STUDENT SELF-ASSESSMENT IN MATHEMATICS AND THE IMPLICATIONS ON LEADERSHIP

KEITH VAN DER MEER

B.Ed., University of Lethbridge, 2008
B.Sc., University of Saskatchewan, 2005

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KEITH VAN DER MEER

Approved:

Supervisor: Richard Butt, Ph.D. Date

Assistant Dean of Graduate Studies and Research in Education: Date
Kerry Bernes, Ph.D.
Abstract

My paper explores the implementation of student self-assessments in junior high mathematics and how this process has impacted my leadership capacity. The intention of the project was initially concerned with the development of student learning; however, the benefits of the process have exceeded this intent. Teacher pedagogy, leadership capacity, and collegial relationships have all been strengthened through this implementation process. Concepts of metacognition, student self-assessment, formative and summative assessment, and effective feedback are discussed as they related to this process. The paper concludes with revelations about my own leadership capacity and how this project has revealed my strengths and areas of growth as a leader.
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Overview

Throughout the entirety of the Master of Educational Leadership program I have struggled with identifying myself as a leader. Having to teach a full schedule has created somewhat of a conundrum; how can I effectively develop my leadership ability without doing so at the expense of my teaching and the learning of my students? In developing an appropriate internship project, I was able to reconcile my dilemma. I made student learning the focus of my project, and through the involvement of other teachers, I was able to develop my leadership capacity. In subsequent sections of this paper I will further detail specific leadership competencies I have fulfilled. I will also reflect on these competencies as they relate to the *Professional Practice Competencies of School Leaders* (PPSCLs) outlined by the Alberta Government (Alberta School Boards Association [ASBA], 2011). The bulk of the paper will reference the specific steps taken in my internship project and how it has evolved over the past 2 years.

The project I chose in fulfillment of my internships for the Masters of Educational Leadership program focussed on student self-assessments in mathematics. The purpose behind the internship was twofold: to develop my leadership capacity and to improve my pedagogy as a mathematics teacher. From a leadership standpoint, the project developed my capacity specifically as an instructional leader. I worked closely with my partner teachers in math providing guidance, support, and insight as my partner teachers and I redeveloped curriculum and teaching methodology. My pedagogy has benefitted as a result of the consistent reflections and adjustments to curricular artefacts by way of increasing student self-assessment.
While the initial mandate of this project was to support and develop my leadership capacity, the affect has not been limited to just me. The work and development my partner teachers contributed resulted in their own leadership capacities increasing, as they have assumed leadership roles within the school. Most recently, all other departments at the junior high school have adopted the work my partner teachers and I have done to increase student self-assessment in mathematics. Each subject teacher has begun to develop his or her own instructional programme to encourage metacognitive thought in the students. In the sections that follow I will detail each stage of the project reflecting on processes and resulting products. I will also explore how my internships have blossomed into a division-wide initiative and the implications this has had on my leadership.

**School Context and my Role**

The school in which I teach specializes in the education of students who have been diagnosed with a learning disability (LD). Class sizes are small, normally six to 10 students, and the focus is on enabling students to achieve their potential despite having an LD. This is accomplished by way of educating students to use accommodations and help them to discover their learning style, strengths, and weaknesses. My role in the school has changed through the course of my master’s program. When I began the program I was teaching junior high mathematics at the Grade 7, 8, and 9 levels. In my second year, I was appointed as the Head of Years (HOY) of the junior high. As a HOY my responsibilities are based heavily in management tasks, such as scheduling, discipline, and reporting. While these management tasks have offered value to my practice, the opportunities for me to expand my leadership capacity have been challenging. My main
obstacle was time. Teaching a full schedule has not afforded me as many opportunities to develop my leadership ability as it has my ability to manage staff. This challenge is truly what helped to shape the purpose of my internship and ensure that leadership, not management, was a large contingent of the experience.

Since assuming the role of HOY I have come to a few realizations regarding my leadership aspirations and the reality I face. The first realization was that the staff I lead are comprised of well-established and very competent educators. Therefore, acting as an instructional leader and supporting their teaching and pedagogy was not how I would be most effective. Second, I have compartmentalized what it means to be a leader. I have tried to concretely define leadership and management as separate entities and failed to understand that this is as ineffective as it is practical. Leadership and management coexist in a delicate dance whereby each faction complements and steps in time with the other. In reflecting on my effectiveness as HOY and a leader to my staff, my ability to manage the junior high has provided my staff with the leadership they require at the current time. That being said, my intentions as an instructional leader have not been wasted. Positive measures have been taken as a result of my leadership project, and these will be discussed in detail later in this paper. The position of HOY and my master’s education have given me greater vision regarding leadership, how I identify myself as a leader, and my leadership style.

**Understanding Self-Assessment: The First Step**

One of my master’s cohort members shared a document with me that he had been using in his Grade 8 mathematics classes to assess students. This rubric, shown in Appendix A, was designed to help his students determine what they understand about
their learning. The pedagogical term aligning most closely with this notion is that of
metacognition, or a student’s ability to assess their own understanding of their learning
(Tanner, 2012). There is an inherent value in having students assess their own learning in
that students are better able to direct their learning. According to VanVelzen (2012),
“When students become more metacognitively knowledgeable about their learning
processes, they tend to learn better” (p. 2).

The idea of students beginning to interact more directly with their own understanding of curriculum was appealing to me because this was not a common practice at my school. Further, introducing this practice could potentially help improve my instructional practice, which appealed to the teacher in me. The opportunity also gave me an avenue to develop my leadership capacity, as I could introduce the concept to other teachers. In preparation to introduce the concept of metacognition and student self-assessment to both the students and my partner teachers in math I needed to know more regarding assessment and how to make it effective within the context of my internship.

