using a class website which houses activities, guidelines, video instructions, projects, and conversations — basically everything that students need to continue learning outside of the classroom. Of particular significance is the presence of a blog on — or attached to — his class website so that students can create work in a medium which welcomes both private and public narrative feedback. In particular, he prefers using *Kidblog* with his class website. For him, the beauty of the blog is that it becomes a sort of portfolio in that it compiles diverse kinds of student work with the feedback they receive from teachers and other students (Barnes, 2015). The method used by Bower resembles that of Barnes (2015). Since he has noticed that students have a proclivity for uploading content online, he uses electronic portfolios which combine the following: blog, discussion forum, wiki, or website (Bower, 2013). Like Sackstein (2015), Barnes recognizes the value of using social media to extend conversations about learning beyond the classroom. In fact, he argues that students want to learn using social media; specifically, they crave feedback in the form of likes, retweets, mentions, reblogs, and tags. Because
students have such an affinity for using social media platforms, he likes to have students think critically about their content curation — what content they share online with others and how it affects them. Specifically, teachers should ask students about their motivation for posting or not posting content, for adding or not adding comments, and how these actions affect others (Barnes, 2015). Another tool which can extend the conversation beyond the classroom is Voxer. This application has a function which allows teachers and students to send each other audio dialogues. As such, instead of having feedback only in writing, it is now possible to record it in an audio format. Remind is another application which assists with some vital classroom functions. Essentially, it is a text messaging app which sends group texts; Sackstein (2015) uses it to send information pertinent to the entire class.

For the sake of collecting data — be it student feedback about teaching or prompting reflection and preparation for an upcoming conference, Sackstein uses online forms (sometimes Google Forms). She then uses that data to inform her future instruction. Preferably, the students fill out the forms themselves online, but if this is not possible teachers can input student written answers directly into the forms. Apart from forms, she sometimes opts to use Socrative or Kahoot — applications where teachers can build diagnostic assessments to receive feedback from students about their learning. These applications even aggregate the results, making it possible to see how the class is doing as a whole (Sackstein, 2015). Barnes employs the use of Celly to receive feedback from the students and assess class progress as a whole. This application creates a private and completely anonymous (for students) texting room where students can respond to diagnostic questions and demonstrate their understanding, or lack thereof (Barnes, 2015). For practicing self-reflection, Sackstein uses Google Forms for narrative pieces but has been experimenting with Explain Everything for a more dynamic type of experience. The latter is a screencasting app that records audio reflections and allows students to accompany their explanations with visual aids. Since
the final grading conferences are merely longer versions of routine conferences occurring throughout the year, she allows them to conduct these final self-assessments using the aforementioned technological tools. Perhaps even more convenient is the fact that she has students maintain their portfolio online rather than in writing. This can be done using a variety of different available tools such as Richer Picture, FreshGrade, Edmodo, Schoology. Google and Microsoft also have tools available for these purposes. In any case, she does not explain much about how these tools are used. Rather, she stresses that the selected tool should be what works best for teachers and their colleagues, considering that the information in these portfolios can then be passed on to future teachers. At this point, Sackstein notes the importance of seeking help if teachers are having trouble acclimating to new technology, be it online or in person. This advice is especially relevant considering that most students — from her experience — prefer working online (Sackstein, 2015); teachers might as well take the time to learn for their sake, if not their own.

Ultimately, the picture that I have painted should provide a framework that can be adopted to construct reduced emphasis on grades classrooms in the context of the Ontario education system. So, it is clear that a functioning classroom does not require the use of grades. Not only do the various forms of feedback and tracking allow teachers to record student learning, they also provide students with more opportunities to improve their learning skills and, as a consequence, their learning.

2.4 Conclusion

A central focus of the classroom without grades is feedback, in a variety of forms. It starts by working with students to create learning outcomes that suit the course content. When students complete work to demonstrate their achievement of these outcomes, teachers provide feedback in writing or through conversation to either acknowledge mastery or prompt revision. All the while,
they facilitate student learning of how to provide peer feedback and reflect. Teachers offer mastery exemplars of feedback and reflection, model the processes for them, have them practice these skills on a daily basis, and offer their own feedback. In the end, their aim is to help students develop the habits of acting on feedback, providing feedback to others and themselves, and assessing their own learning. As students venture through this process, they collect artefacts of their learning along with feedback in order to construct a portfolio of their growth and achievements. For teachers mandated to provide grades for students, conferencing with them and thus giving them the opportunity to justify their deserving of a particular grade — using evidence from their portfolio and otherwise — undermines the detrimental effects of grading by empowering the students, rather than themselves. Teachers can always implement the use of technology in order to render these processes less cumbersome and more efficient. Admittedly, the picture that has been painted of the no-grades classroom is a busy one. However, any picture is insufficient since no writing can substitute for the actual experience of the teachers and students. Whatever is left unclear should be clarified using personal experiences of teachers employing this novel pedagogical approach.

The information presented in this chapter is representative of the most crucial aspects of the reduced-grades classroom and is therefore a satisfactory overview of the work being done by those involved in the movement. As much as there is much left to be studied about the reduced-grades classroom in general, much more is left to be discovered about this approach with respect to high school physics classrooms. My research will attempt to shed light on how the reduced-grades approach is applied in this particular context.
Chapter 3 - Research Methodology

3.0 Introduction

In this chapter, I review all aspects of my research methodology and explain the rationale for my decisions. I begin by explaining the approach and procedures, and the instruments of data collection. The participants are introduced by first elaborating upon why and how they were chosen, and then by providing brief biographies. Next, I describe the process by which I analyzed the data collected from the participants. The ethical review procedures are then summarized by discussing anticipated issues and resolutions. With my methodology made clear, I discuss its limitations and strengths. Finally, I conclude by reiterating key themes and considerations that were made when creating my methodology.

3.1 Research Approach and Procedures

I have reviewed the relevant research in the practice of teaching with a reduced-grades approach and have identified gaps of information. Considering the criteria offered by John W. Creswell (2007) in Qualitative Inquiry and Research Design: Choosing Among Five Approaches, qualitative research is a suitable approach to filling these gaps. Specifically, I determined that more information is needed to gain an understanding of how this pedagogical approach is used by high school physics teachers. This is the problem that needed exploring since existing reduced-grades frameworks are not specific enough to properly inform my context of interest. For my research, the ethical review granted us up to five interviews with teachers. Since the information that I sought could be acquired from teachers through dialogue, I decided to conduct semi-structured interviews of high school physics teachers who employ a reduced-grades approach. This is the specific group of people capable of helping me solve my research problem. They provided me with an in-depth understanding of the information I was missing (Creswell, 2007).
Although the meaning and significance of this study does not extend beyond the discovery of this lacking information — no generalizable claims were made or theories established — value resides in the insight gained from discussing a complex and emerging topic with some of its earliest adopters (Denscombe, 2003).

3.2 Instruments of Data Collection

The only means of data collection for this research project consists of semi-structured interviews. The scope of my project — as determined by my graduate program — only allowed us to collect data in this form. In *The Good Research Guide for Small Scale Social Research*, Martyn Denscombe (2003) paints a clear picture of semi-structured interviews by explaining what they are and why they are useful. My interviews were semi-structured since I prepared a protocol — list of topics and questions to discuss — prior to the interview, but remained flexible enough to allow useful digressions. This allowed me to identify fruitful opportunities to stray from the plan while liberating the interviewee to discuss what they deemed relevant about my topic. The latter is especially significant considering that I was interviewing experts in my research topics. They provided us with novel information that could not be obtained otherwise. This directly aligns with the general purpose of my research which is discovery rather than verification. As such, I am justified in treating the information which they provided as significant findings (Denscombe, 2003). Ultimately, I know less about my topic than the teachers I interviewed so rather than trying to anticipate everything in advance, I prompted them to share their insight by asking them provocative questions. That being said, I made an effort to cover each topic and related question that I had prepared, but new ones came up during the interview; some of my questions were abandoned as a result.

My protocol begins by asking the interviewees some background information, but with particular attention to using the reduced-grades approach. After this, it very much resembles the
literature review in this paper. I ask the teacher whether or not they have a process through which they justify the move to a reduced-grades approach, to their students. If so, a series of related questions follows. If not, I inquire further and the protocol is left aside for this subject, in favour of improvised questions. Next, I ask the teacher whether or not they employ the use of feedback and portfolios in their teaching. If so, a series of related questions follows. If not, I inquire further and the protocol is left aside for this subject, in favour of improvised questions. For the latter two pedagogical strategies, I ask if there is anything about these aspects within their approach that is particular to high school physics classes. I also ask the teacher about the extent to which grading takes place in their classroom. To conclude, I invite the teacher to add anything they deem significant, especially with respect to particularities of the high school physics classroom.

