

An Action Research Study Exploring the Effects of Project-Based Learning
on the Engagement of High School Spike Students

by

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Abstract

PBLearn is a new project-based program designed to re-engage Grade 11 students in academic learning over one semester away from their home schools. This evaluative action research study monitored the program over one semester to: a) evaluate its impact on student engagement, content acquisition, and skill development; b) identify the characteristics of students best-suited for the program; and c) provide feedback for improving the program. Literature pertaining to student engagement, constructivism, project-based learning, and student learning characteristics helped to inform the study and interpret the results. Data were gathered through surveys, interviews with students, parents, and teachers, as well as through observation and examining student records. Data sets suggest a positive impact on learning engagement through increased participation stemming from exploration of student interests, challenge, and an inviting learning environment. Students with the desire to pursue a topic of interest, a growth mindset, and the ability to work independently appear best suited for the program. Learning gains occurred for: ELA, Career Exploration, various areas explored through project work, skill development with the 6 Cs, and personal skills. Suggested action involves minor revisions to the program for further flexibility, accountability, project options to mirror student needs, and increased opportunities for reading and mentorship. The program should be promoted and recruitment efforts are needed to identify students best suited for the program. Improvements are also needed in transitioning students back to their home schools.

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Chapter 1: Introduction and Overview

As a child, I loved going to school. Although I loved it as much because it was a place to spend time with friends and for the gymnasium in which I played many sports for many hours, I also enjoyed my time spent in the classroom. Not every minute, or even every subject area, mind you, but in general when I was at school I was positively engaged in what I was doing. Like most teachers, this no doubt influenced my decision to continue spending my time in schools as an adult. Because of my own experiences in school, it is sometimes hard for me to understand that some students don't see school in the same, positive light. And although most students in Canada attend, feel a sense of belonging, and participate at school, fewer than half consider their courses to be interesting or relevant to their everyday lives (Willms, Friesen & Milton, 2009). To try to increase this number, those of us in the teaching profession are constantly reviewing our teaching practices and the learning environments that we create for students in our classrooms and schools. And while we succeed from time to time, it seems that it is difficult to drastically alter the learner engagement statistics within the existing educational environment. Perhaps this situation is signalling the problem.

Proponents of alternative educational settings suggest that "we need to bust things up (rather than) just tweaking around the edges" (Littky & Grabelle, 2004, p. 163). Having explored some similar programs that seem to be effective, a large urban school division in Western Canada now offers an alternative program in which students are immersed in a Project-Based Learning (PBL) environment for an entire semester. The new program, referred to in this study as *PBLearn*, was launched in September, 2015. Selected students, who in many cases were not excelling in the traditional environment of their home schools, spent one semester working in a

new environment, and with many of the formal structures of the traditional model altered or removed altogether. The hope is that this environment will be more engaging for the students and will thus be one that nurtures their development of valuable and relevant knowledge, skills, and abilities that will serve them as students and as citizens beyond their time at school. I have been an interested “passenger” on this journey over the last year of its development. My study involved monitoring its progress during the first year of the program implementation and providing critical feedback to inform future iterations of *PBLearn* as well as further alternative programming that it might help to spawn.

Context of the Study

Setting. *PBLearn* is being hosted at an urban high school in a large city in Western Canada. This high school was chosen primarily due to availability, given that the school population has been well below its capacity for a number of years. The current student population is around 250 students, whereas it was over 400 only 15 years ago. Like many of the public high schools in the school division, there is a disparity in the socio-economic backgrounds of the families living within the boundaries. About three-quarters of these families would earn lower-middle incomes or below. More than ten percent of students are living in the care of group homes or a similar environment, and the school offers a breakfast program every day for those in need. In contrast, nearly one-quarter of the population lives in a relatively affluent community very near the school. Cultural diversity is equally wide-ranging, with students of Indigenous descent composing one of the largest subgroups comprising nearly 20 percent of the total student body. As a result of the size and backgrounds of the student population, educators have added a number of specialized programs in recent years. These include a program for

teenage mothers, one for students involved in the justice system, a program for students with autism, and a co-operative education program for students with cognitive challenges. Within its more traditional high school programs, the school's teaching staff prides itself on offering different pathways for students to earn their credits and find success, which is a reflection of having numerous students who would be considered at-risk.

One of the advantages of housing *PBLearn* in a building serving numerous programs and having once served a much larger population is that many specialized workspaces are available in-house. In addition to having two classroom spaces dedicated to the program, students also have access to an automotive shop, metal workshop, woods workshop, and graphics computer lab. There is also space for *PBLearn* students to join Physical Education classes or to work out in the training room. The majority of the time spent at school is in the two dedicated *PBLearn* classrooms, and the layout of these spaces is designed by the students in the program at the beginning of each semester. The location of the high school is also well suited to the numerous, planned student excursions, as it is centrally located near the downtown area of the city.

Participants. In the first year, educators selected a maximum of 20 students from the seven high schools in the school division to participate in *PBLearn* each semester. The program targets students who are not thriving in the traditional high school environment. The primary targets are "spike students" which we define as students that have done well in at least one subject area but not in the majority of their courses. Such students have been described as compliant but not engaged in that they are attending regularly and are not disruptive, but do not appear to be particularly enjoying their time in much of their programming. The primary target group does not include gifted students who are already thriving across all subject areas at

their home school; nor is the target group characterized as noncompliant, at-risk students that have frequently been studied with respect to engagement (McCluskey, 2012). Students were first identified through recommendations from home-school teachers and Student Support Services members. While this process may have varied somewhat across the participating schools, suggestions included to identify students demonstrating strength or an interest in at least one subject area, while also seeking out students who were not thriving in their existing school environment. In some cases, this absence of prosperity might have been demonstrated by lower grades; in other cases, a level of student apathy toward his or her schooling might have been an identifier. A group of potential candidates from each school was invited to attend a *PBLearn* open house, after which prospective students completed a short questionnaire and then met with members of the Design Team for a brief interview. A primary objective for these interviews was to confirm an apparent passion—and thus potential idea for project pursuit—was present for each qualifying student.

Two different teachers lead these students in the program in each semester. All teachers working in the school division were invited to apply for a one-term leave from their home school to participate in the program. In selecting teachers for the first year of the program, some preference was given to interested members of the *PBLearn* Design Team, because of their increased exposure to the philosophy and intentions of the program. Three of the four teachers teaching in the program for the first two semesters are high school teachers in the division who were members of the Design Team. The fourth is a teacher from an elementary school in the division, whose home school assignment is working with students in a multi-age Grade 5/6 class.

The study took place during the second semester of the program, from March to June, 2016. All 14 students enrolled in the second semester were invited to participate in the study. The parents of students involved in the program, as well as the two teachers leading the program in the second semester were also invited to participate. Some feedback was also gleaned by following the first and inaugural semester of *PBLearn*, as well as by talking with the administrators at the pilot school site.

The story behind the intervention: *PBLearn*. The idea for the program was originally conceived by three members of the school division leadership team: the superintendent, an assistant superintendent, and the pilot school principal. From a practical standpoint, the student population at the pilot school site is well below capacity. The school offers many specialized programs to make up for the decline in the regular population. In exploring additional potential programs, the principal became interested in a local *Met* school offering. *Met* schools offer a personalized learning environment wherein students pursue subjects of personal interest using a PBL approach. Students arrive with strengths and interests in one or more areas and work through projects in these areas of passion with teachers serving as advisors who help guide their work (Littky & Grabelle, 2004). The members of the divisional leadership team were interested in the PBL feature of the local *Met* program, but were seeking a similar approach that was more affordable and easier to implement. All three members were cognizant of alternative programs for at-risk students, as well as enrichment courses offered to gifted students, but there appeared to be few programs tailored to the many disconnected students between these two extremes. With increased engagement for such students being the key driving force, the

school division sought funding for the program and got approval for its launch in September, 2015.

To plan the details for the program, high school teachers throughout the division were recruited to form the *PBLearn* Design Team. This team was made up of eight teachers in the division, who laid the foundation for *PBLearn* with guidance from the principal and assistant superintendent. I expressed interest and was included as one of the members of the Design Team. The group met a handful of times to add more detail to the broad guidelines provided by the leadership team. One recurring topic of discussion during these meetings was the role that teachers in the program would play.

While some variation from semester to semester is natural and anticipated, those on the Design Team were in agreement about what procedures should be consistent in the program. The teachers would present activities in the early days and weeks of the semester to get students accustomed to the PBL environment and develop a sense of community. Other goals for early in the semester were to hone student project ideas and potentially group students with similar interests. For the remainder of the semester, the task of the teacher was to present information useful and common to the whole group for advancing their projects and ensuring that key curricular learning outcomes could be met. In addition, teachers were to identify individual student strengths and shortcomings and help students to fill gaps in their learning. They were to allow students to make their own decisions, learn from their struggles, help to infuse skill development in the learning, and assist students with making helpful ties to the community.

The Design Team was cognizant of the research that others have used to justify the implementation of programs using PBL and self-directed learning approaches. However, we sought out readings and support from the literature and existing programs to inform our process which is presented in the next section.

Model PBL and self-directed learning programs. Particularly given the early success of another local program, *Met* schools provided an attractive learning model. These schools focus on individualized education based on student interests, using an approach that combines PBL, mentorship, and work experience. American *Met* school co-founder Dennis Littky compares this learning environment to “a great newspaper office, bustling with excitement, everyone busy and engaged, working together and working on their own projects with purpose and passion” (Littky & Grabelle, 2004, p. 53). The team also reviewed a PBL guide created by High Tech High School which is located in San Diego, California. Similar to the *Met* model, the program revolves around “students designing, planning, and carrying out an extended project that produces a publicly-exhibited output such as a product, publication, or presentation” (Patton, 2012, p. 13). These two ideas—students taking a project from initiation to completion, and then presenting a final product as a key part of the assessment in the program—were embraced by the team. Another local program that caught our interest was the *Flexible Learning Program (FLP)* at another school in the city. Using thematic units and project work to reinforce traditional learning, the program also emphasized the presentation of a project artifact at the end of the semester as evidence of learning. However, after another member of the Design Team and I visited the *FLP*, we determined that few other aspects of this middle-years program aligned with our goals for *PBLearn*. Most notably, the program attracted students who were already the

highest achieving in their grade levels, and followed a regular course timetable. Further from home, another member of the team attended a conference in Arlington, Texas, hosted by *Think Forward PBL*. The conference offered attendees an immersion in PBL, asking them to work with driving questions, technology, and present their findings. The group also emphasized the use of assessment rubrics, including those designed to evaluate 21st century skills.