The section that follows is my exploration of the literature that relates to the concepts of formative and summative assessment, metacognition, self-assessment, and effective feedback. In the literature review I attempted to make connections between these concepts. I also attempted to highlight what is important in developing practices that will support and promote metacognition and students’ ability to reflect on their own learning. It is also important to acknowledge the residual affects this project has had on improving teacher practice, and this will be addressed towards the end of this paper.
Literature Review on Assessment

How educators view assessment in the classroom will determine the ultimate affect it has on students. According to Brown (2004), assessment can be defined as “any act of interpreting information about student performance, collected through a multitude of means and practices” (p. 304). It is first important to understand assessment as a formative and summative process. Formative assessments are commonly used provide students with indicators of their understanding of curriculum and advice on how to improve. Summative assessments identify to students their overall achievement in a systemic way, usually at the completion of a unit or course of study (Harlen & James, 1997). As these two types of assessment may complement each other, it is important that their purpose and place in the classroom are well understood by educators. Summative assessments offer the ability to make an overall judgement of a student’s understanding of curriculum; however, this is not aligned with the purpose of formative assessment. Black and Wiliam (2010) identified that summative assessments “give teachers poor models for formative assessment because of their limited function of providing overall summaries of achievement rather than helpful diagnosis” (p. 84). Therefore, it is important that teachers develop a clear understanding of the purpose and function of each type of assessment they use in the classroom. In doing this, teachers ensure that the affect assessments have on student learning will be positive and purposeful.

Beyond understanding the differences between formative and summative assessments, teachers face the problems of how to ensure the assessments being used in classrooms are effective. Crooks (1988) identified that while teachers commonly view assessment as an important aspect of student learning, their own inadequacies may limit
the potential that assessments offer to their pedagogy. In this notion the fecundity of student assessment in its capacity to inform and direct pedagogy are lost in favour of a teacher’s feelings of his or her own proficiency. How assessments are used in the classroom can also prove problematic. Heritage (2009) suggested that students need a larger role in the assessment process, as opposed to the teacher being the only one to identify what has been learned and what is still yet to be understood. When students are involved in the assessment process their ability to make judgements about their understanding improves, as does their ability to make decisions on how to improve their learning (Black & Wiliam, 1998; Heritage, 2009; Tan, 2008). However, Black and Wiliam (2010) contested that for students to effectively make judgements about their learning they must first have a clear understanding of what it is they are learning.

In the pursuit of developing metacognitive thought and promoting student self-assessment, teachers must make clear the curricular learning goals or targets in a manner that each student can comprehend (Tan, 2008). Teachers must also have an understanding of self-assessment and a commitment to how formative assessment can be supportive of the process. Andrade, Du, and Mycek (2010) identified, “Self-assessment is a process of formative assessment during which students reflect on the quality of their work, judge the degree to which it reflects explicitly stated goals or criteria, and revise accordingly” (p. 199). VanVelzen (2012) suggested that formative assessments be designed to make learning explicit to the student, promote autonomy, and place a focus on learning and not performance. For teachers to develop formative assessments that will successfully develop students’ abilities to assess their own learning, teachers must first address the formative assessment practices they use in the classroom. It is necessary to
also develop an understanding of formative assessments in terms of feedback. Hattie and Timperley (2007) referred to feedback as “a consequence of performance” (p. 81). Considering this notion, feedback can be understood as a response to a student’s learning and an opportunity to provide insight and reflection that will further engage and develop the student’s understanding. Higgins, Hartley, and Skelton (2001) suggested that feedback should be viewed as a “process of communication” (p. 270). When considered in these terms, feedback becomes a central component to the learning process in that a dialogue exists between teacher and student that facilitates and fosters knowledge acquisition. To categorize feedback, with respect to promoting student metacognition, Cowie and Bell (1999) attested that formative assessment is “the process used by teachers and students to recognize and respond to student learning in order to enhance that learning, during the learning” (p. 101). When feedback is able to accomplish this feat, the door to metacognition is opened and the ability of students to self-assess becomes possible.

When engaging students to take a greater role in assessment practices teachers face the reality that changes to pedagogy must follow (Heritage, 2009). Black and Wiliam (1998) argued that these assessment practices might require “deep changes both in teachers’ perceptions of their own role in relation to their students and in their classroom practice” (p. 20). Effective use of feedback must be then be anchored to an understanding of how to properly use it (Brookhart, 2007). Much of the information students require must be facilitated by the teacher through feedback provided to students on their learning and curricular progress. First, and most importantly, feedback provided to students is highly dependent on the teacher’s knowledge of understanding of
curriculum (Cowie & Bell, 1999). Teachers must be aware of common misconceptions regarding subject matter and the implications this will have on students’ understanding. This knowledge must then be fully weighed in the development of feedback to ensure these misconceptions will not impede the learning process. Second to teachers’ curricular knowledge is their knowledge of the students they teach. Bruno and Santos (2010) suggested that feedback fully benefiting one student might leave another student confused and unsure how to proceed with a learning task. Without an understanding of where each student is at academically, the feedback teachers provide students may not be appropriate. Cowie and Bell (1999) identified that if teachers are not accurately addressing the non-understandings of each individual student, the fidelity of their feedback is compromised as is the potential gain students are to receive being exposed to that feedback. Teachers must then be prepared to make adjustments to their pedagogy in favour of providing assessment information to students that will further enable them to make judgments about their own learning. Peterson and McClay (2010) provided a checklist for teachers to ensure that students are involved in and aware of the development and usage of feedback. In this checklist Peterson and McClay recommended that teachers

- provide students with information about expectations (criteria and goals are clear, exemplars are provided, and teachers collaborate with students in developing assessment criteria);
- facilitate students’ self-assessment practices (guiding students to assess their own work using assessment criteria);
• provide written and oral feedback (talking with students will help students make connections to written feedback provided by the teacher); and
• provide scaffolding to students (assisting students in planning how to use feedback to further their understanding and apply this to future learning).

For students to fully engage with the feedback they have been given, teachers must not only be sensitive to the students’ understanding of the learning, but also their proficiency in using and applying feedback they are given. Providing students with guidance and support and opening a dialogue to allow further interpretation of feedback then becomes a mandate in ensuring students fully engage with and make use of feedback designed to promote self-assessment practices (Black & Wiliam, 2010).