3.3 Participants

There are many facets to obtaining participants for research and these are discussed in this section. I will present the sampling criteria used to select suitable participants, recruitment procedures used to find teachers, and brief biographies about the chosen interviewees.

3.3.1 Sampling criteria. Since I sought to learn more about high school physics teachers who employ a reduced-grades approach to teaching, establishing the criteria for selection was rather straightforward. First, the teacher had to be employing a reduced-grades approach to teaching. Second, they had to be teaching high-school physics. Third, they could not have published any research or written a book about their experiences. It was necessary that the information they could offer be novel, to some extent. The level of experience for these teachers was irrelevant considering that finding such teachers using this criteria was difficult enough in the first place. I deemed the qualifications of the participants sufficient to fulfill my criteria and therefore, sufficient to achieve my research purposes
3.3.2 Recruitment procedures. As mentioned above, finding high school physics teachers who employ a reduced-grades approach in their classroom is quite difficult. I had to conduct a lot of research and it was through online searches and browsing teacher groups that I found my first interviewee: he was found by searching the Teachers Throwing Out Grades Facebook group. This teacher was contacted via Facebook and his participation in the research was solicited shortly thereafter. With respect to the sampling procedure, it is non-probability rather than random. The former method selects particular participants while the latter does not. For my purposes — delving deep into a very specific topic — non-probability sampling was the only tangible option (Denscombe, 2003). My second interviewee was found with the help of a professor of mine, Garfield Gini-Newman. I told him that I was having trouble finding someone who fit my criteria, and he put me in contact with a teacher that he knows. As I mentioned before, the teachers I interviewed were chosen because they had something specific to offer — how to run a high school physics class with reduced-grading measures. That being said, my recruitment procedure was solely based on purpose rather than convenience. Although I have a network of teachers with much information to offer, none of those known fit the criteria mentioned in the previous section.

Considering the sparse list of teachers who employ a reduced-grades approach — at least according to my research — it was necessary to contact these potential participants as early as possible, in order to determine the feasibility of conducting my research. Being aware of this fact, my participants may have felt some pressure to participate in the research. To alleviate any such pressure, I made it clear from the very beginning that their participation was entirely up to their choosing. To do this, I gave them a summary of my research and we exchanged some information. That way, they were able to make an informed decision of their own. I do not know of any other ethical issues — potential or actual — with my recruitment procedure.
3.3.3 Participant biographies. John is a high school teacher in Western Canada. He has been teaching physics and chemistry for twenty-five years. He has also been involved in the process of designing and marking the standardized provincial examinations (diploma exam) for both chemistry and physics. He has used this knowledge and understanding of the examination process to inform his teaching approach. His approach is founded on principles of mastery learning, and includes a reduced use of and emphasis on grades. The grades of his students on the diploma exam tend to match their grades in his course, indicating that they are well prepared. John takes great pride in this fact.

Bob is a high school teacher in Eastern Canada. He has been teaching for ten years. Though he teaches physics, he also teaches mathematics, economics, and philosophy. It was five years ago that he and his colleagues began to implement the reduced-grades teaching approach into their practice, starting with physics and chemistry. They were motivated to implement this approach in order to make sure that all students — including those not studying physics beyond high school — learned the essential aspects of the subject. Given its success, they have since employed aspects of the approach into their other courses. Bob is currently pursuing a Master's degree in Education and the reduced-grades approach is central to his research project.

3.4 Data Analysis

According to Maykut and Morehouse, the purpose of data analysis is to examine the information collected during our research through the lens of our research topic. Throughout this process, we are ethically bound to minimize to what extent we interpret the words of our participants (Maykut & Morehouse, 1994). So, after having transcribed the audio recordings of the interviews, I immediately coded these transcriptions. Coding is a process in which the researcher parses through the data to search for sections with important information. Once such information is
located, the researcher then labels the section using a keyword — a code. Of the numerous approaches to coding, I chose to use descriptive, in vivo coding, and holistic coding. Descriptive coding summarizes data using whatever words the researcher sees fit. In vivo coding uses words directly from the data to label it. Holistic coding uses an entire phrase to label data (Saldaña, 2009). Though these types of code are different, they all minimize the extent to which the researcher interprets the data, something I sought to avoid at this early stage in the analysis.

Once I had coded the data, I began to recognize ideas that permeated my data. Rather than categorizing my codes, I immediately attempted to unearth themes from the data. Themes are patterns implicit in a data set that are revealed to the researcher in virtue of their perspective being informed by their research interests (DeSantis & Ugarriza, 2000). Uncovering themes was a process that spanned several months. Though identifying themes was not especially difficult, selecting the ones that best represented the data certainly was. To facilitate this process, I created a series of analytic memos — both mental and written — in an attempt to transform my codes into themes. Analytic memos create a medium through which the researcher can communicate with themselves about any aspect of the research (Saldaña, 2009). These memos were especially helpful to me as I wrote drafts of my data analysis chapter and revised the themes that I was using to present my findings. These memos also facilitated the process of connecting the existing literature to my findings, in order to create a discussion between the respective educators. Finally, these memos allowed me to discern what implications, recommendations, and further research, follow from my findings.

3.5 Ethical Review Procedures

Conducting research of any kind has a variety of ethical implications. Martyn Denscombe (2003) provides three ethical principles which guide my understanding of the major ethical issues.
First, he maintains that the interests of participants should be protected; the participants should not be harmed in any way as a result of their participation in the research. For instance, their mental health and reputation should not be negatively affected by the research. Hence the significance of ensuring the confidentiality of the information which I collect from the participants. Second, he states that I — the researcher — should avoid any form of deception or misrepresentation; I should be completely transparent with my participants. This includes everything from providing participants with all of the information they need to make an informed decision, to being fair and reducing bias in my data analysis process. Third, he emphasizes that participants should give informed and written consent to participate, especially in research which is personal in nature and may cause harm. Among the information provided in this letter is the right of the participant to withdraw from the research at any time. As much as these principles are intended to protect the well-being of my participants, they are also in place to protect us from any legal repercussions (Denscombe, 2003).

My research project has several measures in place to ensure that the aforementioned ethical principles are upheld. To ensure that the anonymity of each individual is respected, they have been assigned a pseudonym and any identifying markers — such as their school — has been omitted from the research. Furthermore, all audio recordings were securely stored on my password protected laptop during the data analysis phase, and were promptly destroyed afterwards. Prior to conducting an analysis of the audio data, a transcription of each interview was sent to the related participant. As such, they had the opportunity to review their statements and make any necessary clarifications or retractions. Before the interviews, participants were informed of their right to refuse to answer any question and that they could withdraw from the study at any time, regardless of the progress of the research study. Such points were reiterated as deemed necessary throughout the study, and during the interview in particular. That being said, there are no known or foreseeable risks to participating in this research. As such, the aforementioned measures did not target any specific
issue. Finally, to make sure that the participants understood everything that was just explained, they were asked to sign a consent letter which outlines these procedures, seeks consent to be interviewed and audio-recorded, specifies the expectations that I have of them, and summarizes the research project.

3.6 Methodological Limitations and Strengths

Since I am researching the reduced-grades teaching approaches of high school physics teachers, opportunities to observe these teachers in action would have proven extremely beneficial. Witnessing their practice first hand would have provided an extra source of data. With more than one source, I could have triangulated the data to intensify the focus on specific themes (Creswell, 2007); findings could have been corroborated across sources and their validity would thus have increased (Denscombe, 2003). Of course, conducting observations requires different ethical reviews since it involves a range of other implications — for instance, to what extent I would participate in the environment being observed (Creswell, 2007). So — observations aside, interviewing students would also have proved helpful. Hearing their accounts of teaching practices would have allowed me to draw comparisons with the testimonies of their peers and of the teacher — and another opportunity to triangulate data, albeit not with different methods. That way, I might have been able to better identify the crucial or most easily identifiable components of the teaching approach. Of course, being able to survey or interview a larger number of teachers would have made the results more generalizable (Denscombe, 2003). Surely, there are other high school physics teachers who practice a reduced-grades approach to teaching that could have contributed their insights.

Seen from a different perspective, some weaknesses of my research can become strengths. Although surveying a larger sample of teachers would have allowed us to collect larger quantities of information, the rigidity of questionnaires or standardized protocols would not have provided ample
enough opportunity for the participants to choose what information is worth sharing (Denscombe, 2003). This feature of the research is crucial considering that my participants are experts in my research topic. As such, it is wise to defer to them when it comes to answering my research questions. Hence, the semi-structured interview process is also a methodological strength. Although I mentioned that conducting observations would have been beneficial — especially as a second source of data serving to either corroborate or contradict interview data, interviews are sufficient to obtain the information that I need to answer my specific research questions. Therefore, conducting only interviews is a strength in so far as it is the least complicated way of acquiring the information that I needed to answer my questions.