New pedagogies for deep learning. Our school division has been part of the provincial schools cluster with the global partnership *New Pedagogies for Deep Learning (NPDL)*. Led by a group of educators worldwide including Michael Fullan, the group believes in “learning systems to encourage youth to develop their own visions about what it means to connect and flourish in their constantly emerging world, and equip them with the skills to pursue those visions” (Fullan & Langworthy, 2013, p. 2). Again, the emphasis is on the 21st century skills that they describe as the 6 Cs: character education, citizenship, communication, critical thinking, collaboration, and creativity. Our Design Team agreed that any project learning in our program should emphasize these skills as much (or more) than any other curricular outcomes. In fact, given the emphasis of our program and other PBL programs we have explored on career development, our leadership team proposed that the rubrics used be expanded to include “career” as a 7th C. Rubrics that have been developed by the *NPDL* group were modified and used to encourage application of these skills within the project work.

Communities of practice and mentorship. The expression “Community of Practice” (CoP) was coined by Lave and Wenger (1991) to describe a group of people with a shared interest who come together to acquire new knowledge and apply it in practice. They propose that newcomers to a given CoP will tend to hover on the periphery and should thus be charged with

only limited tasks. It is only once they acquire knowledge and confidence with typical tasks in the community that they will take on greater independence and tasks of greater importance. Our takeaway message from this theory is that students in *PBLearn* will likely be a bit apprehensive about coming into a new learning environment, and as such we need to scaffold the learning with simple, low-risk tasks as they develop comfort. Students can take on more ownership of their learning as they settle into the program, and can even play an active role in the knowledge acquisition of their peers. Another key construct of the CoP theory is the notion that test-taking can become a parasitic practice and that the emphasis should be on acquiring knowledge rather than displaying or verifying one's knowledge (Lave & Wenger, 1991).

Curricula, knowledge acquisition, and assessment. In order to justify the pilot program offering within the existing school system, we had to review course offerings to determine which credits could be earned by students through project-based learning. While the consensus was that there was more flexibility working with option courses, we agreed that there would be benefit (in balancing the students' schedules) if some mandatory credits could be earned as well. A full list of the provincial requirements for graduation is provided in Appendix A. A number of outcomes in the *English Language Arts: Transactional Focus* course seemed to fit naturally, as did the general guideline that "students engage with and compose texts primarily for pragmatic purposes" (Minister of Education and Training, 1999, p. 117). In this vein, many of the texts they might access would help to inform the development of their projects, and many of the texts they would produce would be to help plan, guide, and chart their progress throughout the semester.

Other curriculum connections were envisioned by the team. Given the space and facilities available at the host school, and to provide movement breaks for students and some non-contact time for the teachers, it was also determined that students could accumulate *Physical Education* hours on a daily basis for course credit. With an aim to integrate technology throughout the project work, it was determined that an *Information and Communication Technology* credit would be included, with the half-courses in *Print Communications* and *Interactive Media* seeming to be the most relevant. Providing opportunities for career exploration—both within the project work and as stand-alone assignments—provided justification for a LifeWorks or Career Development credit. The goal, therefore, was that students would earn three or four credits during the semester spent in the program. Some students were even able to gain an additional credit if they met curricular obligations within the scope of their project work. The greatest difference from the regular program was that students earned credits through their project work and artifacts documenting the learning progress. As such, we reviewed and discussed non-traditional approaches to learning, such as the *Genius Hour Project* used by some teachers in our division (Brookhouser, 2013; Krebs, 2013 & 2011; Zvi, 2013), as well as research on formative assessment practices (Dirksen, 2011).

Researcher's positionality. My goal as a member of the Design Team was to continue to serve my colleagues in the role of a critical friend throughout the first year of the program. We met once early in the first semester, at which time the two program teachers (who are also members of the team), shared early challenges and successes. These teachers were also doing their best to document their daily and weekly plans, in order to provide a road map for teachers in the second semester and beyond. This documentation was also intended to ensure some

level of consistency, which would be helpful when evaluating the commonalities and replication of the program across different semesters and program teachers. The plan also provided opportunities for members of the Design Team to visit the program during the first semester to observe and get a sense of how the pilot was progressing both for the teachers and students.

My familiarity with the other members of the Design Team made for a smooth transition and comfortable working relationship as I began my formal observations and interactions with teachers and students while implementing study, starting in March of 2016. I had regular interactions with the two teachers leading the program for the second semester, and it was helpful that I already knew both of them quite well. Given our established relationship, I trusted that they would feel comfortable being themselves and acting as they normally would when I was observing their interactions with students in the pilot. I also expected them to be candid in offering feedback that would provide genuine, trustworthy answers to the research questions. These kinds of responses have potential to help when moving forward with planning subsequent loops of the research process.

I was also already familiar with some of the student participants. Seven of the 14 students enrolled in the second semester attended the high school where I recently taught. I had taught five of them, and at least had conversations with every one of them. This existing comfort level helped promote an open and honest exchange of information, which was buoyed by the fact that I would not be teaching nor evaluating them. My former teaching position at their home school may have motivated the parents of these students to participate in the study as well, as most of them know me to some extent. I did not know the students coming from the

other schools, so I introduced myself to those participating in the study (as well as their parents) early in the semester when I first began my formal research.

My work on the Design Team had afforded me opportunities to spend time in the school, and develop a level of comfort with some of the teachers and school administrators. They provided assurances that they would be accommodating and encouraging of my research in the building. I had discussions with several members of the leadership team for the school division, and they were also very supportive of my research efforts and intentions.

Purpose of the Study

As alluded to in the introduction, *PBLearn* was developed based on the recurring belief in education that the current, traditional approach in schools is not working for all students. For a number of reasons, many students are not fully engaged in this approach, and thus their learning is limited and they are not reaching their potential. The program was designed with recommendations from other program leaders that have been successful in engaging students; it was also informed by what the literature says about what constitutes an engaging learning environment.

As mentioned, the literature appears to offer much insight on reaching students whose academic achievement falls at each end of the spectrum. At one extreme are those students who are thriving in the traditional environment, and are often referred to as “gifted” students. At the opposite end are those students who are so disinterested in the existing school structure that they either drop out or are “at-risk” of doing so. The students who appear to be studied less frequently are the large group of students who fall between those extremes. When it comes to implementing interventions to improve achievement, these students are often overlooked as

they are able to work their way through the system, though in many cases they are not likely reaching their potential or enjoying their time in the existing school system. *PBLearn* is attempting to better address the needs of these students, and I was equally interested in determining whether a different learning environment would help to meet their academic needs.

There are other potential benefits of this project. Despite the selection criteria implemented by the Design Team to help identify targeted “spike students,” it was assumed that those admitted, especially in the first year of the program, included students with varying interests, levels of engagement, and academic ability. Another aim and potential benefit of this study was to observe the learning attitudes of students who showed marked improvement while participating in *PBLearn* and compare them with the attitudes they demonstrated while participating in traditional programs at their home schools.

A final goal of this study was to evaluate the common elements that the *PBLearn* program offers to students, regardless of the semester that they participate in or the teachers who are leading the program for that semester. In addition to the engagement focus, the members of the Design Team, including me, were interested in seeing whether this learning environment is more conducive to what we believe are critical elements of good teaching and learning practice. These elements include:

- Focusing on interests and development of students as individuals;
- Emphasizing the learning process over learning outcomes;
- Integrating skills from different curricula and program areas into authentic applications;
- Nurturing valuable employability and life skills;

- Teachers serving as guides and facilitators who help steer students through the process; and
- Making connections to future career interests (with mentors outside the school).

This list could go on, and perhaps it seems naïve to think that just spending one semester in an alternative setting could be very impactful for the students. Educators involved in designing the program feel that it has potential, but its impacts needed to be observed in practice. The question was also whether all or just some of the students passing through the program would gain benefits, and to what extent. The key benefits sought in this case study were increased and sustained engagement, and the development of valuable skills that will serve the students after their time in the program. In the event that these benefits could be realized, this study holds potential to serve as the impetus for validating and potentially expanding the program to other grade levels, programs, or schools in the school division, in order to benefit the highest number of students.

Research Questions

The following research questions guided this action research study:

1. What impact does *PBLearn* have on the learning engagement of spike students?
2. What are the learning characteristics of students who benefitted the most (and the least) from *PBLearn*?
3. What did students learn from participating in *PBLearn* over one semester?

Delimitations of the Study

Given that the full student population in the program for this semester was 14 students, it made sense to try and involve all of them in this study. There were a number of possible areas

of interest with respect to this program which were not included in the scope of this study, however. While the primary research question pertains to engagement, the study did not look at all forms of engagement. In an article published by the Canadian Education Association, student engagement is separated into social engagement, academic engagement, and intellectual engagement (Willms et al, 2009). The primary focus in this case study was the academic engagement of students getting involved in and completing their work, or the student's "participation in the formal requirements of school" (Willms et al, 2009, p. 7). There is some overlap into the higher-order thinking of intellectual engagement, so I use the term "learning engagement" to describe the desired area of improvement. Although I remained open to possible emerging themes related to the social learning context of the program, there was little emphasis placed on students' participation in the school life of the host school, or social engagement.

The third research question sought to uncover the nature of learning by the students while in the program. Part of my data collection effort was to compare knowledge acquisition in *PBLearn* with that of a traditional classroom; however, this comparison was intended to be relatively limited. The idea was to generally get a feel for whether key concepts were learned and understood, rather than trying to evaluate specific outcomes of the relevant course curricula. As much or greater effort was placed on examining the emphasis on and acquisition of skills. This skill development is one of the areas in which I hoped that there would be some level of consistency for the students from one semester to the next. One goal of the data collection was to evaluate the consistency of the delivery of the program across semesters, to determine if the program itself might be the only—or at least the greatest—factor impacting student

progress. It should also be noted that I followed the students during only one semester in the program, and I only conducted on one follow-up interview near the beginning of the following semester back at their home schools. As such, the data gathered is a snapshot of the impact on the students during their immersion in the program and not a longitudinal look at the impact on the students' futures with respect to their remaining high-school course work, post-secondary studies, employment, or other endeavours.