Contextualizing this information as it applies to my internship and the advent of using student self-assessment in math, three key points needed to fully be considered to ensure that the process was successful. The first is that teachers need to have knowledge of students’ ability and understanding regarding the curriculum (VanVelzen, 2012). This notion can often be perceived as an unrealistic ideal, considering typical class sizes are too large for teachers to develop this understanding (Weaver, 2006). However, as class sizes in my school are small (i.e., eight students), understanding each student as an individual learner is a realistic prospect. The second point is that for students to begin to develop the skills necessary to evaluate their learning, feedback provided to them must accomplish three things: make learning goals explicit, identify progress with regards to learning goals, and suggest to students how to proceed from their current level of understanding (Hattie & Timperley, 2007). These elements were considered in the process of redeveloping the math instructional programme and used in building improved
curricular materials. The creation of assignments and assessments referenced artefacts that explicitly communicated to students each intended learning goal. By doing this my partner teachers and I hoped to involve students more directly in the process of their learning and consequently their assessment. Lastly, the idea that teachers’ pedagogy will ultimately require adjustment in the wake of improving assessment needed to be considered in ensuring the success of the initiative (Heritage, 2009). While the teachers in my school are highly competent and established educators, the move to greater student involvement in assessment was largely dependent on their willingness to modify their own best practice. With consideration given to these three notions the direction of my internship was well informed and purposeful. The remainder of this paper will discuss the implementation of student self-assessments and the impacts on my leadership capacity and the pedagogy of the teachers involved.

**Implementation of Student Self-Assessments in Junior High Mathematics: Year 1**

After completing my research the next step was to communicate the information to my partner teachers. I wanted to ensure that the vision I had regarding the self-assessment was clearly stated, and I was also interested in any feedback each teacher had to offer. Townsend and Adams (2009), in their writings about school improvement, stressed the fact that for any professional development initiative to gain ground with teachers there must be some element of participation by the teacher. Townsend and Adams stated that a greater commitment to improving practice would result if teachers were included as stakeholders in the decision-making process from the beginning. Further, Clement and Vandenberghe (2000) suggested teachers develop feelings of control and ownership when they are involved in the process and refinement of a
professional development initiative. These feelings of ownership foster a willingness in
the participants to grow professionally. My intent to involve my partner teachers in the
development of the project was based on these principles. I wanted their input not only
because I value their insight, but also because I wanted them to be involved in the project
as practitioners to help refine and develop the process.

At the beginning, presenting the project to my partner teachers had two different
results. One teacher was highly supportive of the idea and saw intrinsic value in the
concept of increasing the involvement of students is assessment. The other teacher was
warm to the idea, but as the year progressed I quickly observed a lack of interest and
enthusiasm for the project. (I later discovered this had more to do with how I presented
the project and not how the teacher had felt about the project.) The remainder of the year
was devoted to the implementation and refinement of the rubric that was first shared with
me by my cohort member (see Appendix A). The idea behind the rubric was as follows:

1. Students were presented with the rubric at the beginning of a unit of study in
   math. Students could then review the curricular concepts, referred to as
   specific learning outcomes (SLOs), which would be taught in the particular
   unit.
2. The teacher designed assignments and assessments for the unit using the
   rubric as a reference. In these artefacts, curricular concepts are balanced and
   scaffolded through the progression of the unit. In math, concepts tend to build
   upon one another, so it is not prudent to address more complex concepts early
   in a unit until the basics of understanding have first been established. This
   ideal is evidenced in the blacked-out squares in Appendix A.
3. After completing each assignment outlined in the rubric, students evaluated their own understanding using their graded assignments. Students first identified each SLO as it pertained to each individual question on the assignment or assessment. Students then evaluated their understanding of each outcome based on their performance on the learning task. For each SLO, students used a three-point scale to identify if they understood the curricular objective, needed more support with the curricular objective, or did not have a sound understanding of the curricular objective. It was hoped that students who evaluated their understanding and found themselves deficient would be more willing to engage with their learning to close any gaps in their understanding in anticipation of future assignments and assessments.

The basic principles of the original rubric are sound in their intent to promote student self-assessment. First, the rubric provided clear and explicit learning goals that aligned well with Black and Wiliam’s (2010) recommendations of supporting self-assessment in students. Second, the rubric identified which assignments and assessments pertained to each learning outcome in the specific unit of math. When discussing feedback, Crooks (1988) stated that for feedback to be effective it should “focus students’ attention on their progress in mastering educational tasks” (p. 468). The rubric in Appendix A afforded students the opportunity to check their understanding of each learning outcome as they reviewed their performance on each assignment or assessment outlined within the rubric.

Originally, the SLOs used in the rubric were taken exclusively from the Alberta Program of Studies (Alberta Education, n.d.). However, upon reflecting with my partner
teachers there were more skills, albeit assumed by Alberta Education, that we believed were important in offering the students the best chance at assessing their understanding of curriculum at any time during a unit. Appendices B and C are evidence of some of the changes that were made to the rubric following the completion of the Linear Relations unit in Grade 8. Some of the SLOs were deconstructed and redefined to better scaffold the curricular concept. Further, the perseverance qualifiers on the front page were added to the back page to encourage students to reflect not only on what they learned, but how they were learning it (unknown to my partner teachers and me at the time, the idea of how the students were learning had a large impact in the second year of the project).

Each revision my partner teachers and I made to the rubric was a result of many informal discussions regarding students and their learning. The changes my partner teachers and I made were based on our own experiences using the rubric and how the students were able to effectively begin to evaluate their own learning in the classroom. Townsend and Adams (2009), in their study of what makes school improvement work, identified that for professional development to be effectual it must be practiced in context, during the school day. The work that my partner teachers and I had done on the rubrics was a departmental initiative and quite informal up to this point. There was no clear time allotted to my partner teachers and I to develop curricula regarding the rubrics. However, the commitment of my partner teachers, coupled with the fact that this was in-situ professional development, enabled the success of the project. The year ended with a desire for a greater ability of the students to begin managing their own learning with respect to the curricular outcomes - a concept Heritage (2009) referred to as “internal
feedback” (p. 28), or the ability of students to monitor their understanding with less guidance from the teacher.

**Implementation of Student Self-Assessments in Junior High Mathematics: Year 2**

The beginning of the school year came with a lesson in leadership. As I had previously mentioned, one of my partner teachers had not been fully committed to the project, which I had introduced the previous year. As my partner teachers and I began talking about how we were going to rework the rubrics to better enable student self-assessment, my partner teacher expressed she felt like she was being told what to do. Townsend and Adams (2009) cautioned that when teachers are given specific mandates regarding professional development the result is most often disengagement with the process and a failure to follow through. My intention from the beginning was to involve both my partner teachers in the project; however, in doing so I appealed to only one of them. I took for granted that both teachers had identified as stakeholders in the initiative when one clearly did not. This was truly a lesson worth learning, for, as a leader, the appeal I will have to my staff will never be uniform. I now believe a good leader must be considerate of this and adjust his or her leadership practices accordingly. I was fortunate that my partner teacher was willing to vocalize her displeasure with her perceived role within the project. Without doing so I may never have gained this insight and, more importantly, my partner teacher’s commitment to the project in the second year may not have been achieved.