3.7 Conclusion

Having provided details about many aspects of my research design, I see that none is more important than my participants and how I collected data. That is, what I discovered in my research relied almost entirely on the expertise of the participating teachers. Therefore, deferring to these experts during the data collection stage was paramount. I sought to discover what they had to offer, rather than prescribe a series of commands for them to follow. Conducting semi-structured interviews allowed me to facilitate the release of this information from these experts. In the next chapter, this information is shared in the form of my findings. I have considered these findings in the context of existing research and have considered what novel discoveries I can offer to those interested in learning more about teaching high school physics courses with a reduced-grades approach.
Chapter 4 - Research Findings

4.0 Introduction

The reduced-grades approach to teaching de-emphasizes the importance of grades by undermining their presumed legitimacy as evidence of student learning. According to the existing literature, this approach relies on both justification and feedback (Barnes, 2015; Sackstein, 2015). Justification is the process through which teachers explain or demonstrate the approach to their students. Feedback is information that the students receive about their learning, which they use to improve their learning. The leading proponents of this approach discuss its implementation in elementary or language arts classrooms (Barnes, 2015; Bower, 2013; Sackstein, 2015). As an aspiring teacher, I intend to implement this approach into my practice. But since I will be teaching high school physics, I need to know how it might be done in this specific context. The purpose of my study is to describe crucial aspects of the reduced-grades teaching approach in the context of the high school physics classroom. Specifically, I wonder how reduced-grades high school physics teachers use feedback in their classrooms, and how they justify their approach to students. To this end, I conducted two semi-structured interviews with two physics teachers, Bob and John. Through careful analysis of their transcripts I was able to code recurring ideas and organize my findings according to themes of my choice. In the following sections I present my findings and create a discussion by comparing these findings with the existing literature.

Mindful review of the data revealed two major themes. First, the approaches to feedback used by Bob and John have important similarities and differences. Though they both offer students feedback through revision and/or practice, Bob allows revisions to some graded assignments whereas John mostly offers prior practice. Second, the approaches to justification that they use have important similarities and differences. Though the principles of reduced-grades classrooms are
apparent in their respective classrooms, Bob offers his students explanations for his approach whereas John justifies his approach through practice. Provincial education mandates influence their approaches to the uses of both feedback and justification. Below, I elaborate on each theme separately.

### 4.1 Similarities and Differences in Approaches to Feedback

Feedback plays a central role in the reduced-grades classroom, especially for graded assessments (Barnes, 2015; Bower, 2013; Sackstein, 2015). This holds true for both Bob and John. Their respective approaches are centered on providing students with opportunities to practice and/or revise graded demonstrations of learning. However, their respective approaches are in part shaped by provincial mandates. Both have courses with provincially mandated learning outcomes, but John also has a provincial standardized test at the end of his course. These mandates inform their respective approaches to feedback for graded assessments. They are also the reason that neither use individual student portfolios. Below, I elaborate on these similarities and differences. I also invoke existing literature to prompt further discussion.

#### 4.1.1 Revision as feedback for graded assessments

Feedback can be given to students in a variety of different ways, revision being one of them. Revision happens after an attempt to demonstrate learning. It involves reviewing and providing feedback about student work, so that the student can re-assess and improve upon it. For graded assessments, these revisions are used to assess student achievement of specific learning outcomes. Bob and John use revision to different extents in their approaches to feedback for graded assessments.

In a typical physics course, there are numerous learning outcomes. If followed closely, they can take the entire course to cover. Bob and his colleague were motivated to rid themselves of this burden: “...we wanted the students to do some engineering - that’s one of the main thrusts for this.
And we wanted them to solve novel problems and... to reduce the amount of curriculum outcomes that we had to cover...” This reduced list of learning outcomes, or “essentials” are what they deem sufficient to pass the physics course — what students would most likely need for their future studies. Bob weights the “essentials” as sixty percent of the final mark for the students. But students do not receive a mark for these learning outcomes, they simply pass or fail. To pass, students cannot make any mistakes. Yet, no one fails. Students have an unlimited amount of opportunities — until the course ends — to pass, therefore demonstrating their learning of the “essentials”. These “essentials” and the manner in which they were selected call to mind Martin’s “rocks”. His students also have as many opportunities as possible to receive feedback, revise their work, and resubmit their work, within the timeframe of the course (Martin, 2013a). In both of their classes, they receive feedback by revision on these graded assessments, until they have rectified all their mistakes.

For instance, students will have “essentials” tests — aimed at testing their understanding of important concepts: “...we structure the tests very carefully so a lot of them are multiple choice but we’ll give not just four answers, we’ll give like eight answers.” The selection of a specific answer reveals to Bob a specific misunderstanding or error. As the students complete the test, they approach Bob with their answers. He checks their answers in real-time, and prompts them to explain why they chose a particular answer, or why they did not chose another — he conferences with them to check for understanding: “... if they don’t know within ten seconds or there’s too many ‘ums’ or ‘uhs’ I say ‘Go figure it out.’... so that helps that it’s quick; the conference lasts no more than thirty seconds, forty-five seconds.” These conferences can be likened to those used by Barnes (2015), Bower (2013), Martin (2013a) and Sackstein (2015) to track student achievement of learning outcomes. However, Bob and Martin (2013a) conference based on need rather than prior arrangement. Since the information relevant to the conference pertains to the work in question, they do not require students to collect evidence of their work into an individual portfolio, like Barnes
(2015), Bower (2013), and Sackstein (2015) do. After a conference, Bob’s students revises their work, understands their mistake, and corrects it — no penalty is incurred. This process continues until the student has answered the test perfectly, with no mistakes: “… we need to guarantee that they have that essential component.” Now, if a student fails to complete the test during class, there is a study hall time to which they will be assigned by Bob, to revise their demonstration of the learning outcomes. Given the improved quality of feedback possible in individual student conferences, Sackstein (2015) recommends setting aside some time in this manner. Throughout this revision process, Bob must be creative, so as to accurately assess student learning and ask appropriate follow-up questions. However, with years of experience and only “essentials” outcomes on which to focus, it is easier for him to anticipate student mistakes, and guide the revision process.

In Bob’s class, feedback for “essentials” laboratory experiments is structured in similar fashion. The students devise a scientific approach to an investigation, and then carry it out. Here, some of the “essentials” scientific skills learning outcomes are being assessed. These skills are called upon in every lab. To demonstrate their learning, students can revise their work during future labs:

I don’t care when or how they show me those things, but you can show me how to collect data ten times during the course and I just check it off, you’re done… being able to create a mathematical problem - well whether you do that with Newton’s laws, or with the speed of sound… you can do that a whole bunch of different ways.

Given their recurrence throughout the course, these learning outcomes are the only ones from Bob’s course that would lend themselves to being tracked long term, using individual student portfolios. But again, the conferences are spontaneous. Furthermore, students need to demonstrate these skills only once to pass, so there is no progression to be made. Hence, there is no need for individual student portfolios. These circumstances differ to those of Barnes (2015), Bower (2013), and Sackstein (2015), who teach courses with long term writing objectives that are tracked for
improvement throughout the course.

The students also have an “essentials” component to their final exam: “…they have an exam, it’s essentials. They have to get one hundred percent on that to get a credit in the course.” Bob did not go into more specific detail about how giving feedback for the “essentials” labs or exam work, but in general he said:

They can do that [exam], up until exam week… they’ll revise it, they’ll redo it, they’ll come in and conference… Same thing happens - we do a practical exam, so they have to show us that they can do basic lab skills, and again if they don’t get that done, they can… have another shot.

No matter the format, students have ample opportunities to revise their graded assessments.

For his part, John allows few opportunities for revision of graded assessments. For his grade eleven physics students, he may allow them to redo a quiz. For his grade twelve physics students, he would not. However, he usually has one requiz opportunity built into his course. Also, students can replace any one of their marks with their results from the government mandated field test — a particularly challenging examination. For John, the final marks he gives are important for his sake:

… it’s really important for me that that mark is… valid, because it is gonna be compared with the diploma exam mark… We use them for teacher performance… our administrators in all the schools in [school board] are gonna look at those results and they know… who’s teaching physics…

and that of the students: “The kids… the marks are important to them as well for post-secondary, or scholarships…” In his opinion, allowing revisions to graded assessments undermines this validity. Besides, John argues that revisions do not change student marks, and when students ask for them, they simply want to demonstrate that they have memorized the answers. John’s view is contradicted
by Barnes (2015) who also operates in an environment with standardized testing and is able to offer students feedback by revision for graded assessments. This difference may be attributed to the fact that he teaches middle school, so the stakes are much lower for his students — they are not seeking admission to a college or university. However, Sackstein (2015) does teach secondary school in a similar environment to John, and she offers plenty of feedback by revision for graded assessments. Yet, it may be that her courses are not requirement for university, unlike physics. But this is not the case for Martin (2013b), who teaches a university prerequisite course in the same province and is therefore subject to the same circumstances, but still offers his students feedback by revision on graded assessments. That said, John’s idea of revisions certainly seems different than the one used by Bob or those prevalent in the literature (Barnes, 2015; Bower, 2013; Sackstein, 2015), since here students are working on an original piece rather than improving an existing one. But, the underlying idea is just the same: specific learning outcomes are being reassessed. For these reasons, revisions to graded assessments do not sit well with John.