The two teachers in the program were consulted as part of the data collection process, but mostly to shed light on the progress of the students and their learning. For the teachers themselves, the time spent in the program potentially served as impactful professional development. It was assumed that their participation in *PBLearn* would alter their pedagogy throughout the semester, and it would be interesting to see how it impacted their teaching practice once they returned to their positions at their regular schools. Although having different teachers lead the program each semester makes it more challenging to ensure consistency of the program delivery, part of the rationale was how participation might influence teaching practices after the fact. Changes in teachers' practices were too far removed from the proposed objectives of this study, and so were not tracked.

The literature review presented in Chapter Two is limited to the scope of this study and the research questions proposed. Relevant literature on student engagement is related to learning engagement. Literature on teacher practices concentrates on those approaches that promote student engagement, rather than including how the teacher and his or her practice is impacted by trying different pedagogical approaches. The action research methodology and the data collection methods outlined in Chapter Three were considered sufficient for exhausting all

relevant and helpful insights from participants in the study. Chapter Four reviews the findings of the research, and Chapter Five draws conclusions and suggests potential calls to action stemming from these findings. References and Appendices—including the instruments used for data collection—are provided at the end of the thesis.

Chapter 2: Literature Review

While *PBLearn* is a unique program—particularly in this school division—it can be informed by previous literature, studies, and education models. With engagement being the primary focus and desired outcome for this program, a logical starting point is to define engagement in general and learning engagement, in particular, as well as its importance for education. The next section will discuss the many factors that can influence engagement, which become major considerations for the implementation of *PBLearn*. Much of this work relates to different pedagogical practices, which leads to the discussion of some of the more traditional practices in high school. These practices will be contrasted with some constructivist approaches that are becoming more widespread in schools due to their perceived effectiveness. Project-based-learning (PBL), in particular, reflects many of the tenets of constructivist theory, and some PBL models will be reviewed. Of particular interest is how such PBL approaches appear to have a positive impact on student engagement. As well as promoting engagement, these strategies appear to encourage the development of helpful skills, which is another goal of *PBLearn*. To provide insight for student selection into the program, some discussion focuses upon the attitudes toward learning of different students and those that might benefit most from an educational approach similar to *PBLearn*. This chapter concludes with a discussion of some of the potential challenges and limitations of PBL approaches.

What is Engagement?

Effective teachers can easily identify the students who are most involved in their work, and it does not take a seasoned educator to distinguish between students who are engaged and those who are not. Definitions of engagement vary from “student identification with and

participation in academic learning” (Strambler & McKown, 2013, p. 87), to “participation, connection, attachment, and integration in particular settings and tasks” (Newmann, 1989, p. 34). Most definitions highlight the engaged student as one who is actively participating in an activity that has some personal meaning. What makes learning engagement unique is the challenge of keeping students interested in activities that will help their development. Whelage (as cited in Finn, 1989) suggests that “the school must find curricular experiences that can both retain student interest and engagement on the one hand, and result in worthwhile learning and development on the other” (p. 134). Academic engagement has been a problem in schools in North America. Studies show that academic engagement will decline as students move from elementary into middle years and then high school, to the point where fewer than half of the students in Canada and the United States are engaged in their academic studies (Marks, 2000; Newmann, 1989; Willms, 2003; Willms et al., 2009). Surely if students are having trouble connecting to the content in the classroom, it will have a negative impact on their learning and development.

Importance of Engagement to Academic Achievement

The literature suggests that our goal as educators is not to trick students by engaging them in one activity and then trying to shift their energy to something more academic or related to the curriculum. Instead, the intent is more about presenting the course content so that it connects with student interests, such that they want to investigate further. Littky and Grabelle (2004) make the point: “When we are interested in what we are learning, no one has to force us to keep learning; we just do” (p. 98). Marks (2000) suggests that “students who are engaged with school are more likely to learn [and] to find the experience rewarding” (p. 154). Others, like

Finn (1989), argue that no learning can occur without engagement as “active participation is the minimal essential condition for formal learning to occur” (p. 127). It would seem then that engagement is as much a requirement of learning as any other. Elements of engagement become “significant predictors of academic achievement, continuing motivation, and commitment to educational opportunities” (Johnson, 2008, p. 72).

Major Influences on Engagement

If the stakeholders in education can agree that engagement is a key requirement, then the task becomes identifying and nurturing those features that help capture students’ engagement. Some factors may relate to a student’s background and life outside of school, which may be more difficult for educators to influence. For example, “Youngsters lacking the necessary encouragement at home may arrive at school predisposed to nonparticipation and nonidentification” (Finn, 1989, p. 130). Lack of support at home does not mean that engagement is out of reach for some students, but rather that there may be a greater inclination to withdraw. Other factors can be influenced more directly by the school, such as the area of study. In some cases, it might be difficult to engage even very capable students in any content area. McCluskey (2012) acknowledges this idea by saying, “without doubt, there are many high-ability young people who see the educational curriculum as irrelevant” (p. 3). In more cases, at least some content areas are appealing, as “students naturally find some topics and activities more stimulating and enjoyable to work on than others” (Newmann, 1989, p. 35). It might not be surprising that many students are most interested in optional or non-academic subjects (Shernoff et al., 2003). These interests may not seem helpful for teachers, as certain content areas are curricular requirements. However, as Johnson (2008) suggests, “low levels of

engagement may not be a “student-problem”...but may instead be a “teacher-problem”” (p. 81). The teacher can have more influence on engagement through his or her chosen delivery methods and interactions with students.

A variety of pedagogical approaches can be implemented by the teacher in any given classroom. Some approaches might be more conducive to the transmission of information and some might be more geared to student participation and we must keep in mind that “different teaching methods in themselves produce different levels of student involvement” (Finn, 1989, p. 132). If we agree that engagement is a requirement for learning, then it would seem that the methods that promise to foster student involvement are desired. It is important to keep in mind that approaches to assessment and evaluating affect student learning as well. Though this point may seem obvious, “some students are still being denied the opportunity to demonstrate what they have learned in the most effective manner for them” (Brooks & Brooks, 1993, p. 123). If engagement isn’t hampered by the chosen pedagogical approach, perhaps the way the teacher assesses or interacts with students is the problem. Past studies suggest that the dynamics of student and teacher interactions and relationships are precisely what provide students with an opportunity to engage and achieve (Hamre & Pianta, 2007; McKown, Gregory & Weinstein, 2010). While the exact cause of disengagement may vary by case, what is evident is that traditional approaches to teaching and learning being used in many high schools are not always effective with all students.

Traditional Approaches in High School

High school teachers often lament the limitations that high school settings impose on teachers. Frequent are their calls that heavy curricula and standardized testing are realities that

demand a more traditional approach at least in certain content areas. Hackmann (2004) suggests that “secondary teachers may be less willing to employ methods perceived as reducing the emphasis on content” and thus usually follow a behaviourist approach which “typically advocates the presentation of curriculum content in small increments followed immediately by student practice” (p. 697). The perhaps ill-fated result in these approaches is that “many teachers have as a goal students’ performance, or correct responding, rather than their learning” (Hendry, 1996, p. 28). The unfortunate outcome is an emphasis on short-term recall rather than long-term understanding (Katz, 1985). The over-riding concern is that students are being taught how to succeed within the school system rather than how to learn. Scribner and Cole (1981) describe this problem as serving the face validity of the school at the cost of true learning for the student. Littky and Grabelle (2004) paint a bleak picture for students in such settings:

They’ve got to figure out how to please eight different teachers with eight different sets of expectations and eight different images of who they are—perceptions based on the 45 minutes each teacher spends with them in a room of 20 to 30 other kids. (p. 31)

Considering Alternative Approaches

As the research into student engagement demonstrates, these traditional or behaviourist approaches to education do not seem to be satisfying the majority of students. While many teachers include at least occasional, alternative approaches, they tend to revert back to many of the aforementioned strategies. Educators pushing for reform are calling for drastic changes and “completely overhauling the entire structure of schools as we have known them for way too long” (Littky & Grabelle, 2004, p. 29). One recurring suggestion is to provide

students with greater freedom to choose topics of study more related to their interests (Meyer, Turner & Spencer, 1997; Newmann, 1989). Newmann goes further to suggest that student input should be considered not only for *what* should be studied, but also for *how* it should be undertaken, in that they “must have some influence on the conception, execution, and evaluation of the work itself” (1989, p. 35). Hendry would support this rationale, given that “depending on their knowledge, teachers and students may generate different meanings for the same materials” (1996, p. 23). Lave and Wenger (1991) highlight the attractiveness of apprenticeship programs for a similar reason, suggesting that the apprentice engages in practice rather than being an object of the desired outcome. This idea that individuals should be more actively involved in planning their learning to reflect how each learns best is the driving force behind constructivist approaches to teaching and learning, which appear to be gaining momentum in the field of education.

Constructivist Approaches to Education

Constructivism has been linked to education practices since Piaget (1977) described learning as an active process wherein individuals build meaning by incorporating new events and concepts into existing knowledge. Brooks and Brooks (1993) describe key components of the theory such as the notion that learners individually and internally construct understandings and incorporate new experiences into existing understandings. These authors advocate further for the active role of students within a constructivist learning environment whereby students “construct the process and the understanding rather than having it done for them” (1993, p. 47). Newmann (1989) shares this belief that students should “construct and produce knowledge in their own words, rather than merely parroting the language of others” (p. 35). In the views of

these researchers, the student should not only create meaning for him or herself, but should also play a role in setting up the learning environment.

Constructivist learning environments when set up effectively reflect the individual learner while nurturing collaboration amongst participants. Building the program around each student respects the needs of the individual. There is evidence that student-centeredness is particularly helpful for struggling students, as McCluskey notes “the more successful programs for underachievers tend to be child-centred, to focus on strengths, and to build upon student interests” (2012, p. 16). Yet, interaction with others is often what drives many opportunities for learning, and Hackmann (2004) reinforces this idea in saying that “constructivist theory is based on the premise that individuals must be socially engaged in learning” (p. 697). Constructivism with its emphasis on individual needs and a collaborative learning milieu is a critical theoretical underpinning for the project-based-learning model being implemented in this study.