Moving forward, my partner teachers and I wanted to focus on to make the rubrics and instruction more impactful on student learning and understanding. Research by VanVelzen (2012) supported the notion that effective assessment focuses on students
learning more than it does on student performance. The concept of metacognition, or the “awareness or analysis of one’s own learning or thinking processes” (“Metacognition,” 2013, “Definition,” para. 1), was a new area of focus in targeting the learning process rather than the learning product. Perkins and Salomon (1989) identified that when students learn how to analyze their own thinking they “monitor and direct their own progress, asking questions such as, What am I doing now, Is it getting me anywhere, [and] What else could I be doing instead?” (p. 20). My partner teachers and I set a goal to enable students to effectively ask these questions of their learning and have the ability to begin to answer them independently. When a student is able to think metacognitively, the potential benefits stretch beyond the classroom and offer students the ability to learn and succeed in any environment (Tan, 2008; VanVelzen, 2012).

The first development that was made to the rubric was coupling major assessments, such as unit exams, with a formal test evaluation, as depicted in Appendix D. Subsequently, the rubric was amended to work in harmony with the evaluation document. The unit test column of the rubric was expanded from one column to three columns (see Appendix C). This provided students with the ability to assess their understanding of each SLO outlined in the rubric in comparison to their achievement on the unit exam. Students identified how many items they understood and how many they struggled with for each SLO as they worked through the summative assessment. Student then made an assessment about their understanding regarding each particular curricular concept. The guiding principle behind this amendment was to encourage students to reflect on their understanding as a result of the work they had put into reviewing for summative assessments in each unit. In principle this seemed to be very logical, but
through discussions with my partner teachers and through evidence of student
teachers and I developed another self-assessment document that complemented the
rubrics and aimed to focus on students’ learning behaviours. The purpose of the
document was to encourage students to reflect on how their learning behaviours impacted
their achievement in math. The document, as seen in Appendix E, breaks down learning
behaviours into four categories: homework and assignments, in-class behaviours,
accommodation usage (as we are an LD school), and self-reflection practices. Each
section further divided into three subsections that function to encourage each student to
reflect on their learning behaviours, both inside and outside of the classroom. My partner
teachers and I designed the document with intent; it is appropriately referred to as the
“reflection bulls-eye,” as each student is encouraged to exhibit the behaviours closest to
the centre of the page. Introduction of this artefact into the classroom did not produce the
results I had hoped. Students were quick to highlight a section, usually in the middle of
each category, and submit the assessment back to the teacher. When asked about the
reflection, most students were unable to justify why they selected the qualifiers they did.
The reason students had such little insight was that the consideration they were giving the
document was a surface response—there was no deep thinking involved. Upon further
consideration, comment boxes were added to the bulls-eye, as shown in Appendix F. The
reflection document now asked students thought provoking questions that required deeper
thinking as they assessed their learning behaviours. In turn, more time was afforded to
students to complete the bulls-eye assessment; as a result, students dedicated more attention and detail to the process. It is important to note that my partner teachers and I were sensitive to the fecundity of this document to support metacognitive thought. My partners and I felt that by presenting the bulls-eye assessment for each unit would dilute the effectiveness in developing self-awareness in each student. As a result, students completed the bulls-eye assessment four times during the year, once for each mathematical strand of learning.

While the revisions to the reflection documents are a seemingly endless exercise, the process of these revisions is what has been the most rewarding. Townsend and Adams (2009) stated that effective teachers “know how to assess their own teaching” (p. 109) and use these findings to “select, develop, and implement their own professional development activities” (p. 109). Looking back on the progress and developments to the self-assessment rubrics, I would argue that by virtue of these refinements my partner teachers and I have modelled effective teaching. While the focus of my project has always been on student learning, there has been an unavoidable affect on my pedagogy, and that of my partner teachers. The assessments, feedback, and understanding of the students my partner teachers and I teach have improved and developed throughout the entire process. Perhaps this is best phrased by Lambert (2009) who attested, “When people learn themselves through change, they commit themselves to the outcome” (p. 113). The commitment Lambert referred to has been personified in the time and energy my partner teachers and I have put into this process.
**Student Self-Assessments as a Division-Wide Initiative**

In their writings, Townsend and Adams (2009) explored the concept of collaborative leadership as it applies to schools. These authors suggested that effective leaders “view the collaborative inquiry process as an opportunity to develop the talents of others” (Townsend & Adams, 2009. p. 71). This statement has been a guiding principle in how I have approached the teachers in my division. As I have already mentioned, teachers at my school have a wealth of experience and pedagogical talent. Experience can be both a blessing and a curse to leadership, as it can seemingly position a teacher as unmoving in his or her pedagogical practice. The belief teachers have in their own pedagogy is based on their success as an educator through the duration of their career. It can become difficult for a leader to enact change as the “feet” of a teacher’s pedagogy are cemented in stone and unable to progress forward. The collaborative work I have done within my subject area has not only been a positive example to the staff at my school, it has also developed the leadership capacity of each of my partner teachers. I felt that if my partner teachers had a large role in communicating the results of this work, they would not only demonstrate their capability as leaders to the staff, but also model the collaborative nature that has enabled so much growth and development in their own pedagogy. Generally speaking, if my partner teachers provided evidence that they were moving their pedagogy forward, the rest of the staff could be inspired to do the same.