In designing the “essentials” component of his course, Bob does well to not let provincial mandates — in this case learning outcomes — dictate his approach to giving students feedback. He is able to provide his students with opportunities to revise and resubmit their graded assessments so that it is effectively a pass/fail process, thus undercutting the importance and use of grades in his classroom. Though the learning outcomes in his course are not particularly well-suited for portfolios, Bob has chosen to prioritize certain approaches to giving feedback by revision. There is, however, one component to Bob’s course in which he does not allow revisions, where his approach likens that of John. He calls this component “extensions” — more challenging content, perhaps touching on upper level learning outcomes. For graded assessments of this material, students are not allowed revisions. This closely resembles the overall approach employed by John, which offers little opportunity for revision of graded assessments. Instead, they offer an alternative feedback approach
to their students: practice.

4.1.2 Practice as feedback for graded assessments. Another way to give students feedback is through practice. Practice happens prior to an attempt to demonstrate learning. It is any task which prepares a student for a future performance. Practice tasks are assessed and can be revised, but they need not figure into the grading scheme. Bob and John use practice to different extents in their approaches to feedback.

Like Bob, John’s physics course is built around learning outcomes. However, rather than reducing the number of outcomes in question, he and his colleagues took a different approach. They focused on the significance of descriptors that defined each outcome:

…‘explain’ is very critical right, and ‘explain’... can go really deep. Because how far do you explain something in physics? That’s a sign for us or a question red light if you will from the curriculum people that ‘Hey, go deep on this program outcome.’

John emphasizes how being able to explain physics concepts is critical to learning physics. So, the most important learning outcomes are those with descriptors which require teachers and students to explore the content in more depth. For his grade twelve course, there is further motivation for targeting these learning outcomes. At the end of the semester or year, the students take a diploma exam worth thirty percent of their final grade. The diploma exam is standardized, so it reflects the aforementioned learning outcomes, descriptors included: “On the diploma exam... that’s [the descriptors are] permission for that person to go deep as well...” In his experience, these diploma exams marks — and the course marks for that matter — are important for students to gain admission to and receive scholarships from their desired post-secondary institutions. It is therefore all the more important for his students to understand the descriptors. Given the importance of learning outcomes for the diploma exam, John uses them to structure the feedback that he offers to his students on graded assessments. Here John — and previously Bob — hits on an important point
for reduced-grades movement leaders: learning outcomes are an integral component of offering quality feedback to students (Barnes, 2015; Bower, 2013; Martin, 2013a; Sackstein, 2015). Recall however that John does not offer his students feedback by revision on graded assessments. So instead, to make sure that his students grasp and demonstrate their learning of these outcomes, he offers a plethora of practice in advance of graded assessments.

Although John’s classroom employs a reduced grades approach, it is fundamentally based on mastery learning principles. The main principle of this approach is that mistakes and failures — or practice — are a part of learning. This principle is best illustrated in the process of learning to ride a bicycle where there are many falls, training wheels, and finally mastery. This approach shares this core principle with the reduced grades approach. Sackstein (2015) even shares it with her students at the beginning of her course. So in this setup, John gives his students multiple opportunities to practice and master the most important learning outcomes. The goal is for them to perform when it comes time to demonstrate their learning, especially for a grade. In total, he has twelve evaluations throughout his course — two quizzes and one test, for each of the four units — which assess student learning and serve as practice for the diploma exam, in the grade twelve class. Since the diploma exam consists of multiple choice and numerical response questions, his quizzes and tests are structured the same way — although they are shorter in length. Practice with this format is needed:

…it’s not uncommon for me three quarters of the way through the year to get kids having problems with the format on a numerical response… I like to use that format all year long and just be consistent with it…

Until they become accustomed to the format, the evaluations are more likely to cause them stress, something John wants to reduce since it affects performance.

Though Barnes (2015), Bower (2013), and Sackstein (2015) may qualify this approach as “teaching to the test”, it is clear that John is committed to improving student learning. For him, it is
paramount that students understand the content and sharpen their problem-solving skills: “...you’ll get a brand new scenario that you’ve never seen before. I never covered it in class, and you should be able to deconstruct it, and explain how it works.” These practice opportunities accurately mimic what students will face on the diploma exam, promote their learning of needed skills and concepts, and thus increase their chances of a successful performance.

John acknowledges that students could instead be prepared with more communication oriented questions. In fact he used individual student portfolios when the diploma exam had written answer response questions. But now, it would undo many of the aforementioned benefits, so he no longer uses them. Besides, his method is tried and tested:

...it’s not uncommon for the marks to drop eight to ten percent, in that range, so the diploma mark is lower than the kids’ marks, and that doesn’t happen here. Usually... their class average will be within a percent or two of the diploma...

The feedback through practice that he offers his students is effective, and his tests are reliable indicators of achievement in relation to the provincial standards. John takes great pride in this fact, given that the exam itself is a high stakes circumstance for all students, with university admissions and scholarships in mind. But, these quizzes and tests are not the only means of practice that he offers his students. In fact, they may not even be the most important.

Apart from graded assessments, John has a plethora of formative tasks set to offer students practice in both understanding concepts and question formats. According to John: “...labs are really critical because it’ll help the kids... get a real gut feeling for physics principles and they’re... the natural attention grabber...” For these reasons, John runs at least one lab or experiment each week. During the lab process, he usually gives oral feedback to the entire group, according to their needs. He describes it as a conversation where students are free to share their results and compare ideas. Although the students are not practicing the format and exact processes needed for the diploma
exam, they practice doing work with similar concepts and exercise their problem-solving skills. This is a staple of the reduced-grades approach; learning skills take precedence over content and processes (Barnes, 2015; Bower, 2015; Sackstein, 2015). John does not grade these rich learning tasks because he wants his students to benefit from them in full:

I’d do a lab, and, if I’m gonna assign a mark to you... I can give you a little background information on it... kids will ask for help, and I’m not gonna give it because I would have to be very careful with the help... because I wanna give them an individual mark.

With similar intentions, John has the students work in groups on engineering projects which achieve similar aims. The students have multiple opportunities to try and fail, to revise their work, and learn the intended outcomes. The sheer intrigue factor is enough to motivate most students to engage with the tasks. But as an added incentive, lab content figures prominently on the diploma exam: “…lab, is… where they’re most likely to get really difficult questions on the … diploma exam... it’s critical that they understand what’s going on in that lab in order to help them... do well on the exams.”

Despite not being graded, or being formatted like the quizzes or tests, John cites a strong buy-in to this type of practice. Students value the learning experience and feedback that it provides.

Otherwise, John also has his students do numerous worksheets with practice questions in groups — here students have an opportunity to practice and learn from their peers, or from him. Though there is only so much time to learn in the classroom, John seldom assigns any homework: “I don’t like homework, because I don’t want kids struggling after hours at home, they won’t be able to do it... I want them to experience that in my classroom...” At times, he will offer practice quizzes before graded quizzes, or pop-quizzes for students to know where they stand; his bank of questions is seemingly endless. Despite none of these formative tasks counting for marks, his students generally buy into the idea that these means are pathways to mastering the content and format that will be on the quizzes, tests, and exams. They value the practice that is offered, and the
feedback gleaned from it. The same goes for Bob’s students, who rely on feedback through practice to excel in his course.