Project-Based Learning (PBL)

As the name suggests, PBL uses project work to guide student learning. The name does not suggest, however, that PBL is being implemented anytime that a project has been assigned in a classroom. One definition of PBL is “a dynamic classroom approach in which students actively explore real-world problems and challenges and acquire a deeper knowledge” (<http://www.edutopia.org/project-based-learning>). And while there is likely a different definition of PBL for each program, some aspects appear to be present in most offerings. Two key aspects identified in this definition are the authentic nature of PBL as well as its ability to promote deeper learning. Such environments provide students with opportunities to explore activities engaged in by adult professionals (Krajcik & Blumenfeld, 2006), which provide them

with exposure to areas of personal interest and relevance in the world beyond the classroom (Marks, 2000). In terms of promoting a deeper level of learning, PBL “promotes links among subject matter disciplines and presents an expanded, rather than narrow, view of subject matter” (Blumenfeld et al, 1991, p. 372). The belief is that learning set off by a student’s driving question pushes him or her to explore it to the extent of truly understanding rather than simply learning enough to pass a test.

Many proponents of PBL speak to the benefits of its collaborative nature. Ribeiro (2011) mentions the cooperative interdependence among students in this setting. It appears as though a PBL approach eliminates some of the competition between students in traditional approaches and helps to promote cooperation and teamwork in the classroom and the school (Achilles & Hoover, 1996). Others address the alignment of student and teacher objectives. With the student striving to learn about his or her chosen topic, the teacher serves more in the role of facilitator, helping the student to attain the next level of understanding when needed but allowing space for these teachable moments to present themselves naturally (Mergendoller, Maxwell, & Bellisimo, 2006; Strobel & van Barneveld, 2009). Others discuss the impact of students connecting to others outside the school who can offer help or guidance. Scholars describing two recognized PBL programs in the United States discuss the benefit of “getting students out of the classroom and into the field” (Lattimer & Riordan, 2011, p. 21) and the value of giving them opportunities to “speak to scientists, officials, and ordinary citizens who deal with these problems on a day-to-day basis” (Lipson, Epstein, Bras & Hodges, 2007, p. 351).

Project-Based Learning (PBL) Models

To better illustrate some of the key tenets of the approach, some new PBL programs from the local area as well as some well-known programs in North America were reviewed. The *Flexible Learning Program* is a local middle-years offering in which course work, according to the 2014-2015 School Handbook, is “student-centered, activity-based, and thematically organized” (Winnipeg School Division, 2014, p. 10). While the program stresses inter-disciplinary connections, teamwork, and study based on student interests, the project work is still done within a regular course timetable. While this program is essentially an enrichment offering, a separate local offering is more of an immersion in PBL. As the only high school in Canada linked to the United States-based *Big Picture Learning* network, students here work with the same teacher-advisor throughout high school in a program that “includes courses, research, projects and internships” (Pearson, 2015). The program follows the *Met* school model that was first implemented in Rhode Island in 1995. Co-founder Dennis Littky explains that the intent of the program “was to free ourselves of all the traditional structures and completely reinvent what schooling could be” (Littky & Grabelle, 2004, p. 121). He describes how a primary differentiation of the program is that it is built around student interests. Students take responsibility for their own learning path, though this responsibility is shared with the student’s parents, teachers, and mentors. These mentors largely include members of the community with whom students work through the internship requirement of the program. This apprenticeship provides desired real-world connections and applications as well as potential career guidance. Student learning is monitored through ongoing assessment, and a large piece of this process is the periodic

exhibitions of learning where students display what they have learned to the other students and stakeholders in the program.

Though it is a separate entity, many of the *Met* school features are shared by High Tech High School in San Diego, California. The school's website describes the intent of the school's founders "to create a school where students would be passionate about learning and would acquire the basic skills of work and citizenship." What started as one high school now includes several elementary schools, middle schools, and high schools. While PBL is implemented in all of these schools, it is central to the work at High Tech Middle School. Among the advantages of PBL, they reference the importance of accessing adult mentors and coaches in the community and the benefit of students presenting their work in a public forum (Lattimer & Riordan, 2011). While both *Met* schools and High Tech Middle School immerse students in PBL throughout the program, the *Terracope Program* at MIT might be most like the *PBLearn* model in that they use a strictly PBL approach during only one year of their program. The program was born from "the lack of enthusiasm and excitement" among students (Lipson et al., 2007, p. 349) and cites collegial student-teacher relationships and the supportiveness of the close-knit learning community as well as the student-centered approach as keys to their success. These educators found that having students working in this environment in their freshmen year provides them with valuable skills and an easier transition into the school. These examples appear to show benefits of PBL approaches at the middle-years, high school, and post-secondary levels.

Project-Based Learning for Student Engagement

It is particularly important to the development of this study to ascertain whether one of the successful outcomes of these programs is indeed increased student engagement. Reviewing

the previous discussion on drivers of engagement, one influence was the pedagogical approach itself. Conceivably, it is because these PBL offerings are relatively rare among more traditional learning models that they offer a “fresh zest to the learning process, for students and teachers alike” (Ribeiro, 2011, p. 13). A second factor discussed was the area of study. Perhaps what differentiates these PBL programs from traditional settings is mostly that student choice influences the content of their inquiry, rather than content being dictated strictly by the instructors of the courses in which they are enrolled. Brooks and Brooks (1993) also note that “Students are most engaged when problems and ideas are presented holistically rather than in separate, isolated parts” (p. 46).

Marks (2000) found that high levels of classroom engagement occurred with “students’ self-selection into a program of special interest to them” (p. 156). This comment proposes two important notions. First is the idea emanating from many educators that offering students the freedom to choose topics can promote a deeper approach to their learning (Meyer et al., 2007). Second is the idea that if students apply for a program themselves, they are more likely to be engaged upon admission. Although most people—adults at least—would likely agree that school is necessary and beneficial, it is a mandatory endeavour for students. If students are applying themselves, it would also seem more likely that they will attend school.

Although the pedagogical approach and area of study are critical factors in this discussion on school engagement, the teacher is also a consideration. Regarding academic achievement, research suggests that “the single most influential school-based factor is the teacher” (Stronge & Hindman, 2003, p. 48). In a traditional classroom, an effective teacher delivers an interesting lesson and connects with individual students. While this same connection

is likely as important in a PBL setting, an effective teacher in this context might be one who knows when to intervene and when to allow the student to work independently. Hendry (1996) believes that “construction occurs from within through students’ interrelation with the world of which teachers are a part” (p. 24). This notion suggests that a teacher can contribute to learning either by helping the students to engage or simply by being one resource available to the student on her or his learning journey. Working in a PBL milieu can be a significant adjustment for teachers, who must become accustomed to new roles, as well as an increased demand on time and active participation (Lipson et al., 2007; Ribeiro, 2011).

Shernoff and colleagues (2003) outline the advantages of a PBL-type environment: “With respect to instructional relevance, students are more likely to become engaged with authentic academic work that intellectually involves them in a process of meaningful inquiry to solve real life problems that extend beyond the classroom” (p. 159). A PBL program providing authentic links—as the PBL models previously discussed—likely increase the chances for engagement. These same authors also speak of the “state of flow” that occurs when the challenge of a task is in line with or just slightly above the student’s skill level. As such these scholars suggest, “issuing appropriate challenges and providing opportunities to enhance skills...may be one of the most ideal ways of engaging students” (Shernoff et al., 2003, p. 160). Marks (2000) also highlights the benefit of demanding schoolwork when stating that “more complex and cognitively challenging class work...has the potential to engage students more deeply” (p. 157).

Project-Based Learning for Skill Development

Students who are engaged in their learning are more likely to find academic success. In most PBL programs, however, academic success is only one of the objectives. The *Terrascope*

Program staff at MIT categorizes learning objectives according to “process and content learning, skill improvement, and personal development” (Lipson et al., 2007, p. 358). Others refer to these as “21st century skills” (Trilling & Fadel, 2009) or “employability skills” (Lees, 2002). Regardless of the label, these kinds of learnings typically include such desired skills as problem solving, oral and written communication, teamwork, creativity, respect, ethical behaviour, concern for the community and the environment, applying learning to both new and real-world situations, self-confidence, and self-directed learning (Lattimer & Riordan, 2011; Ribeiro, 2011). According to their website, “High Tech High’s mission is to develop and support innovative public schools where all students develop the academic, workplace, and citizenship skills for postsecondary success.” They reference Michael Fullan as an influence on their school structure and objectives. He speaks of the need to build “students’ capacities to collaborate, connect with others, create innovative products, programs and solutions, and ultimately to implement them in the real world” (Fullan & Langworthy, 2013, p. 16). This emphasis of non-academic as well as academic goals appears to be gaining popularity among those seeking reform in education.

Student Attitudes Toward Learning

While most studies point out the benefits of PBL programs for all students, many highlight the mindsets of students that might make them more likely to succeed outside of a traditional classroom. If PBL programs are not the norm, they inherently present both a challenge and a risk. This type of program might not appeal to all students, as most are cautious, prefer feeling in control, and avoid risk (Doyle, 1983; Meyer et al., 1997). Students more likely to embrace the PBL environment would be academic risk takers who welcome difficult tasks and have a tolerance for failure, uncertainty, and confusion (Clifford, as cited in Meyer et al., 1997).

Entwistle (1987) identifies three types of students: *deep strategy users*, who focus on learning and understanding; *surface learners*, who seek to complete coursework without a full understanding of content; and *strategic learners*, who are driven by grades and assessments. It is the deep thinking, challenge seeker who would be more likely to thrive in a PBL setting, whereas challenge avoiders using a surface or strategic approach may find that the self-directed approach and absence of assessments in PBL do not push them to their definitions of success. Ames (1992) uses slightly different terminology to describe learners with *mastery goals* who embrace learning and risk and contrasts them to learners with *performance goals*, who may obtain high marks but prefer success with little effort. Dweck (1986) distinguishes between *adaptive* and *mal-adaptive* students using similar criteria. Regardless of nomenclature, the suggestion is that ideal candidates for a PBL setting are not necessarily those who have had academic success, but rather those who are open to new challenges and who have a desire to learn for personal satisfaction. In many cases, these students might be ones who have not found much success in a traditional setting (Mergendoller et al., 2006).