In anticipation of sharing the work we had done using student self-assessments in mathematics, I reflected on the culture of the junior high teachers. I wanted to ascertain what would be most appealing to the staff regarding the concept, and how best to involve them in the process to ensure their support of the initiative. Bush (2011), in his
exploration of leadership models, identified that the schools that encompass a cultural model have members who share a common set of values. Teachers at my school are highly aligned in their vision as a result of a commonly held mission to be the leaders in individualized instruction of LD students. There also exists a healthy level of competition amongst staff members in pursuit of this end. The principles underlying student self-assessments are to improve student learning and understanding. With consideration given to the mission of being the leaders of LD instruction, introducing this concept to the staff had great potential to be successful. Exploring cultural models, Bush (2011) cautioned that there is a danger in imposing ideals on teachers in pursuit of a monoculture. This imposition of ideals may act to subvert teachers and staff who do not hold similar values. As a result, the support of these teachers is lost and the ideals originally purported by leadership may now be a misrepresentation of what the school truly stands for. I saw the idea of a monoculture as something that would help support the student self-assessment initiative. I believed that the underlying ideals inherent in this project were completely aligned with those held by the staff. Therefore, the monoculture that already existed in the junior high was complementary to this initiative, and the next logical question was how best to unroll the concept to ensure acceptance by all staff members.

My main concern in presenting this work to the staff was to ensure the role my partner teachers had in the process was significant and impactful. I saw tremendous leadership capacity in each of my partner teachers, and I wanted to ensure this was given appropriate consideration. In his writings on leadership, Hargreaves (2009) identified that for change to occur in schools and be effective, leadership driving the change must
embody certain principles of sustainability. One such principle is that the leadership needs to be distributed. Hargreaves asserted,

The promise of sustainable success in education lies in creating cultures of distributed leadership throughout the school community, not in training and developing a tiny leadership elite. In the contextual realities of high expectations, rapid change and a youthful profession in the first decades of the twenty-first century, teachers cannot be the mere targets of other people’s leadership, but must see themselves as being, and be encouraged to be, leaders of classrooms and of colleagues. (p. 193)

Involving my partner teachers as leaders in the process would create the potential for sustainability of the initiative. Further, presenting this project’s progress to the junior high would position each of my partner teachers as leaders within the classroom, but more importantly as leaders amongst their peers.

The last important consideration was when to approach the staff with the concept of using student self-assessments to improve learning and understanding. The intended goal was for teachers to internalize the information that was presented regarding self-assessment and make sense of it as it applied to their own pedagogy, a concept Townsend and Adams (2009) referred to as “constructivist professional development” (p. 86). Further, I wanted to ensure that each teacher had the available time and space to examine his or her own assumptions regarding self-assessment and was afforded the opportunity to participate in collaborative learning with their peers. I also was highly sensitive to what Townsend and Adams (2009) identified as the major barriers to effective
professional development, which included lack of awareness, stress, distrust, fear of failure, competing demands, and impatience and pessimism.

**Lack of Awareness**

Teachers’ willingness to develop their pedagogy can be compromised when they are not fully appraised on the inherent value or educational merit of the activity in question. In response to this barrier I ensured that I presented current research and information regarding the benefits of student self-assessment and promoting metacognitive thinking in the classroom. It was my hope to connect relevant theories to the practice of self-assessment that my partner teachers and I had undertaken in mathematics thus far. Involving my partner teachers directly in communicating the project work to the staff was also effective in purporting the educational value of the project. Having partner teachers describe their experiences and successes with student self-assessment further supported the validity of employing the student self-assessments across the division.

**Stress**

Tensions arise when teachers are handed directives from administration and told to put them into practice. While my intent was for each teacher to develop a unit of curriculum that hinged on student self-assessment, I also made clear that how they developed the unit may be highly independent from how it was accomplished in mathematics. I felt that affording teachers more creative control of the initiative might better incite their willingness to participate.
Competing Demands

The notion that teachers have many responsibilities in the confines of their day poses a challenge for effective professional development to be sustained over a period of time. Another professional development session on technology was scheduled on the day my partner teachers and I were to share the project with the staff. In addition, students had just completed midterms and teachers were responsible for marking the assessments and communicating these results to parents. There were already two other important events that would be competing with the professional development my partner teachers and I intended to present. In anticipation of these conflicts, I had secured additional time for teachers to develop their units of study later in the week. Staff appreciated the extra time, and this had a large impact on their commitment to the process.

Impatience and Pessimism

Almost every school experiences periods when teachers struggle with the improvement process. According to Fullan (2001), this process is known as an “implementation dip” (p. 40) and can be described as “a dip in performance and confidence as one encounters an innovation that requires new skills and new understandings” (p. 40). Rogers (2003) stated that for any innovation to gain acceptance it must move through a process by which “(1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system” (p. 11). Appendix G shows a depiction of Rogers’s innovation model; it can be seen that early adopters have a significant role in the process of the acceptance of an initiative. In consideration of this fact, it was my intention to target teachers in each subject area of the junior high prior to involving the entire staff. Approaching teachers prior to unrolling the
self-assessments secured some early adopters in the attempt to create a base of acceptance of the initiative.

Following the presentation of the project I was pleased to see the majority of teachers committing to the process. Most teachers were excited to develop their own units using methods similar to those discussed. In reflection, the work I had done to disarm the barriers to professional development that Townsend and Adams (2009) had warned about was fruitful. Junior high teachers were confident that the work they were doing was beneficial to student learning. Each teacher felt supported and was provided the time and space necessary to do the work. The opportunities to collaborate amongst subject areas were well received and further incited a desire imbed self-assessments into their own pedagogy. Those teachers I had approached prior to the presentation were surprisingly vociferous in their support of the project, which further fuelled the willingness of a common acceptance of the initiative. Only one teacher did not come as quickly to process as most others. However, the tireless efforts of my early adopters have since developed enough understanding of how student self-assessment can be beneficial that this teacher has committed to the process. Overall, I am surprised how well the initiative has been embraced by the entire junior high staff. I credit much of this success to my partner teachers who were the true early adopters of the initiative. Through their commitment to improving pedagogy and willingness to modify their own practices they have been role models to the entire division and the enactors of change.

My Leadership Competencies in Accordance with the PPCSLs

The PPCSLs (ASBA, 2011) are a list of indicators that are designed to meet three major requirements:
a. identify the basic competencies for effective school leadership, applicable in all Alberta school contexts;
b. frame a school leader’s career-long responsibility to fulfill the essential purpose of educational leadership; and
c. facilitate province-wide consistency in school authority policies and processes for school leader professional growth, supervision and evaluation. (pp. 2-3)

These competencies are the result of an Alberta advisory committee initiative to develop a leadership framework that will “improve school leadership in Alberta, contribute to the resolution of school leadership workforce issues and achieve the Framework vision” (ASBA, 2011, p. 1). Along with their respective indicators, these competencies have had a large influence on how I have viewed myself as a leader. As the document is principally designed to reflect the attributes of good leadership, my intent has been to model these attributes in my own leadership practice. Of the seven competencies outlined in this document, I have chosen to focus and reflect upon four (Competencies 1, 3, 4, and 5), as they have applied to my internships and the introduction of student self-assessments in the classroom.