Recall that Bob has divided his course into two types of learning outcomes: “essentials” and “extensions”. For graded assessments that evaluate “essentials”, students can revise and resubmit their work as often as needed until they achieve perfection. For the “extensions” material, there are no such opportunities. The “extensions” are assessed using the exact same formats (tests and labs), with the addition of an engineering project. This project is done over the course of the year or semester, so students have opportunities for revisions and improvements, but there is a final submission deadline — specifically, a presentation, and the assessment is not simply pass or fail. So, the revisions are not for the demonstration of learning, but for the intermediate formative steps. Having received feedback from Bob, community members, professionals, and peers, they are assessed according to a rubric that has been designed by Bob, and shared with the students. The other extensions assessments are even less forgiving; they are what Bob calls a “one shot deal”. There are no opportunities for revision whatsoever, not even in the intermediary: “… for the stuff that’s gonna bring them from a sixty percent to a hundred percent, that’s a one shot deal and you gotta show up and do your best on that day.” There are no mandatory conferences built into the process; students receive written feedback, and if they want to discuss matters in further detail, they can arrange for their own conferences during study hall. But, these conferences will not contribute to adjusting their grade in any way whatsoever. This contrasts to teachers from the literature whose conferences can always be used as evidence to inform grading (Barnes, 2015; Bower, 2013; Sackstein, 2015). But these learning outcomes are novel and more challenging, so it is not imperative that students fully grasp them; they are not “essentials”. If students want to excel in his course, it is imperative that students learn to take full advantage of the practice offered prior to the graded assessments.
Bob lists several reasons for not allowing revisions for these graded assessments: First, he suggests, it would be too time consuming. Given the difficulty of the content, many students would take a long time to gain a complete understanding. Bob also cites trying to find a balance between opportunities to improve, and deadlines for performance: “There should be limits and firm deadlines to things and there should be an appropriate amount of stress and anxiety, especially if you’re gonna be going to university, I mean it’s gonna happen.” Bob further notes that the keenest students would “… absolutely give themselves a heart attack writing it fifty times…”, it being the extensions exam. When it comes to gaining admission to a university or receiving scholarships, students must perform to earn it. Though Barnes (2015), Bower (2013), and Sackstein (2015) do the exact opposite in allowing their high school students — after consultation — to dictate their final grade in conference, the stakes are lower because none of them teach courses prerequisite for university or college, except for maybe Sackstein. Martin (2013a) for his part does midterm grades through conferencing, but creates a final grade by compiling grades throughout the course. Instead of conferences, the feedback which Bob offers to his students comes in the form of prior practice rather than revisions, through the “essentials” graded assessments and the regular coursework which prepares students for these “extensions” graded assessments.

As seen by comparison, Bob designed the “essentials” component of his course with little influence from provincial mandates, save the priority learning outcomes that he and his colleague identified. The same goes for the “extensions” component of his course. He opted for feedback by practice instead of revision only because he believes that students who want to excel in the course need to perform. In effect, his approach to feedback was hardly limited by provincial mandates. This is in stark contrast to John, whose approach to feedback is directly related to the provincial mandates which define his teaching circumstances. The learning outcomes are predetermined, and that they must be covered is solidified by the fact that there is a standardized test assessing these
outcomes at the end of the semester, or year. So, John ensures that the content his students cover aligns with those in the curriculum, and that they have ample practice with the format of the diploma exam. Given that the results of these exams are taken very seriously at various levels, John seemingly has no choice but to offer his students what he deems to be the best preparation possible: practice assessments with the same content and format. Though the reduced-grades movement leaders work with government mandates similar to those of Bob and John, they manage to implement their approach nonetheless (Barnes, 2015; Bower, 2013; Sackstein, 2015). Given some aforementioned similarities and this important consideration, whether John’s approach qualifies as a reduced-grades approach requires further consideration.

4.2 Similarities and Differences in Approaches to Justification

Underlying the reduced-grades approach to teaching is the idea that grades distract from learning. In an attempt to return student focus on learning, undermining the notion that grades are important is paramount. To this end, teachers who employ the reduced-grades teaching approach use various means of justification (Barnes, 2015; Bower, 2013; Sackstein, 2015). Any approach can involve a combination of thoughtful explanation and principled practice. This holds true for Bob and John. Where Bob emphasizes both clear explanations and principled practice to justify his reduced-grades approach, John offers little explanation for his approach. But, he does justify it through his practice.

4.2.1 Explanation as justification. A thoughtfully devised explanation to justify a shift away from grades is a favourite tool of the reduced-grades teacher (Barnes, 2015; Bower, 2013; Sackstein, 2015). Students are accustomed to the significant role that grades play in their education, so the shift can be at first disconcerting. With this consideration in mind, Bob tells his physics students about the reduced-grades approach on the very first day. In fact, he and his colleague have
a prepared presentation which outlines their entire philosophy. As Bob explains it:

…grades ultimately don’t matter; you know if you have a seventy-five you can get into basically any science program in Canada… there’s lots of people that between myself and my colleague we know that went on to be great engineers and doctors… with… middle of the range marks in high school…

They also introduce their students to some of the ideas upon which their physics courses are founded: problem solving, scientific communication, and mathematical modelling. These facts and values help students understand that grades are not the arbiters of their futures. They need not concern themselves so much with grades, and can instead focus on learning. Sometimes, such explanations lead to the desired effect.

Other times, students are not convinced by these explanations: “…some students are stuck in that traditional model…” In such cases, Bob goes further than sharing his philosophy; he cites research: “…I really feel they need it. And so I’ll pull out some research at that point sometimes…”

Still, some students have concerns: “…there’s a lot of trepidation around not having a mark for universities and scholarships…” When grades are needed, Bob has a procedure in place: “If the students need a mark for a scholarship or something, university acceptance - that kind of thing, then we can create one…” No doubt, some of this worry stems from parents too, so he sends home a letter explaining the reduced-grades approach at the beginning of the year, and mentions it to parents during interviews. Indeed, presenting the theory behind the reduced-grades approach to students is no small feat. But all of these initiatives help reorient the focus from grades to learning. However, Bob could do more to bolster his argument for the reduced-grades approach. For instance, Sackstein adds an extra dimension to her thoughtful explanation of the reduced-grades approach. She incites student discussion and reflection on the matter — an element she deems crucial to garnering their support. She also draws comparison to the idea of mastery learning — where
mistakes and failures are inherent to learning — and how it is undermined by traditional grading (Sackstein, 2015). Bower (2013) echoes these statements, noting that students need to question the use of grades to the same level of depth that he did when making the ideological shift.

By comparison, the explanation process used by John to justify his reduced-grades approach is not quite as comprehensive. With his grade eleven students, he shares the fact that he will have some flexibility: “…flexibility in that… if I have a really poor performing quiz, I’ll throw it out and ‘Hey look, let’s all do a rewrite.’ and I’ll make another one…” With his grade twelve students, he warns them that he will be less flexible than in previous years. The validity of their performances is made all the more significant with admissions and scholarship opportunities around the corner. Otherwise, he shares little: “…I don’t even advertise that I’ve got this extra quiz that’ll replace a mark…” Across grade levels, his main message is that all of the work they do throughout the course, regardless of the format or whether it is graded, is in preparation for the provincial diploma exam, what he calls “race day.”

Compared to Bob and teachers from the literature (Barnes, 2015; Bower, 2013; Sackstein, 2015) John shares less with his students at the beginning of the year. This may stem from the fact that although he employs a reduced-grades teaching approach, his main focus is on mastery learning. By sheer virtue of its name, it takes focus away from grades and places it on learning. Furthermore, it is a more widely used approach, meaning a less — if at all — disconcerting change for students. He may have deliberately chosen this approach just because it supports student development of problem solving, all while respecting relevant provincial mandates, namely learning outcomes and standardized testing. It is therefore no surprise that John does not often feel compelled to cite research in justifying his approach. When he does, it usually has little to do with either mastery learning or reduced-grades classrooms: “I don’t really share theory or, I mean some but not often… so I don’t know if that’s so much tied to the reading [about mastery learning] I’m doing…” Clearly,
John could do much more to explain his approach to his students — considering the efforts made by Barnes (2015), Bower (2013), Sackstein (2015), and Bob.

4.2.2 Practice as justification. John’s students get justification for his reduced-grades approach through his principled practice. The reduced-grades approach employed by John centers around mastery learning. Given that his grade twelve students have a diploma exam at the end of the year, his approach focuses on helping the students do well on this exam. As such, all the work he assigns throughout his course serves as preparation for this exam: “…we do a ton of class work. And in physics, the kids really buy into, ok the work I’m assigning… is the pathway to being successful…” His graded assignments reinforce the motivation behind his approach: “…so those quizzes and tests that I’m marking, are of the same format that they’ll write on their diploma exam. So I believe that again, I call it… ‘race day’, so we should train for that…” Of these evaluations, there are only twelve throughout the entire course. Combined with the fact that they consistently grapple with difficult physics concepts, his students have much less time to spend worrying about grades. In this manner, his principled practice justifies itself to the students.