The lack of achievement among some students might not be so much due to an inability to succeed, but rather to a lack of motivation in the existing setting. Once again, there may be few indicators that would help teachers to identify these less enthusiastic students as they may still be obtaining passing grades. These “disengaged students may get by in school by making a token effort...they can tune out, complete some of the work with minimal concentration” (Newmann, 1989, p. 34). They may not be failing school despite the fact that school has been failing them. Lave and Wenger (1991) would say that these students have been hovering around the periphery of their learning community, and we need to find a way to draw them in closer to

where deeper learning can take place. It could be that those with the most to gain are these “neglected high-ability young people on the fringe, whose talents all too often go unrecognized and untapped...who, if engaged, have so much to offer” (McCluskey, 2012, p. 2). Is a PBL setting just the type of approach to finally engage some of them? Littky & Grabelle (2004) have seen evidence of this in their environment:

I see it every day: kids who have been dismissed as “dumb in math” or “uninterested in science” or “nonreaders” doing incredible things in these exact same areas because they were (finally) allowed to start with something they were already interested in. (p. 27)

The authors further believe that this opportunity to thrive in a PBL setting is not only encouraging for those with a tendency to disengage, but also those highly motivated and academically gifted students who aren’t inspired by the traditional curriculum. Perhaps the most encouraging news comes in those reports that suggest that while key processes for success in school—such as self-regulation and a desire to attain goals—may be more natural to some, they can be learned by all (Zimmerman, 2002). This notion suggests that all students have the capacity to engage in their learning and to succeed, given the right environment.

Challenges with Project-Based Learning

While PBL holds much promise for students who are disengaged learners in traditional classroom settings, this pedagogical approach is not without its limitations and criticisms. Some institutions use such programs despite research purporting that “unguided approaches such as experiential learning and inquiry learning have been consistently found to be less effective than guided ones with regard to student learning” (Strambler & McKown, 2013, p. 92). One study that found evidence that struggling students may benefit from this type of environment also

recognized that there exists “no empirical studies suggesting that PBL is an effective instructional approach for lower ability high-school students” (Mergendoller et al., 2006, p. 52). One proponent of PBL described challenges in the collaborative environment such as individuals either dominating or free-loading in group work (Lipson et al., 2007, p. 356), while another cautioned against the common pitfall of emphasizing the project itself over the actual learning (Lattimer & Riordan, 2011, p. 19). Those educators that preached about the fresh challenge that PBL offers to most students also admitted that PBL’s emphasis on general learning and revision conflict a lot with typical academic goals of accuracy and completion (Meyer et al., 1997, p. 517).

If the PBL learning environment seems like an abrupt shift for students, it is also a significant adjustment for teachers. Brooks and Brooks (1993) propose that “it requires the willing abandonment of familiar perspectives and practices and the adoption of new ones” (p. 25). This may be a good thing, however, as Brooks and Brooks also suggest that “once teachers are exposed to these practices, they enthusiastically experiment with constructivist pedagogy until it becomes part of the very fabric of their classrooms” (1993, p. 101). If they so willingly embrace these practices, then they must see the benefit. Littky & Grabelle (2004) suggest that taking on the unique and demanding work is worth the risk as the exposure to new approaches and ideas “is what helps keep them alive as human beings and as teachers” (p. 129). This investigation of PBL from a teacher’s point of view is a significant consideration unto itself and is perhaps best reserved for future study.

As identified by members of the leadership team in the school division and by the Design Team, the literature on student engagement seems to provide justification for the

implementation and project-based learning orientation of *PBLearn*. The literature also seems to support that the identified spike students will be in a position to benefit from this alternative to the traditional learning model that seems to be failing this type of student. Still, as a result of its location, student selection, and one-term student immersion approach, there is no existing program that is quite like *PBLearn*. This study helps document the impact of the program during its inaugural year, which will help to evaluate its effectiveness and provide suggestions for refining the program as it moves forward, in the event that it accomplishes its goals of enriching student engagement and critical skill development. The next chapter outlines the methodology implemented for this process.

Chapter 3: Methodology

As the name suggests, action research is an appropriate approach to employ when both action and research are desired. In this approach to research, a desire to improve practice drives the specific action to be taken, and in many cases, the action and its results call for further cycles of the research. Lewin (1946) was the first to suggest that action research is a cyclical, repetitive process. Many methodologists, including Carr and Kemmis (1986), refined this cycle to include the steps of planning, acting, observing and reflecting, such as that presented in Figure 1.

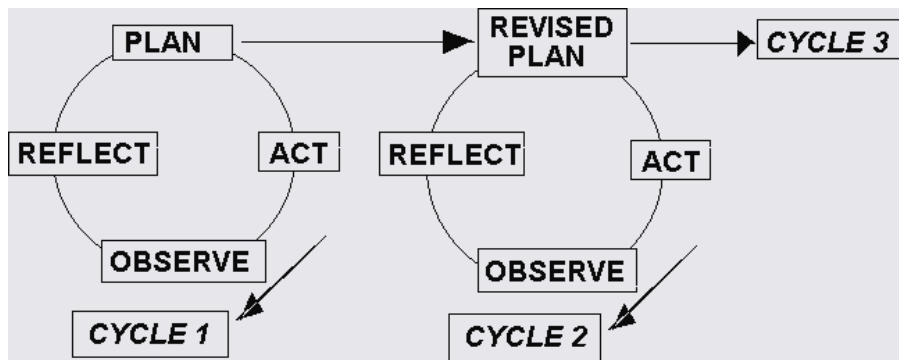


Figure 1: Action Research Cycle (Riding, Fowell & Levy, 1995, p. 3)

The cycle provides two important features. First, after some initial planning, some action is taken. This requirement of taking concrete action is the major difference between action research and other research approaches. Second, the process does not end once the action is taken. Instead, the action is observed and reflected upon, which then leads to a revision of the plan and a revised set of actions to take. The *PBLearn* program itself constitutes a complete action strategy or educational intervention. After all, action research is at its core “a distinctive approach to inquiry that is directly relevant to classroom instruction and learning and provides

the means for teachers to enhance their teaching and improve student learning” (Stringer, 2014, p. 1). In addition to this definition, Stringer (2014) contends that action research is appropriate “to engage in program development and evaluation or to develop strategic initiatives” (p. 5). *PBLearn* should be considered such a “strategic initiative” as it has been developed precisely as an enhanced educational environment both for learners and for teachers.

To this point, assembling the Design Team coupled with their efforts leading up to the launch of the first semester made up the initial *planning* stage. The first *acting* stage was completed when the students and teachers in the inaugural group worked through the first semester of the program. Although some revisions were made in the short turnaround before the second semester, it is likely most realistic to consider the entire first year of the program as part of the initial *action* stage. With this study taking place during the second semester and leading into the second year of the program, it served to monitor through the *observing* and *reflecting* stages which completed the first loop of action research. This thesis report worked in parallel with a more timely—if less exhaustive—first loop occurring amongst the program teachers and administration in planning the second year of the program. This first cycle helped to inform necessary changes to drive the planning and action strategies for future iterations of the program. Data gathered offered evidence to suggest that the program is worthy of continuing, and provided some recommendations for how it can be modified or improved. As related to the research questions, these changes involve how the program is delivered, the outcomes and skills it helps promote, and the student selection process.

Action research is the appropriate methodology in this case then as both action and research were intended outcomes. As with most situations of program implementation, research is used whenever possible to refine the program for future iterations. Action research is often used within the school division to study our own practices with participants and other critical friends involved in programs, providing feedback to help drive change. The research in this phase of the program implementation was more formalized through this study. Observing and reflecting periods will follow every semester of *PBLearn*, however this study produced a formal written report which will benefit the school division.

My role in this study reflects the typical role of researcher in an action research study. In these cases, those conducting the study are typically positioned as “insider researchers” who “see themselves as part of the context they are investigating” (McNiff & Whitehead, 2011, Kindle locations 166-168). A more typical form of action research in education might involve one teacher monitoring the success of a new practice being implemented in her or his own classroom. In this case, I was part of a group of educators on the Design Team who collaborated to outline *PBLearn* and were following its progress as critical friends. As such, I was very much an “insider” and invested in the program being studied. As a team, we felt we designed a learning environment that holds promise for working with spike students. Although the team agrees on the advantages and appeal of such an approach to learning, we haven’t been able to completely implement it in our own teaching for a number of reasons. In this respect, we sometimes found ourselves experiencing the “living contradictions” that often exist among educators (Whitehead, 1989). We have some ongoing concerns about the current learning environment that we work in and we wanted to evaluate if other settings would help alleviate

these concerns. We did something about these concerns and this study was part of the process of evaluating to what extent this new program will help. We know it is not the absolute solution, but are hopeful that it is a step in the right direction. This study, as a part of the program evaluation process, was intended to help provide some direction for future steps.

Given the action research methodology, qualitative data collection methods are the most appropriate. The primary goal of quantitative studies—establishing cause and effect relationships—is not appropriate for action research (McNiff & Whitehead, 2011; Stringer, 2014). Instead, the goal in action research is to start with a general goal to improve practice, and to make adjustments along the way to promote improvements. A primary goal here was to get a sense of the student experience in *PBLearn* and to determine if this environment offers greater learning opportunities for the participants. Qualitative interviews, for example, offer an opportunity to explore individual student experiences in depth. And while much of the data collection to uncover the student experience was qualitative, some quantitative data was also gathered to help corroborate the impact of the program. Numerous authors suggest that a combination of qualitative and quantitative methods is often appropriate in action research (Creswell, 2012; Klein, 2012; Mills, 2000). This combination of data sources used in this study is outlined in the following section.

Data Collection

I used a variety of tools and techniques to collect primary data. Surveys were used to collect information from students in the program as well as their parents. Interviews were conducted with the participating students as well as the two teachers in the program. In addition, data were sourced from pre-existing student records. For each instrument, data were

organized to align with the three research questions, as outlined in chronological order in Table 1.