Professional Practice Competency #1: Fostering Effective Relationships

To meet this competency, “a school leader must build trust and foster positive working relationships within the school community on the basis of appropriate values and ethical foundations” (ASBA, 2011, p. 4). Through the process of collaborating with my partner teachers and later with the entire junior high staff, my internship has created many opportunities to foster and develop positive working relationships. The following is listed as a specific indicator for this competency: “A teacher . . . models and promotes
open and collaborative dialogue” (ASBA, 2011, p. 4). The refinement process to ensure that the rubrics were meeting the needs of each student was dependent on open dialogue rooted in collaborative practice amongst teachers. The professional relationships that have evolved out of this process were by no means the intention of my project, but are a result nonetheless. The entire process has also proved enlightening, as it has highlighted how important positive relationships are in professional development and school improvement initiatives. Despite the validity of a professional development initiative, relationships between staff members are large determinants in the propensity for change. While I have not made this competency my primary focus, reflecting on my experience has positioned this competency in the forefront of my leadership intentions moving forward. I highly value positive relationships as a teacher, but have a greater awareness of their significance from a leadership standpoint.

**Professional Practice Competency #3: Leading a Learning Community**

To meet this competency “a school leader must nurture and sustain a school culture that values and supports learning” (ASBA, 2011, p. 5). I believe this competency to be the one that is most reflective of the work that I have accomplished during the last 2 years of my master’s internship. Indicators of this competency included that an effective leader “fosters a culture of high expectations for students” (ASBA, 2011, p.5) and promotes this concept as a “shared responsibility amongst staff” (ASBA, 2011, p. 5). Another indicator identified that effective leaders must facilitate “meaningful, collaborative professional learning for teachers and other staff” (ASBA, 2011, p. 5). The original conception of student self-assessments in mathematics was a result of my own desire to promote and develop student learning. I further involved my partner teachers in
the process, supporting the notion of making student learning a shared responsibility. Recognizing the inherent value in the project, the next logical step taken was to include the entire division. As I have already discussed in reflecting on the culture of my school, I wanted the process to be highly collaborative. Collaboration would ensure teachers felt supported but more importantly that the process would be a positive and meaningful experience. As a leader I feel highly competent with regards to this competency. My capacity as a leader with regards to the competency of “leading a learning community” (ASBA, 2011, p. 5) has been reflected in the work I have done with my partner teachers. The project has been successful and thus so has my growth as a leader.

**Professional Practice Competency #4: Providing Instructional Leadership**

To meet this competency “a school leader must ensure that each student has access to quality teaching and the opportunity to engage in quality learning experiences” (ASBA, 2011, p. 6). Within the framework of developing student self-assessments in mathematics I felt that this competency would be most reflective of my leadership. However, through evaluating myself against indicators underlying this competency, I have found much room for my growth as a leader in this capacity. My knowledge of curriculum is limited as I have been limited in the subject areas I have taught. Further, my knowledge of appropriate pedagogy, as it relates to student learning, is an area of growth. While my internships are based in the intention to improve pedagogy, they also indicate how much development I still need in my own teaching practice. As I focus more on this competency I am confident in the support I have available to me at the school. As a leader I believe that while it is important to exhibit qualities of formal leadership, being a leader also means being a good student. I have much to gain from the
expertise and experience of the teachers in my school. Through collaboration and
distributive leadership practices regarding curriculum and instruction, I have great
opportunity for growth and development in my own leadership regarding this
competency.

**Professional Practice Competency #5: Developing and Facilitating Leadership**

To meet this competency “a school leader must promote the development of
leadership capacity within the school community for the overall benefit of the school
community and education system” (ASBA, 2011, p. 6). When the concepts of student
self-assessments were introduced to the junior high, my partner teachers played an
important role in the process. While I spoke to the staff about the research behind
metacognitive thought and assessment, my partner teachers spoke about the development
of the rubrics, how the artefacts have been used in the classroom, and their experiences
using self-assessments with their students. I was encouraged to see how much their
expertise has been sought since the presentation and how involved there are in
spearheading the initiative. I would have never thought that in my role as a HOY I would
be able to reflect on this competency of developing leadership. However, I feel that I
have satisfied many indicators of this competency as it has applied to my internship. As
a result of this project, my partner teachers have also positioned themselves as
instructional leaders; they have demonstrated to the staff their commitment to lifelong
learning and improving the learning of the students they teach.

**Summary of Professional Practice Competencies**

I feel that referencing the aforementioned PPCSLs (ASBA, 2011) and comparing
their indicators to my leadership capacity has allowed me not only to grow as a leader,
but also to recognize my capacity as a leader within my school. Balancing a teaching schedule and the designation of HOY of the junior high does not always offer the opportunity to reflect on leadership. However, I found that having a copy of the PPCSLs on hand allowed this reflective practice to occur. In consideration of specific indicators and outcomes of the document, I am better equipped to recognize my own leadership practice and ensure that I am taking measures to improve my capacity as a leader within my school.

**Reflection on Leadership Styles**

As I have progressed through the Master’s of Educational Leadership program I have had the tendency to compartmentalize leadership styles. As I have explored different styles of leadership I have always juxtaposed them to myself in an attempt to identify with a single type of leadership that I most embody. Early on I favoured the idea of what it meant to be a pacesetter leader. Goleman (2000) identified a pacesetter as “a leader [who] sets extremely high performance standards and exemplifies them himself. . . . He quickly pinpoints poor performers and demands more from them” (p. 86). Goleman further indicated that while there may be a need for this kind of leadership at times, this approach is ultimately unsustainable, as it eventually ruins the climate of a school. I believe I identified with this notion of leadership as a result of the experience I had working under a principal who exhibited pacesetter qualities. As a teacher, there was always an urgency to do more at the school and do it better. This drive appealed to me on many levels. I saw the potential for what could be done to improve student learning, and I was not afraid to put in the time and effort to improve my own practice. Looking back, however, I would agree that this type of leadership seemed to exhaust people and
foster feelings of resentment towards administration. This leadership style is also accompanied by a culture of fear. As Goleman (2000) stated, “If they [teachers] don’t rise to the occasion, he [the principal] replaces them with people who can” (p. 86). While the notion of being easily replaced may provide a vehicle for increased output, it ultimately will result in a negative school culture that will not be supportive of student learning and improvement.