However, is this enough? Offering students an abundance of practice prior to a task is undoubtedly advisable, especially given a focus on problem solving skills. Nonetheless, a common feature of the reduced-grades classroom is the notion that students have multiple opportunities to demonstrate their learning, even for assessments of learning (Barnes, 2015; Bower, 2013; Martin, 2013a; Sackstein, 2015). Though the students may receive grades on such assessments, the fact that they can do them again without penalty is liberating. It undermines the significance of grades. Seeing that John has no revision function built into his graded assignments, he misses out on a valuable opportunity to further undermine grades, and justify the approach to his students. Furthermore, since these graded assignments mimic the diploma exam, they are fixed. That is, students do not have a voice in deciding what product they will create to demonstrate their learning.
for a grade; yet another missed opportunity to shift the focus away from grades by inspiring some intrinsic motivation (Kohn, 2011). Sackstein (2015) and Martin (2013a) offer their students opportunities for creativity for this very purpose. Sackstein also stresses the importance of repeating initial explanations and discussions throughout the entire course. She even recommends shifting away from what she calls grades vocabulary, such as substituting “This is wrong.” with “Try another way.” (Sackstein, 2015). To his credit, John does have his students investigate concepts in depth, be it during laboratories, engineering activities, or even on problem solving worksheets. Sackstein (2015) and Martin (2013a) do the same by having their students take on long term projects. Such initiatives normalize the relegation of grades and focus on learning. John does not — and perhaps cannot — go to these same lengths because of the limitations on his practice imposed by provincial mandates.

Bob does not work under such restrictions, so he does employ these strategies for his graded “essentials” assessments: “... they can do it basically as many times as they want... If you mess up a question nine times, I’m gonna have nine different follow-up questions and we’re gonna go through this until you get it.” Any inkling that grades are important is thus undermined. No matter how students do, so long as they succeed they get full marks: “...the essentials test is pass/fail; you either get the whole thing or you get nothing.” A focus on learning permeates the course: “…we have this continuous process about where... I’m never talking about grades, I’m always reinforcing this idea about problem solving.” Though many of his assignments involve no choice on the part of the students, Bob does incorporate an engineering project with this feature: “There’s also the engineering project that happens throughout the semester... we have some criteria for them: it has to be solving a problem...” Only the graded assessments for “extensions” material involve neither choice nor revision, but this is less than half of the grade. As such, students are free to effectively “forget” about grades for more than half of the course. This course structure therefore does much to
undermine the importance of grades, and further reinforces the focus on learning. The lack of influence from provincial mandates no doubt contributes to making this practice possible.

Still, Bob and John could further bolster the effectiveness their respective approaches. Barnes (2015), Bower (2013), and Sackstein (2015) place a great deal of emphasis on specific learning skills in their classrooms, namely reflection and self-assessment. Being able to reflect is necessary for students to assess and act upon received feedback. It also offers further insight into student thinking, thus making it easier to assess their learning and offer feedback (Sackstein, 2015). Barnes maintains that the ability to self-assess is fundamental to embracing the reduced-grades approach. Though he says that the process can be initiated by asking students simple questions (Barnes, 2015). There is no question that Bob and John put their students in positions where they need to reflect and conduct self-assessments. As such, their students are developing these important skills. However, their commitment to these developing these skills in their students is not a focal point, like it is for Barnes (2015) and Sackstein (2015), who have measures in place to explicitly introduce and practice these skills. This discrepancy may be attributable to the different number of learning outcomes between their courses and physics in general. It is certainly related to the fact that Bob and John do not use portfolios, a favourite reflection tool for Barnes (2015) and Sackstein (2015). But in spite of these differences, Bob and John would do well to treat reflection and self-assessment more intentionally in their classrooms, so as to improve student learning in general, therefore adding practical justification for the adoption of a reduced-grades approach to teaching.

4.3 Conclusion

There are many components to a reduced-grades high school physics classroom. Through a combination of thoughtful explanation and principled practice, the approach is justified to students. Trepidation surrounding the approach can be dispelled through simple explanation and discussion.
Otherwise, the reduced-grades approach garners support through its practice, where learning is always at the forefront. For Bob, the justification process is straightforward. For John, having to consider the significance of standardized tests and learning outcomes in tandem undermines the effort. Nonetheless, a specific approach to feedback for graded assessments, which includes a combination of practice and revision, is adopted.

Both Bob and John offer feedback in accordance with what they deem to be the most important learning outcomes. Bob reduced the number of, and prioritized, specific learning outcomes, thus giving time for his students to revise graded assessments of these priority outcomes. For the other outcomes, his students only have access to feedback through practice. Restricted by the diploma exam, John opts to offer feedback to graded assessments mainly through prior practice, and seldom, through revision. Given the short-term nature of the learning outcomes in physics and the lack of written work in their courses, both opt to forego the use of portfolios. In comparison to the leaders of the reduced-grades movement, the measures taken by Bob and John differ in nature, mostly due to the nature of their subject matter. That said, these movement leaders have a list of measures that might be adopted or adapted by either of these teachers to bolster their own reduced-grades approach.

My in-depth analysis of the data alongside existing literature has led to significant findings which may influence the educational community, but will certainly influence my own practice. It is possible to operate a reduced-grades classroom in high school physics. Ample justification can be offered to students for the shift away from grades. Feedback for graded assessments can be approached by offering students both opportunities for prior practice and revision. Not only is such an approach to teaching this course possible, it is being done with success in actual contexts. The pedagogical nuances discovered in this research have already triggered much thought about how I might one day host my own reduced-grades classroom. Despite these encouraging findings, there is
still a lack of research to substantiate the positive effects of this approach on student learning, in all subject matters. Rightfully so, teacher anecdotes will not suffice. For this movement to gain more traction and find refuge in more classrooms, this is precisely the kind of research that needs to be done. In the following chapter, I discuss such implications and recommendations.
Chapter 5 - Implications

5.0 Introduction

The purpose of this research was to discover how the reduced-grades approach is employed in the seldom discussed context of high school physics courses. The reduced-grades approach is a pedagogy which seeks to undermine the importance and use of grades in the classroom. In this chapter, I review my findings and assess their significance. The implications of my findings, for both the educational community and myself, are used as measures of significance. Based on these implications, I offer actionable recommendations. I then dedicate a separate section to recommend further areas of academic research. To finish, I summarize the key components of this chapter.

5.1 Overview of Key Findings and Their Significance

The reduced-grades approach to teaching has two critical features: feedback and justification. Feedback is descriptive information offered by teachers to their students in order to improve student learning. Justification is a process through which teachers offer the rationale for their approach, through explanation, practice, or both. Both features are used to undermine the use of and emphasis on grades. In my two interviews, I found that Bob and John use feedback and justification differently in their reduced-grades classrooms.

Approaches to feedback in reduced-grades high school physics classrooms are informed by existing provincial mandates, especially when they pertain to graded assessments. In the curriculum, physics courses have numerous learning outcomes, making it difficult to offer multiple iterations of feedback for a single outcome on graded assessments. Both of my interviewees — Bob and John — have therefore made concerted efforts to reduce the number of these outcomes by targeting the most important ones. Leaders in the reduced-grades approach do just the same (Barnes, 2015;
Bower 2013; Martin 2013a; Sackstein 2015), allowing them to give more feedback for each learning outcome on each graded assessment. John has added the pressure of preparing his students for provincial standardized examinations. Though these graded assessments help reveal which learning outcomes are most important, students only have one attempt to demonstrate their achievement. He therefore opts to offer much of his feedback for graded assessments through prior practice work. Despite also dealing with standardized tests, some leaders of the reduced-grades movement do offer revisions for graded assessments (Barnes, 2015; Sackstein, 2015). For his part, Bob offers feedback both through practice work and revision of graded assessments. In addition, both Bob and John have come to the conclusion that individual student portfolios would not function well for their respective courses. Portfolios are most effective for tracking long term learning outcomes and written work, something neither course has nor requires. Some teachers from the literature do employ the use of portfolios, but they teach younger grades, or language art courses (Barnes, 2015; Bower, 2013; Sackstein, 2015).

Approaches to justification in reduced-grades high school physics classrooms involve both explanation and practice. Both Bob and John practice the reduced-grades approach consistently, therefore implicitly undermining the importance of grades. However, only Bob offers a detailed explanation of the rationale behind his approach. The students are told explicitly that learning takes precedence to grades, and that the latter impede learning. Some teachers from the literature also share this message with their students (Barnes, 2015; Bower, 2013; Sackstein, 2015).

5.2 Implications

From my findings stem numerous implications for movement leaders, policy-makers, and teachers. For movement leaders, my findings present alternative perspectives of the reduced-grades approach, which raises questions about the approach in general. For policy-makers, my findings
demonstrate how certain policies undermine learning and limit the effectiveness of reduced-grades approaches. For teachers, my findings offer evidence that it is possible to successfully employ a reduced-grades approach in the physics classroom, using recognizable pedagogical strategies.