Table 1

Data Collection Goals and Instruments

Research Question: Data Source:	Impact on Student Engagement	Student Attitudes Toward Learning	What did Students Learn?
Student Entrance Survey	Q. 1 – 3, 4a-c, 11b	Q. 4d-o, 5 – 7, 9, 11c	Q. 8, 10, 11a
Parent Entrance Survey	Q. 1 – 3	Q. 4, 5a-g, 6, 8	Q. 5h-s, 7
Initial Teacher Interview	Q. 1 – 3	Q. 4 – 6	Q. 7 – 14
Classroom Observations	(Looking for evidence of all)		
Student Exit Survey	Q. 1 – 3, 4a-c	Q. 4d-o, 7	Q. 5 – 6, 8 – 9
Student Exit Interview	Q. 1 – 6	Q. 2, 8 – 10	Q. 1 – 2, 7
Parent Exit Survey	Q. 1 – 2,	Q. 7	Q. 3 – 6
Teacher Exit Interview	Q. 2, 9	Q. 1	Q. 3 – 9
Student Records	Attendance	Attendance, grades	Grades
Student Follow-up Interview	Q. 1 – 3, 5, 7	7	Q. 1 – 2, 4 – 7

Recruiting participants. With only 14 students participating in the program during the semester of study, it made sense to try to recruit them all to participate. To begin the study, I visited with the students during class time in the program. I introduced the study, provided assent forms for them and informed consent letters for their parents/guardians, and explained that all of the data collection would be completed during class time. This is one reason that a high level of participation resulted. The other reason is that the students admitted to *PBLearn*

had to apply in the first place. The application process suggests that they were open to this approach to learning, either because they believed that it would be impactful, or they were looking for an alternative to the model in their home school. In either case, their belief in the program likely made them more open to wanting to support its development. Although participation was slightly more time consuming for the students' parents, once again it is likely that they wanted to support their child's participation in the program. If the open house that I witnessed as part of the Design Team was any indication, the parents were optimistic from the outset that *PBLearn* could be a helpful alternative for their child. Potentially the greatest obstacle was ensuring that the parents received the information and consent form for participation in the study. To help guarantee that they did, parents were sent informed consent letters electronically by email, via hard copy with their children, and then I followed up by email or telephone if necessary. With only 14 different contacts to make, follow-up continued until each parent had been contacted. When contact was made, emphasis was put on the fact that parents would only be asked to complete two short surveys, taking a total of 30 minutes. They were also reminded that this program is in its early stages and that as early participants; their feedback could be impactful on the program's effectiveness. The two teachers in the program were already aware of the requirements and quickly indicated their willingness to participate.

Student entrance survey (March 2016). Students were given an entrance survey to complete (see Appendix B). This survey was administered during class time and took less than 30 minutes to complete. It consisted mainly of questions which students could respond to by selecting the most appropriate response. The existing *High School Survey of Student Engagement* (HSSSE) developed by the Center for Evaluation and Education Policy (n. d.) at

Indiana University provided a model both for format and a number of potential questions. For most of the questions, students selected one of four answers with various Likert scale options provided. With respect to the first research question, this survey sought to establish the students' existing level of engagement in their home school and to identify those factors that foster engagement for each student. Here is an example of a question from this section:

2. How much do each of the following classroom activities and assignments interest or engage you?	Not at all	Very Little	Some	Very Much
a) Teacher lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Discussions and debates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

With respect to the second research question, the HSSSE offers some questions that would help identify the interests, motivations, and aspirations of each student. However, these were supplemented by some others that would help to uncover student attitudes toward learning. As identified in the literature, these distinctions might include those who are risk-averse (Doyle, 1983; Meyer et al., 1997) compared to those who have a greater tolerance for uncertainty (Clifford, as cited in Meyer et al., 1997), as well as those motivated by learning and understanding versus those motivated by grades (Ames, 1992; Dweck, 1986; Entwistle, 1987). The following question, for example, sought to uncover these distinctions, and could potentially provide insight as to which type of student mindset is best suited for the program:

7. How much do you agree or disagree with the following statements?	Strongly Disagree	Disagree	Agree	Strongly Agree
a) I like taking on new challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I like taking on difficult tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I prefer tasks that I have done before	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The third research question addressed the content and skills that students expected to acquire during their semester in the program. As such, the entrance survey was only used to establish a baseline for specific student skills and abilities near the beginning of the program, as well as to identify student expectations for *PBLearn*. With the HSSSE offering little help here, original questions for this survey again included questions with a choice of answers such as the following:

8. Identify your current level or ability in each of the following areas.	None	Limited	Some	A Lot
a) Creativity: imagination, pursuing new ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Collaboration: teamwork, learning with and from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Citizenship: respect for others and the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other questions for this section were open ended to allow for a greater depth of responses, such as this question:

10. What do you hope to learn in PBLearn that you might not have been able to learn at your home school?
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Parent entrance survey (March 2016). Parents were also asked to complete a survey early in the semester (see Appendix C). This data was compared to that collected from the students, in order to get a more accurate picture of the attitudes toward learning of students in the program, their existing levels of engagement, and their expectations for the program. This survey was sent to parents by email or provided as a printed copy if that was preferred. It has fewer questions than the student survey and should not have taken more than 15 minutes to complete. Here are parts of two questions that show the similarity to the student survey questions, with slight modifications:

1. Which of the following school activities do you believe your child finds interesting or engaging?	Not at all	Very Little	Some	Very Much
a) Teacher lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Discussions and debates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. How often does your child:	Not at all	Very Little	Some	Very Much
a) Do school work at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Talk about school at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Initial teacher interview (April 2016). An initial formal interview was conducted with each teacher after the student and parent surveys were completed and reviewed. Once again, the goals of these interviews were to get initial impressions of each student's engagement and progress in the program, to identify the students' attitudes toward learning, and to confirm the desired outcomes (both for content and desired skill acquisition) for the semester (see Appendix D). It was thought that two months would be ample time for the teachers to have formed a reasonable understanding of each of the 14 students and to have set out their shared vision or goals for the semester. Given that there is an expectation for some consistency in program delivery across semesters, this was also probed. The interviews were audio recorded for later transcription and to ensure no data loss. With respect to student engagement and progress, questions included:

1. Tell me how (student name) is doing so far in the program.
2. How would you describe (student name)'s level of engagement?
3. What types of activities or other factors seem to influence (student name)'s engagement?

Questions of the following nature were posed to help confirm students' attitudes toward learning:

4. What motivates (student name) to perform or succeed in school?
5. How would you describe or characterize (student name) as a learner?
6. Why do you think (student name) is or is not well suited to this program?

Questions of this sort helped to get a feel for students' beginning abilities with some of the desired skills:

7. With respect to the 6 Cs (a list will be provided), which if any characteristics does (student name) seem to demonstrate or possess?

These questions were used to help determine the level of consistency in the program setup and delivery:

9. How would you describe your approach to the PBL pedagogy that you are implementing this semester? Are there any theories or models that have informed this approach?
14. How would you say that this semester is the same or different from the last semester of PBLearn?

Questions such as the following sought to uncover the intended outcomes of the program:

10. In your planning and in the classes you have had so far, how would you describe the balance between students acquiring content knowledge and developing skills?
11. What skills are you consciously trying to develop? What teaching strategies are you employing to do so?

The responses to these questions were used to inform follow-up questions in the second teacher interview, near the end of the program.

Classroom observations (March to June 2016). I attended program classes once per month to observe and take notes on program implementation. To gather student-specific evidence, I had a dedicated section for observations for each student. These observations were undertaken to note demonstrations of engagement (or distraction). A separate section was used to note general activities, endeavours, or moments in class that appeared to be more or

less engaging for a number of students. In doing observations, indicators identified within the literature were used. "Students' level of engagement in academic work can be inferred from the way they complete academic tasks: the amount of time they spend, the intensity of their concentration, the enthusiasm they express, and the degree of care they show" (Newmann, 1989, p. 34). While it is difficult to gauge enthusiasm or degree of care, the amount of time spent on task and the apparent level of concentration on those tasks are evident enough to note. I also looked for demonstrations of the following behaviours, as Finn (1989) suggests that they convey student engagement: verbal participation, social behaviour with peers, attentiveness, reaction to and relationship with the teacher. Finn also suggests that displays of negative behaviour, anxiety, or worry may be signs of disengagement, and were thus noted as well.

Two other categories of observations were made for indications of content acquisition and/or skill acquisition. Instances where students were asked to complete a task for a specific reason, or when they completed a task naturally on their own, were noted to see if certain tasks were being completed by a number of students, or perhaps even the majority of students. These observations helped to determine the types of learning that were occurring within the semester, and perhaps consistently within the program.

Student exit survey (June 2016). As the end of the semester approached, students were given an exit survey to complete (see Appendix E). This was done during class time and took about the same amount of time to complete as the entrance survey. In order to address the question of whether the program had an impact on student engagement, the goal of the exit survey was to ascertain whether students' level of engagement at the beginning of the

program—as identified on the entrance survey—had changed after their time in the program.

The first section of questions attempted to get a sense of these changes. While these questions were mostly quantitative in nature, they were primarily used to guide questions in the student interviews that followed, with a goal of uncovering the reason for changes in engagement. In some cases, questions from the entrance survey were repeated, with slight modifications to seek feedback on the time spent in the program. In other cases, the questions more directly asked students to identify how they felt differently about their school experience as a result of the semester in *PBLearn*. A question of this sort was:

3. How much do you agree or disagree with the following statements?	Strongly Disagree	Disagree	Agree	Strongly Agree
a) I have really enjoyed school this semester	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) PBLearn has increased my desire to learn new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The exit survey did not have a section referencing the research question related to student attitudes toward learning, given that these were established through the earlier data collection. As such, the second section of questions for this instrument addressed the learning that occurred during the semester spent in the program. Again, many of the questions here were revisions of questions from the entrance survey, to measure any perceived differences in skills and abilities. They also echoed goals from the *National Survey of Student Engagement* used by the Indiana University Center for Postsecondary Research and Planning. While this instrument is used with college students, the goal is similar: “students estimate their educational and personal growth since starting college in the areas of general knowledge, intellectual skills, written and oral communication skills, personal, social and ethical development, and vocational preparation” (Kuh, 2002, p. 2).

To measure their perceived progress, students were asked questions such as:

6. Compared to your experiences at your home school, how much do you think PBLearn has helped you:	Much Less	Less	Same	More	Much More
a) Learn concepts in English Language Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Learn concepts in Information Technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Learn concepts in Physical Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Participate in Physical Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Learn concepts from other courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Develop your creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Develop your collaboration (working with others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The third section was more direct in seeking feedback on the time spent in the program.