Despite the potential negative outcomes of pacesetting leadership, I continue to value hard work and dedication. Through exploring the fundamentals of transformational leadership I found many appealing characteristics of leaders typifying this style. I could identify with these characteristics, as they related to my own philosophy. While transformational leadership lends itself most readily to schools in need of restructuring or change (Leithwood & Jantzi, 2009), I felt that although my school was established, the demands that LD education places on teachers aligns well with the notions of change and restructuring practice. As Leithwood and Jantzi (2009) identified, transformational leadership “focuses as much or more on building the capacity of staff as on motivating them” (p. 46). Reflecting on my internship I could see these ideals personified in the work that I had done with my partner teachers. Their capacity regarding the fundamentals of student self-assessment and metacognition was developed and, as a result, their motivation to improve teaching practice followed. Leithwood and Jantzi (2009) further stated, “A critical aspect of transformational leadership is helping staff develop shared understandings” (p. 46). Bringing together the junior high teachers to discuss the work that my partner teachers and I had been doing in mathematics opened the door to collaboration. Having my partner teachers speak about the work they had
done modelled to the remaining staff this collaboration, but also developed a shared understanding of the potential for benefitting student learning.

While my internship involved a restructuring of curriculum and teacher instructional practices, to identify it as an endeavour based solely in principles of transformational leadership would be limiting. As I reflected on the leadership that was present in my practicum, it became apparent to me that more than one theory has worked in concert with others in enacting change and developing teacher pedagogy. The work in my internship is focussed on improving student achievement. By this notion it was not hard to gain the support of my partner teachers as well as the entire junior high, as the fundamentals of teaching and instruction are deeply rooted in student achievement.

Southworth (2009), in his exploration of learning-centred leadership, asserted, “Leadership becomes more potent when it focuses on developing students’ learning and strengthening teaching” (p. 93). It seems too simplistic to connect effective leadership with student learning, but my internship has clearly revealed this fact to me. My capacity as a leader has been strengthened by my resolve to improve student learning and to involve the junior high staff in the process. I am also aware of the time and work that first had to be put into this project to ensure that it was practical and sustainable.

However, the project’s outcome supports the assertion that leadership based in student learning is supported and sustainable.

In introducing my internship project I asked the staff to redesign a curricular unit of study that incorporated the fundamentals of self-assessment. My concern was that I did not want this request to be received as a directive. Lambert (2009) contended, “Hierarchical power relationships invite dependencies and limit the brain’s power to
learn well” (p. 115). It was my intention that the staff felt they were equal participants in a process of development rather than the subjects of a change directive within the school. Providing the staff opportunities to collaborate along with facilitating an open dialogue helped to develop a support system that was resolved of dependencies on my leadership. Lambert (2009) also identified, “When people learn themselves through change, they commit themselves to the outcome” (p. 113). My internship project relied on Lambert’s notion that if teachers could develop their own understanding of how to use these self-assessment documents in their classrooms then they would be more inclined to use them. Constructivist leadership theory can be attributed to how I approached my second internship. While elements of pacesetting may have preempted the process through identifying to my partner teachers the potential benefits and uses of student self-assessments, the remainder of the process has truly been a collaborative endeavour. In the constructivist approach Lambert (2009) offered the idea that “change is a process of learning together” (p. 124). Without the insights from my partner teachers, along with developments from other staff members, the fecundity of the self-assessment artefacts would not be nearly as beneficial to student learning.

Reflecting on the process of my internships, I have developed a better understanding of my own leadership style. Initially, my intent was always to classify myself as being a single type of leader. When sitting in a classroom and reading a textbook this made sense to me. My internships have afforded me the opportunity to recognize that no one single style of leadership can define a leader. Each new situation that requires leadership, as in the case of my internship, asks a leader to exhibit numerous traits. These traits must respond to and address the needs of staff and students to build
and develop capacity of the entire organization. In the case of my internship, philosophies of transformational, constructivist, and learning-centred leadership were employed in the ultimate goal of improving teacher pedagogy and student learning. Ensuring that student learning was the focus of the project appealed to teachers’ pedagogy and inspired their commitment. Co-constructing knowledge through collaborative practices solidified teachers’ dedication and also evoked a common understanding of the purpose of the initiative. Lastly, the fact the internship sought to develop the capacity of my partner teachers and the entire staff of the junior high contributed to improving the entire school community. Overall, the fundamentals of differing leadership styles worked in unison to help ensure that the project was successful. Through this process I was able to better identify with my own leadership style and focus on the areas that have enabled me to be successful as a leader.

**Conclusion: Internships and Impacts on Leadership**

The internships I have completed in fulfillment of the requirements for my master’s degree have provided valuable insights regarding my leadership capacity in addition to improving my pedagogical practices. Developing student self-assessments in mathematics began as a project originally intended to serve as a balance between my role as a teacher and leader at my school. I did not want to compromise my teaching at the expense of pursuing a leadership initiative outside of my everyday practice. What was not clear to me at the time was just how impactful this process would be on developing my capacity as a leader. Through the development and implementation of student self-assessments, many of the decisions I made and the steps that I took were a reflection of my capacity as a leader. My reflections allowed me to take into consideration potential
problems and situations that might have negatively impacted the process. Through the education I received, I was able to guide the process in directions that contributed to the ultimate success of the project. Understanding leadership theory as it applies to practice, having experience with this practice, and reflecting on the results has been invaluable in my growth and development as a leader. Beyond this notion, the work that I completed throughout my internships evolved into something that could potentially impact pedagogy outside of the junior high school at which I work. The project has been so successful many teachers are excited about the prospects of sharing the self-assessments with other professionals outside of their network. As I consider this commitment, I can honestly feel confident in the work my fellow teachers and I have done, and the leadership I have provided through the duration of the process. What started as a project intended to improve my own pedagogy has developed into something that impacted so many more people; leadership has been distributed among junior high teachers, efficacy in their instructional practice has increased, and my capacity as a leader has grown.