5.2.1 Implications for movement leaders. For those spearheading the reduced-grades movement, my findings raise questions about the approach. One of interviewees — John — employs the reduced-grades approach in ways that greatly differ from movement leaders. Nonetheless, he qualifies his approach as reducing the use of and emphasis on grades. What qualifies as a reduced-grades approach is up for debate, and there may exist differently named approaches with similar methods and outcomes. So, it is more useful to ask which components of such approaches are expendable, and which ones are not. For instance, does practice prior to graded assessments undermine the use of and emphasis on grades to the same extent as do revisions to graded assessments? All teachers from the literature opt for revisions to some extent (Barnes, 2015; Bower, 2013; Martin, 2013a; Sackstein, 2015) while the teachers that I interviewed are split on this point. Also, do attempts to undermine the use of and emphasis on grades fall short without an explicit explanation of the approach to students? Again, most teachers from the literature provide explanations (Barnes, 2015; Bower, 2013; Sackstein, 2015) while Martin (2013a) makes no mention of it, and the teachers that I interviewed are in disagreement. Finally, do attempts to undermine the use of and emphasis on grades fall short without the use of individual student portfolios? Neither of the teachers that I interviewed or Martin (2013a) uses portfolios, in contrast to other teachers in the literature (Barnes, 2015; Bower, 2013; Sackstein, 2015). These discrepancies may exist because the teachers that I interviewed and some of those cited teach different grade levels and subjects. Nonetheless, they demonstrate how reduced-grades approaches are difficult to encompass under a single banner. Yet, to gain traction and reach a wider audience the movement may need to sort these different approaches into a larger recognizable whole.
Unfortunately, this is made difficult by existing educational policies. Depending on the circumstances in which some teach, certain strategies or pedagogies that are central to the reduced-grades approach are unavailable or unfeasible.

5.2.2 Implications for policy makers. Where standardized testing is common in North America, teachers are coerced to align their teaching to prepare for the test, often leading to poorer learning outcomes for students (Bower, 2013; Kempf, 2016). John finds himself in this very setting. To some extent, this setting dictates the way he implements the reduced-grades approach. Bob on the other hand has no standardized testing at the end of his course. So, he has much more freedom to implement the reduced-grades approach, as he so pleases. Specifically, he can choose how he gives feedback to his students, and how he justifies the approach to them. Now, some teachers mentioned in the literature operate in circumstances similar to or worse than John when it comes to standardized testing, but they do not compromise reduced-grades principles (Barnes, 2015; Bower, 2013; Martin, 2013b; Sackstein, 2015). For all except Martin (2013b), this may be attributed to the fact that the latter have by design fewer mandated learning outcomes in their subjects, and therefore less content to cover on these exams. John works with numerous short term learning outcomes, and has dedicated much time towards surfacing the most important ones — many reduced-grades teachers do just the same (Barnes, 2015; Bower, 2013; Martin, 2013a; Sackstein, 2015). However, he has been unable to reduce the number of outcomes below that which is tested on the exams. The tandem of standardized exams and learning outcomes limit John in his implementation of the reduced-grades approach. Martin (2013b) however has managed to navigate similar circumstances to offer his students revision on graded assessments. While Bob does the same without the limitations imposed by standardized exams, he cannot justify using individual student portfolios. The reduced amount of outcomes are still too many to track on a long-term basis. These realities lead us to consider: What other components of the reduced-grades teaching
approach may be encumbered by provincial standardized exams or provincially mandated learning outcomes? And to what extent? Specifically, with regards to the physics classroom?

Policies carry much influence in shaping the pedagogical approaches of teachers, and are thus subject to obstructing reduced-grades approaches to teaching. We are therefore left wondering: What other existing policies undermine the implementation or effectiveness of reduced-grades approaches to teaching? And to what extent? Specifically, with regards to the physics classroom?

5.2.3 Implications for teachers. My findings describe in detail the processes of reduced-grades classrooms in the context of high school physics. As such, they also offer insight into the general reduced-grades approach. Giving feedback to students on graded assessments can be done frequently to centre student focus on learning. Justification for the approach can quell any concern. Standardized tests and numerous learning outcomes need not completely undermine the reduced-grades approach. The cited and researched approaches have been implemented with success. So then, why are teachers emphasizing and using grades, so much?

5.2.4 Implications for my professional identity and practice. Analysis of the strategies and techniques employed by both Bob and John have inspired myriad ideas to inform my future teaching and research, and have committed me to making the reduced-grades approach a staple of my teaching approach. As a teacher, I will give a lot of feedback, especially on graded assessments. I now better understand and recognize the important roles that both practice for and revision of assessments, graded or not, can play in a reduced-grades physics classroom. I therefore intend to use them in tandem. I understand that to some extent, I may be limited by existing policies, and will therefore have to adjust accordingly. Be it numerous learning outcomes or standardized tests, Bob and John offer valuable insights. I also intend to be transparent and principled in my approach. So, justification of my approach to students from the beginning and consistently throughout the course will be a staple of mine. From Bob I will borrow strong justifications for the approach, from John I
am reminded how principled practice is equally significant. As for the use of portfolios in physics, I am left with nothing but reasons for omitting their use.

As a researcher, there is still much to know about the reduced-grades approach. Indeed, the discrepancies in styles entails that there is no consensus or agreement about what constitutes this approach. Maybe there need not be, but until then research about it will be hard to find, if it even exists. So, I will make it a priority of mine to add to this field by documenting the work that I do, in my own classroom.

5.3 Recommendations

The recommendations that I make here are aimed at the aforementioned stakeholders and follow from the implications of my findings for each of these respective groups.

5.3.1 Recommendations for movement leaders. There are yet many questions surrounding how to approach critical components of the reduced-grades method, namely feedback and justification. My findings reveal different approaches within the same subject matter, albeit in different circumstances. Presuming that there are many teachers who employ this approach, that their methods are not known at this point, and that they operate in varying circumstances, uncovering further approaches will only increase the variability of the method. If movement leaders want the movement to gain favour and traction with the public and other educators, and perhaps one day become policy, the movement then needs to be packaged into a consumable portion. This does not necessarily mean that we should tighten the definition and exclude many of its adopters, but instead select a few of the key components that do or should exist across all reduced-grades approaches, and define the approach accordingly. We might agree that feedback by revision for all assignments, graded or otherwise, is ideal; that portfolios are indeed expendable; that the justification process requires an explanation to students no matter the circumstances. So long as the
approach as a whole reduces use of and emphasis on grades, and that there is agreement about a clear idea to be spread. This also implies coming up with a name for the approach, but this is made difficult since abandoning grades or any suggestion of this kind seems to be taboo in education. That said, presenting it in this manner makes it easier for educators to understand and more amenable to research.

5.3.2 Recommendations for policy makers. My findings show that provincial mandates restrict the reduced-grades teaching approach. Specifically, they restrict how teachers can justify the approach to their students, and use feedback to support student learning. I would however suspect that student learning is central to many policy decisions. Such is the case for the Growing Success document from the Ministry of Education of Ontario (2010). It is therefore reasonable to suppose that these bodies would implement policies which seek to achieve this mission. Yet, teachers like John and Bob work in circumstances where the implementation of a reduced-grades approach — an approach focused on learning first and foremost — is limited by the same governing bodies which stipulate learning as its main mission. Therefore, I recommend that policy makers from all educational governing bodies make improving student learning their primary motive — if it is not already, and acknowledge that some of their policies obstruct this mission. As such, they should seriously reconsider any existing policies — including but not limited to standardized tests and curriculum learning outcomes — which may impede student learning and therefore make difficult the implementation of reduced-grades approaches to teaching.

5.3.3 Recommendations for teachers. My findings present two different approaches to the reduced-grades teaching approach in the context of high school physics courses. These approaches are implemented under quite different circumstances. Therefore, these distinct approaches may appeal to physics teachers working in a wide range of conditions. But, how these teachers approach feedback for graded assessments and justification is relevant to all teachers.
There is a lot of material here — and even more in the works that I cite — which teachers can use to develop their own reduced-grades approaches to teaching. Presumably, teachers who are reading research of this kind have already begun to re-assess the role of grades in their classrooms. Or better yet, they have already begun using common aspects of the reduced-grades teaching approach. Whatever the case, I implore teachers — especially those teaching high school physics — to implement and experiment with the techniques that have come to light in my research, for the sake of improving student learning. Whether they offer prior practice to or revisions of graded assessments and explain their reasoning for the approach to students or simply lead by example, students will be empowered to make mistakes and fail.

5.4 Areas for Further Research

There are numerous potential areas for further research. Little to no academic research exists about the reduced-grades approach. In order to discover how teachers employ this approach, a research project similar to mine but much greater in scale, would help define the approach and reveal its most pertinent features. Such a project could begin by looking at the features that I have identified: approaches to giving students feedback and justification to students for the reduced-grades approach. Such research could be done to include all reduced-grades approach teachers, and then discuss features particular to certain disciplines, like physics for instance. This information would help define the movement, creating a more digestible whole for educators interested in its potential benefits. Until then, this knowledge is disseminated mainly through anecdotes, by movement leaders and the teachers themselves. A useful step in this direction is a teacher-led research project to be conducted in the Peel District School Board, in 2017-2018.