Again, these questions provided starting points for the student interviews. Here are some questions from this section:

7. How much do you agree or disagree with the following statements?	Strongly Disagree	Disagree	Agree	Strongly Agree
a) Project work in PBLearn was confusing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I wish that more instructions/directions had been given	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) PBLearn gave me the right amount of freedom to choose	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. What do you feel were the most important factors affecting your learning this semester? Rank the following factors from 1 (most important) to 7 (least important).	
_____ The teachers	_____ Other adults who helped in the program
_____ Other students in the program	_____ The school, classroom or learning environment
_____ Field trips or outings	_____ Your project or topics that you learned about
_____ The way that you shared or presented what you had learned	

Parent exit surveys (June 2016). Around the same time that students were completing exit surveys, parents were asked to complete a follow-up survey similar in duration and content to the one completed at the beginning of the semester (see Appendix F). Once again, the questions mirrored the student survey and were used to offer another perspective. The first section sought feedback on the students' engagement in the program; the second revisited initial assessments of the abilities of students in the different content and skill areas. Lastly, parents were asked to provide general feedback on the program, with questions such as:

4. In your view, what are the most positive or helpful features of PBLearn?

5. In your view, which features of PBLearn are the least helpful?

Student exit interviews (final week of the semester). All students were invited to participate in a one-on-one interview at the very end of the semester (see Appendix G). Depending on the student's experience in the program and willingness to provide feedback, each interview took from 10 to 20 minutes to complete. At the beginning of the interview, students were notified that the interviews would be audio recorded for later transcription and ensuring that data will not be lost. They were also told that these transcriptions would be made available to them for verification and review. To allow the students to warm up to the interview and to discuss what they wished to share, the interview began with general questions:

1. Tell me about your experience this semester in PBLearn.

2. Tell me about a typical day for you this semester.

As Stringer (2014) suggests, such "grand tour questions comprise ways of initiating participant descriptions of their experience" (p. 59). The next questions emerged from in-class

observations or sought to expand on responses from the student and parent exit surveys.

Examples of question formats and types include:

You have indicated that your participation in _____ has increased in *PBLearn*. Why did this change occur for you?

You have indicated that your Critical Thinking skills have improved throughout this semester. Give me an example of how you have demonstrated this improvement.

You have indicated that you prefer learning in the environment at your home school. What is it about the learning environment at your home school that you prefer?

The last two questions asked for the student's perspective on the *PBLearn* experience and how they felt about returning to study in a traditional high school program setting:

9. Knowing what you know now about this program, if you had to go back and decide whether to attend, would you? Explain why you would or wouldn't want to do it again.

10. How do you feel about returning to your home school to begin your Grade 12 year?

Lastly, students were reminded about meeting in October of the next school year to discuss whether their experiences in *PBLearn* were impacting their learning or attitude towards school now back in a traditional high school program.

Teacher exit interviews (end of June). The final data collection piece for the semester was an interview with each teacher (see Appendix H). These interviews took place after the students had completed their work for the semester, and after the student interviews and parent surveys had been completed and reviewed. These interviews followed a similar format to the first teacher interviews. In the first portion, the teachers were asked about the engagement of each student:

1. How would you describe (student name)'s level of engagement throughout the program?

2. How would you describe his/her desire to learn throughout the semester?

The next set of questions sought to confirm the learning attitudes of individual students:

3. Earlier in the semester, you described (student's name) as _____ (from Question 5 of Initial Interview). How would you alter that description at this time, if at all?

4. Do you feel that he/she was well suited for the program? Why?

To compare to the student feedback, teachers were asked about the skills displayed by each student. The next questions were follow-ups to identify the intended content and skill development goals for the semester. They looked like the following:

6. You had planned the balance between students acquiring content knowledge and developing skills to be _____. Explain whether this balance occurred or not, and why.

7. You had stated that you hoped to focus on developing (name of skill). Did this work out as planned? If so, provide some examples of how this skill was integrated and developed.

The remaining questions asked the teacher to compare the program delivery to that of the previous semester, and sought the teacher's general feedback on the program and possible suggestions for improvement.

Student records (summer 2016). Existing school records were collected as data for this study. Each student's home school was contacted in late August to request the students' report cards for the 2015-2016 school year. These were reviewed to collect:

- The number of absences and tardies in the semester prior to *PBLearn*.
- The number of absences and tardies during the semester in *PBLearn*.
- Course grades for courses from the first semester of Grade 11.
- Grades while in the *PBLearn* program.

It should be noted that any changes to attendance or grades cannot automatically be attributed to *PBLearn*, but changes occurred while students participated in the pilot program.

While these data might provide some insight into outcomes of the program, it is new and so

different from the traditional model of the home schools that even the way teachers take attendance may itself cause at least minor changes in the data. Such data would have to be tracked and analyzed over a longer period. It would also be important to review students' records for grades and attendance for the first semester back at the home school following the semester spent in the program, though this comparison would occur in a subsequent loop of the overall action research evaluation of *PBLearn*.

Student follow-up interviews (October 2016). To get a sense of whether *PBLearn* students' experiences in the program had any lasting effects on their approach to schooling, students were contacted for a short interview in October 2016 (see Appendix I). These interviews took place at the students' home schools, at a time convenient to their schedule. Only a few, opened-ended questions were asked at this time. Students were asked about how the *PBLearn* experience had impacted:

- Transition back to their home school;
- Reactions and questions from non-*PBLearn* students;
- Their current learning and course choices; and
- Their plans for the future.

The students were also asked if they were happy with the choice they made to attend *PBLearn*, and to provide any other feedback on their experience.

Data Analysis

As has been previously described, data gathered from each instrument was reviewed and analyzed immediately as it impacted the content and direction of subsequent collection. While the information collected during interviews and observations were qualitative, the survey data

was both qualitative and quantitative. As a result, the different data types called for different forms of analysis.

Qualitative data. The review of qualitative data included two forms of analysis. As data were reviewed, thematic analysis allowed data to be organized and interpreted and for emergent themes to be identified. A separate analysis identified potential key experiences that might warrant further exploration. While some aspects of the two analyses were done concurrently, the processes were separate, as addressed in the following sections.

Thematic analysis. This process classified data according to the source of the data and the research question to which it pertained. Figure 2 is a diagram created by Stringer (2014, p. 101) and slightly modified to demonstrate the categorizing and coding process for this study.

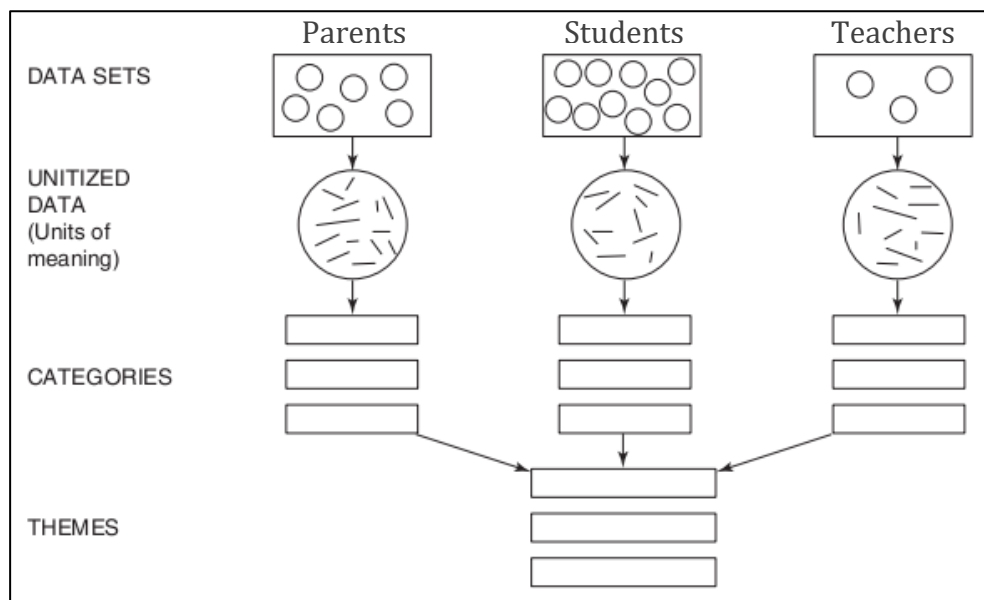


Figure 2: Thematic Analysis of Qualitative Data.

First, data were coded to identify whether the source of the data was students, parents or teachers. Stringer (2014) suggests that “this allows us to take account of the differences in perspective and experience of the types of people inhabiting the context of the study” (p. 101).

The goal at the next level was to “unitize” data: to break down full responses or sentences into separate blocks of discrete data (Stringer, 2014). By reading over survey responses and interview transcripts and highlighting each separate unit of information, I divided full responses that might address different areas or research questions. It is at the next level where data was categorized with respect to the relevant research question: student engagement, student characteristics or types, and learning in the program (content and skill acquisition). As Table 1 suggests (Data Collection Goals and Instruments), the questions in each data collection instrument had already been organized to facilitate these groupings. A fourth category included data that offered general feedback about *PBLearn*. Within each of the four categories, numerous subcategories had the potential to emerge from the data. Figure 3 illustrates some of these possibilities and corresponding codes.

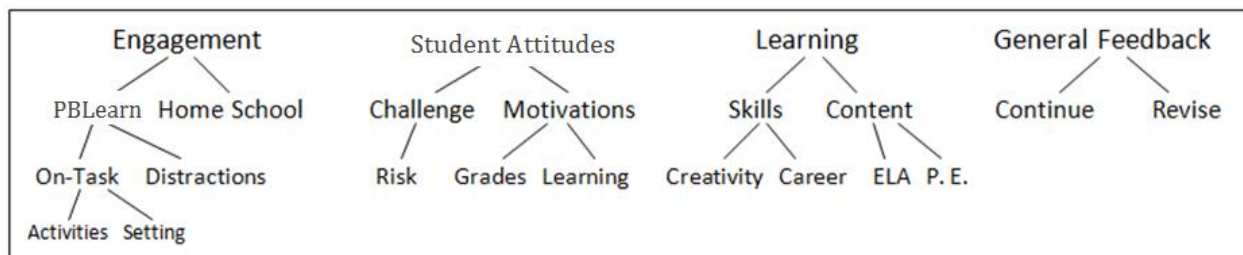


Figure 3: Possible Sub-categories and Codes

Once data had been categorized, the recurring themes provided the impetus for answering the research questions and any proposed actions. Some of the themes stemmed from one category in isolation. For example, it became evident that the program does little to promote the use of technology; in future iterations of the program, educators may choose to put more emphasis on this desired area of learning. In contrast, some themes require a combined look at multiple categories. For example, it seems that students with certain attitudes are more

or less prone to engagement in the program. In this case, looking at these two categories in combination could help address the question of student selection for future iterations of the program.

Key experiences. As information was categorized and coded during the thematic analysis, individual accounts and observations were reviewed again with an aim to search for critical or insightful instances. These are what Stringer (2014) refers to as “key experiences”, which he suggests “can be either positive or negative, and may include ... the sense of wonderment (or frustration) emerging from a particularly difficult learning process” (p. 89). A new learning environment like *PBLearn* was different enough for students that it could certainly constitute such a “difficult learning process.” While collecting and reviewing data, therefore, any significant individual events or responses were added to the list of key experiences for further review. It should be noted that key experiences were those that seemed important to the participants as well as the researcher. In most cases, the reaction of the participant made them easy to observe or to identify in their responses.