Fullan (2001), in his exploration of leadership, asserted that all leaders must be cognizant of the fact that the effectiveness of a leader will not rely on “who you are as a leader but by what leadership you produce in others” (p. 137). As I reflected on my leadership practice and the internships I have completed, the value of Fullan’s statement cannot be understated.
References


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doi:10.1080/02602930500353061
Appendix A: Original Assessment Rubric

Grade 9 Math Unit 2 Powers

SLO 1 – I can write a power in expanded form and standard form
SLO 2 – I can solve expressions involving powers
SLO 3 – I can multiply powers with the same base
SLO 4 – I can raise a power to an exponent
SLO 5 – I can divide powers with the same base
SLO 6 – I can apply the power rules to negative exponents
SLO 7 – I can apply the power rules to scientific notation

Perseverance (P) (1) When I found things difficult, I thought about it, struggled and then found success
(2) When I found things difficult, I thought about, couldn’t figure it out so I asked for help
(3) When I found things difficult, I immediately asked for help without trying myself first

<table>
<thead>
<tr>
<th>Name:</th>
<th>Exponents, WS 1</th>
<th>Product of Powers, page 2</th>
<th>Power of Power, Top of page 2</th>
<th>Power of Power, Bottom of page 2</th>
<th>Quotient Rules</th>
<th>Negative Exponents</th>
<th>Scientific Notation</th>
<th>Option Review</th>
<th>Unit Test</th>
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<tbody>
<tr>
<td>SLO 1</td>
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## Appendix B: Redeveloped Rubric

<table>
<thead>
<tr>
<th>SLO 1: I can identify the variable, coefficients, and constant in an algebraic expression</th>
<th>Problem Solving #1</th>
<th>Quiz</th>
<th>Problem Solving #2</th>
<th>Unit Exam</th>
</tr>
</thead>
</table>

| SLO 2: I can model algebraic equations using tiles and scales |
| --- | --- | --- | --- | --- |

| SLO 3: I can solve algebraic equations using tiles and scales and algebra |
| --- | --- | --- | --- | --- |

| SLO 6: I can use the distributive property to expand and solve algebraic equations |
| --- | --- | --- | --- | --- |

| SLO 7: I can distinguish a linear relationship from a non-linear relationship |
| --- | --- | --- | --- | --- |

| SLO 8: In the linear equation \( y = mx + b \) I can explain the effect \( x \) has on \( y \) and successfully graph the equation using a table of values |
| --- | --- | --- | --- | --- |

| SLO 9: I can solve word problems involving formulating equations from word cues using GRASP. |
| --- | --- | --- | --- | --- |

### P - Perseverance

1. When I found things difficult I thought about it, struggled and then found success
2. When I found things difficult I thought about it, couldn't figure it out so I asked for help
3. When I found things difficult I immediately asked for help without trying myself first
# Appendix C: Further Developed Rubric

## Grade 8 Unit 4 Linear Relations

<table>
<thead>
<tr>
<th>Name:</th>
<th>Problem Solving Quiz</th>
<th>Problem Solving #2</th>
<th>Unit Exam</th>
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</thead>
<tbody>
<tr>
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<td>SA</td>
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<td>✓</td>
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</table>

### SLO 1: I can identify the variable, coefficients, and constant in an algebraic expression

### SLO 2: I can model algebraic equations using tiles and scales

### SLO 3: I can solve algebraic equations using tiles and scales of the form below:
- \( ax = b \)
- \( ax + b = c \)
where "a", "b" and "x" are integers either positive or negative.

### SLO 4: I can solve algebraic equations without tiles of the form below:
- \( ax = b \)
- \( \frac{x}{a} = b , a \neq 0 \)
- \( \frac{x}{a} + b = c , a \neq 0 \)
- \( ax + b = c \)
- \( a(x + b) = c \)
where "a", "b" and "x" are integers either positive or negative.

### SLO 5: I can verify my answers to algebraic equations using substitution

### SLO 6: I can use the distributive property to expand and solve algebraic equations

### SLO 7: I can distinguish a linear relationship from a non-linear relationship

### SLO 8: In the linear equation \( y = mx + b \) I can explain the effect "x" has on "y" and successfully graph the equation using a table of values

### SLO 9: I can solve word problems involving formulating equations from word cues using GRASP.

## P- Perseverance

1. When I found things difficult I thought about it, struggled and then found success
2. When I found things difficult I thought about it, couldn't figure it out so I asked for help
3. When I found things difficult I immediately asked for help without trying myself first
Appendix D: Test Evaluation

NAME______________________ TEST: Unit 4 – Linear Equations & Graphing DATE____________________

Mark that I earned on this test ___________________________ Multiple Choice /15
Mark that I could have got on this test _________________ Short Answer /25

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<tr>
<th>Question #</th>
<th>Marks lost</th>
<th>Concept</th>
<th>Didn't know how to do it</th>
<th>Careless mistake</th>
<th>Read question wrong</th>
<th>Didn't show enough work</th>
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"True genius resides in the capacity for evaluation of uncertain, hazardous, and conflicting information"  
- Winston Churchill
Appendix F: Redeveloped Self-Assessment Bulls-Eye

Note: this handout included the bulls-eye diagram presented in Appendix E along side the figure presented below.

<table>
<thead>
<tr>
<th>Homework Assignment and Completion</th>
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<tbody>
<tr>
<td>Have I completed all assigned tasks? Did I complete these tasks on time? Did I study for exams and quizzes? What did I do to study?</td>
<td></td>
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</table>

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<thead>
<tr>
<th>In Class Behavior and Attitudes</th>
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<tbody>
<tr>
<td>Do I exhibit a positive attitude to learning? Do I work respectfully with others? Am I on task?</td>
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</table>

<table>
<thead>
<tr>
<th>Use of Accommodations</th>
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<tbody>
<tr>
<td>Do I understand my strengths and weaknesses? Do I ask for help (appropriately during class time, and during extra help times if needed)? Do I use appropriate accommodations?</td>
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<table>
<thead>
<tr>
<th>Self-Reflection</th>
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<tbody>
<tr>
<td>How have I used the feedback given to me in this unit? What can I do to improve in the future?</td>
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</table>

| Teacher Comments |  |
Appendix G: Interpretation of Rogers’s Model of Innovation