Once the reduced-grades approach is better understood on a larger scale, it will be necessary to research its effects upon students and their learning. Separate research may already
exist when it comes to giving students feedback and being transparent about grading. However, research about these pedagogical tools needs to be conducted specifically for a context in which the reduced-grades approach is in place. I suspect that the effectiveness of such pedagogical tools, and perhaps many others for that matter, differs in accordance with the use of and emphasis on grades. For that reason, it may be crucial to study the use of these tools in these new contexts.

Provincial mandates undoubtedly influence teaching approaches — the reduced-grades approach is no exception. My research shows how they influence the particular approaches of two high school physics teachers. However, it would be useful to know on a larger scale, how such policies influence teachers who use this approach. Presuming that these teachers are all first and foremost focused on student learning, such research could reveal insight into how these policies undermine student learning in general. This information would be useful for all teachers, but especially those using the reduced-grades approach. Even better, it may prompt policy makers to reconsider existing mandates which obstruct student learning.

5.5 Conclusion

The reduced-grades approach to teaching physics is predicated on giving students feedback through prior practice, revision, or both. Justifying the approach to students is done through explanation, practice, or both. Portfolios are not used. Some similarities and differences exist in comparison to the movement leaders. Existing provincial mandates to some extent compromise the reduced-grades approaches of these teachers. I therefore recommend that policy makers revise their policies to support such pedagogical approaches. Despite resistance, I implore teachers to implement aspects of this approach into their practice. For physics teachers, I recommend adopting strategies outlined in my findings. I recommend that movement leaders agree upon a definition which can be easily spread and consumed. Such a move may lead to more research about the movement,
thereby revealing — among other things — what effects it has on student learning. My research is part of this effort.

Having revealed the reduced-grades approach in the context of high school physics, and having compared them to the existing literature, it is now easier to identify which specific considerations inform its use in these contexts. Physics teachers, such as myself, and all teachers for that matter, are now better positioned to employ the reduced-grades approach in their own practices. Yet, many will no doubt express trepidation concerning admission standards, parental perspectives, administrative perspectives, collegial perspectives, effects on students, and other concerns associated with undermining this traditional practice. But concerns of widespread fallout are not legitimate reasons to dismiss the approach. Bob offers arguments to resolve the issues of university admissions and career prospects, while in their works some of the movement leaders offer strategies for these and other potential issues (Barnes, 2015; Bower, 2013; Sackstein, 2015). Even better, my findings show that it is possible to implement a reduced-grades approach in less than ideal circumstances. It just takes enough bravery and conviction to get started. I too am scared, but my experiences only continue to strengthen my convictions. Many students have been distracted from learning by grades. As teachers, we have the responsibility to promote their learning. Better yet, we have the tools.
References


DeSantis, L., & Ugarriza, D. N. (2000). The concept of theme as used in qualitative nursing research. Western Journal of Nursing Research, 22(3), 351-372.


http://realteachingmeansreallearning.blogspot.ca/2013/05/we-all-decide-weighting-of-our.html


Education Policy. Retrieved November 5, 2015, from

Appendix A: Letter of Consent for Interviews

Date: __________, 2016

Dear (insert participant name),

My Name is Michel Clark and I am a student in the Master of Teaching program at the Ontario Institute for Studies in Education (OISE) at the University of Toronto. A component of this degree program involves conducting a small-scale qualitative research study. My research will focus on discovering the methods particular to high school physics teachers who employ a reduced-grades approach to teaching. I think that your knowledge and experience will provide insights into this topic.

Your participation in this research will involve one 45-60 minute interview, which will be transcribed and audio-recorded. I would be grateful if you would allow me to interview you at a place and time convenient for you, outside of school time. In the case that we live far apart, this interview will be conducted over Skype or some other teleconferencing application. The contents of this interview will be used for my research project, which will include a final paper, as well as informal presentations to my classmates. I may also present my research findings via conference presentations and/or through publication. You will be assigned a pseudonym to maintain your anonymity and I will not use your name or any other content that might identify you in my written work, oral presentations, or publications. This information will remain confidential. Any information that identifies your school or students will also be excluded. The interview data will be stored on my password-protected computer and the only person who will have access to the research data will be my course instructor, Arlo Kempf. You are free to change your mind about your participation at any time, and to withdraw even after you have consented to participate. You may also choose to decline to answer any specific question during the interview. I will destroy the audio recording after the paper has been presented and/or published, which may take up to a maximum of five years after the data has been collected. There are no known risks to participation, and I will share a copy of the transcript with you shortly after the interview to ensure accuracy.

Please sign this consent form, if you agree to be interviewed. The second copy is for your records. I am very grateful for your participation.

Sincerely,

Michel Clark
Appendix A: Letter of Consent for Interviews

Researcher’s Name: Michel Clark

Phone Number: [redacted]

Email: [redacted]

Course Instructor’s Name: Arlo Kempf

Contact Info: [redacted]

Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw from this research study at any time without penalty.

I have read the letter provided to me by Michel Clark and agree to participate in an interview for the purposes described. I agree to have the interview audio-recorded.

Signature: ________________________________

Name: (printed) ______________________________

Date: ________________________________
Appendix B: Interview Protocol

Introductory Script:

Thank you for agreeing to participate in this research study, and for making time to be interviewed today. This research study aims to learn about reduced-grades approaches to teaching in the high school physics classroom, for the purpose of shedding light on this movement and informing my future practice. This interview will last approximately 45 - 60 minutes, and I will ask you a series of questions focused on the aforementioned topic. I want to remind you that you may refrain from answering any question, and you have the right to withdraw your participation from the study at any time. As I explained in the consent letter, this interview will be audio - recorded. If there are any questions that do not pertain to your practice, feel free to let me know and I can move to the next question. If you need clarification for any question, feel free to tell me and I will elaborate. Do you have any questions before we begin?

In the protocol, the word NEST indicates the following line of questioning:

If not…

   Why not?
   Do you do something else instead?
       If not…
           Why not?
       If so…
           What is it, how does it work, and why do you use it?

If so…

   What is your process, how does it work and why do you use it?

Background Information

Tell me a little bit about yourself.

Why did you decide to become a high school teacher?

How long have you been teaching high school?
Why did you decide to teach physics?

How long have you been teaching physics?

**Reduced-Grades Approach**

Is it fair to characterize your approach as focused on reducing the emphasis of grading?

Why did you begin using a reduced-grades approach in your teaching practice?

How and where did you find the information that you needed to implement this approach?

How long have you been using this approach (reduced-grades)?

For which courses do you employ a reduced-grades approach? Why?

How important is the emphasis on reduced-grades for the success of your approach?

Have you worked with any other teachers in developing your reduced-grades classes?

**Justification**

Do you share your views about traditional grading with your students? *NEST*

Do you introduce the concept of reduced-grading to your students? *NEST*

Do you use research to support the move away from grades to your students? *NEST*

Do you do anything to ensure that your students engage with the initiative in the long term? *NEST*

Do you use technology to facilitate this process? *NEST*

**Evidence of Learning**

Do you employ giving feedback as an alternative to grading? *NEST*

Do you use feedback to inform your understanding of student learning? *NEST*

Do you structure the feedback that is provided to your students? *NEST*
Do you formally present the feedback process to students? NEST

Do students receive feedback in different forms? NEST

Do students receive feedback from you during class? NEST

Do students receive feedback from you outside of class? NEST

Do you offer guidance to students while they review their feedback? NEST

Do you teach students to provide feedback using your approach? NEST

Do students have opportunities to offer feedback to one another during class? NEST

Do students have opportunities to offer feedback to one another outside of class? NEST

Do you solicit student feedback about your approach? NEST

Do students have multiple opportunities to submit revisions of their work? NEST

Do you use technology to facilitate any part of the feedback process? NEST

Do you use a feedback process with aspects that are particular to the high school physics classroom? NEST

Do your students maintain individual portfolios of their work? NEST

Do you teach students how to maintain a portfolio? NEST

Do you teach students what criteria to use for their selection of portfolio artefacts? NEST

Do you have students prepare formal reflections to accompany their selected items? NEST

Do you provide students with opportunities to update their portfolios in class? NEST

Do you use technology to facilitate any part of maintaining student portfolios? NEST

Do your students use portfolios with aspects that are particular to the high school physics classroom? NEST

Do you give grades at any point in your class? NEST
Are there any forms of learning evidence that you use beyond feedback and portfolios?

Is there anything else about your reduced-grades approach that you would like to add?

Is there anything in particular about the reduced-grades approach that you would like to add, with respect to high school physics?