When a key experience was identified, I tried to discover what caused the experience to be significant for the participant. Interviews provided the best opportunities to follow up on meaningful experiences observed or identified by students and teachers. While it required further steps and efforts to understand each key experience, this labour was justified. Since key experiences “are those aspects that are seen or felt by participants to be a central part of their experience” (Stringer, 2014, p. 96), further exploration of these may provide as much of an understanding of the student experience in *PBLearn* as the macro-exploration provided by the thematic analysis.

Quantitative data. The process for analyzing quantitative survey questions and student records data was separate from the qualitative analysis. Two sets of descriptive statistics were calculated to draw meaning from this data. The first set represents aggregate data from each of the two participant groups: students and parents. The second set compares before and after responses from each individual student and parent. While the aggregate responses give some idea about the average impact of the program on any given attendee, the individual comparisons shed more light on the impact of the program for different types of students.

Aggregate statistics. For all of the quantitative survey questions, frequency distributions were calculated to demonstrate the number and percentage of respondents who selected each response option. For example, when students were asked how often they participated in classroom discussions at their home school, 3 or 27.3% responded “never”, 4 or 36.4% responded “sometimes”, 2 or 18.2% responded “often” and 2 or 18.2% responded “all the time”.

For the Likert-scale survey questions, mean scores were also calculated to demonstrate the average response of all respondents to each question. For the same question as the previous example, the numerical average of all answers (never = 1, sometimes = 2, often = 3, all the time = 4) was calculated. For this example, a mean response of 2.3 represents an average response between “sometimes” and “all the time,” but closer to the former. Mean rates were calculated for attendance and mean scores for grades which were culled from the attendance records and report cards. These descriptive statistics were used to compare results from the beginning of the program to those at the end of the program. Once again, the goal was not to presume any causality with *PBLearn*, but rather to understand the program and its potential impacts, and provide evidence to support the study conclusions and possible calls to action.

Individual comparisons. Comparisons of individual student responses were made for survey questions that were asked at the beginning and again at the end of the semester. For example, Barry responded that he “rarely” learned outside of class time at his home school, but learned “often” outside of class time in *PBLearn*. This represents a change of “+2” (rarely = 2 and often = 4) for that question. A similar comparison was made with attendance from the student report cards. While Garth had 20 more absences in *PBLearn*, Carlos had 106 fewer. The interest, therefore, is both in determining *how many* students showed improvement or decline in the areas of engagement and learning, and identifying *how different types* of students responded to the program.

Criteria for Ensuring Quality

It is important in any research study to ensure the quality of the data and of the entire process of data collection. The traditional measures of reliability and validity for quantitative data don't apply in primarily qualitative action research studies like this one. While several criteria have been proposed to ensure quality for such studies, Reason's criteria (2006) are appropriate and reflect many of the other common criteria for quality in action research. Reason offers the reminder that action researchers “are no longer pursuing a validity that is about getting it right” (p. 190) and instead they must “be aware of the choices that are made” (p. 187) when ensuring the quality of their study. Reason posits that action research can be evaluated on four dimensions: practicality, whether it is democratic and participative, whether it incorporates many ways of knowing, and the extent to which the study is an emergent process. The discussion that follows explains how these criteria were applied in this study.

Practicality. Given that this form of research is intended to incite and guide action, a study is only useful if it provides suggestions for improving practice. This idea is similar to Herr and Anderson's (2015) notion of *outcome validity*. *PBLearn* succeeded in engaging students and helping them learn, so in this case, the program demonstrates both practicality and outcome validity. In addition, the findings hold potential to help to refine the student selection process for the program, which also renders the study worthwhile.

Democratic and participative. Reason (2006) reminds us that action research is a "process that seeks to do research with, for, and by the people" (p. 189). In other words, it should involve as many people in the process as possible. This notion mirrors two criteria from Herr and Anderson's (2015) set. First, it addresses the notion of *democratic validity*, which calls for "collaboration with all parties who have a stake in the problem under investigation" (p. 69). In my study, all 14 students and the two teachers in the program were invited to participate, as were the students' parents. The student and parent feedback were gathered to help counter any potential bias stemming from the researcher and teachers who were also involved in the design of the program; I deliberately sought out data that ran counter to my beliefs, values, and anticipated program outcomes as discussed with the Design Team. Second, this criterion addresses the notion of *dialogic validity*, which calls for a thorough peer review. Since the study is being conducted for my Master of Education thesis, the findings are made public for other interested members of the profession. Making one's work community property also satisfies the need for dialogic validity. The following process of member checking outlines how the researcher helped to ensure data quality.

Member checking. Interviews and surveys were conducted with three sub-groups in this study: students, teacher, and parents. Those interviewed were sent their transcripts for review, verification, and to check for identifying comments. I also did meaning checks with participants during the interviews to ensure that I understood their comments. The Design Team and the participating members of the division's leadership team also served as critical friends. I asked for feedback on my interpretations of the data which enriched the discussion of findings and recommended actions.

Many ways of knowing. This dimension demands that a quality study reflects both what occurs in practice and relevant knowledge from the literature. Reason (2006) explains that "many action researchers argue that their work is based upon ways of knowing that go beyond orthodox empirical and rational Western epistemology and that starts from a relationship between self and other, through participation and intuition" (p. 195). In other words, a quality study is a study informed by differing modes of knowing. This idea reflects Eisenhart and Borko's (1993) standard of *comprehensiveness* in educational research. The *PBLearn* Design Team understood that, given an unlimited time frame and access to resources, further review of past PBL programs and visits to successful programs would improve the probability of success for *PBLearn*. Similarly, I understand that further literature review is available. In both cases, we made efforts to ensure that our work was adequately informed both by the research and our own experiences as teachers. Rather than exhausting every existing and potentially helpful resource, we are comfortable leaving room for more learning to occur with *PBLearn* in action.

Emergent process. Reason (2006) contends that "good action research does not arrive fully fledged in clear research design separate from the stream of life but evolves over time" (p.

189). The Design Team outlined some of the general structure and learning objectives for the program, but purposely allowed flexibility for students to direct the learning process where they needed it to go. As well, the program delivery was and will continue to be reviewed after every semester to identify possible improvements. This study of the students over the course of one semester was mostly planned in advance. Still, there was room allotted during interviews to ask questions that emerged naturally from previous data collection. Perhaps most importantly, the eventual action that now flows from this study and from the program in general, could go in a number of directions. This response meets Herr and Anderson's (2015) notion of *catalytic validity*. For example, this study showed that the program promoted increased engagement for students, and therefore, it should provide support for increased student access to such programs. Similar options presented themselves with respect to content and skill acquisition. The study of different student types in the program could drive approaches for student selection in future iterations. The aim at the outset was not to speculate about potential discoveries and action to take, but rather to remain open to whatever appropriate action the data suggested.

Ethical Considerations

Although there was no foreseeable risk to students' participation in this study, there are nonetheless a number of ethical issues that were considered.

Ethics approval. I first submitted an application to the University of Manitoba's Education/Nursing Research Ethics Board. Once my study was approved (see Appendix J), I obtained permission from the divisional superintendent for permission to conduct the study within the school division.

Dual roles and conflict of interest. According to the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans (2014), situations of dual roles “may create conflicts, undue influences, power imbalances or coercion that could affect relationships with others and affect decision-making processes (e.g., consent of participants)” (p. 99). The dual role that could be perceived as creating power imbalances is that in addition to acting as researcher, I am also a teacher and recently-appointed administrator in the school division. Although I had previously taught some of the student participants, there was no direct authority as I did not teach them in the program and I will not be teaching them again. I didn’t anticipate my new role as Vice-Principal at an elementary school in the division to have any bearing on my existing relationship with the teachers in the program. Although I took on a leadership role, there was no direct authority as I was not working in their schools. Another potential conflict is that students, parents and colleagues might have felt pressure to participate, knowing that it is a requirement of me obtaining my degree. It was hoped that they were not unduly influenced by the academic credential that I stood to gain by conducting a successful study.

Informed consent. Letters of consent were provided for students, parents, and teachers to sign. These letters outlined the purpose of the study (including the research questions), risks, and benefits of the study. The letter described the format and timing of the various data collection methods and outlined how findings will be shared with participants and eventually disseminated more publically. Participants were assured that while examples of experiences, responses, and observations will be shared, their identities, and those of the school and location, will be protected. The letter reminded students, parents, and teachers that

participation was voluntary and that they could withdraw at any time without impacting their grades, participation in the program, or relationships with their teachers or the researcher.

Confidentiality and safe data storage. Data included completed surveys, digital recordings and transcripts of interviews, field notes, and copies of student records. These have been kept confidential and safely stored in a locked filing cabinet in my home. I did the transcriptions myself in the privacy of my home office so that digital recordings could not be overheard by others. The names of students and their pseudonyms have been kept in a file, separate from the data. Participants signed a pledge of confidentiality. Digital information has been stored on my password-protected computer and will be deleted after my study is complete and I have graduated, no later than October 2017. Hard copies of data will also be shredded and destroyed at that time.

Limitations and Advantages of the Methodology

Although all research is a demanding and time-consuming process, the cyclical and repeating process of action research can impose even further time demands on the researcher. As described earlier, the intervention of *PBLearn* as a new program offering is itself a complete action research study, and this investigation of one specific semester in the program is but one loop in the research cycle. The advantage of focusing on only one semester makes this study more manageable and its anticipated findings timelier. The shortcoming is that although the program review will continue in future iterations, it may not be formally documented in the context of an ongoing study and thus the findings are restricted to this one semester with one group of students and teachers.

This restriction also speaks to inherent limitations for generalizability. While some aspects of the program will surely be repeated with each iteration, the results from one semester in isolation will always be a reflection of the students and teachers in the program at one point in time. The characteristics, learning and teaching styles, and strategies of these teachers and students are specific enough that their results cannot be generalized to any group of students and teachers; however they may be transferrable to those working in similar school contexts which have been richly described for readers. Consistent findings across several, separate groups of students would be more generalizable, but would require a more comprehensive, longitudinal study.

Many of the instruments used for data collection relied on self-reporting from the participants. It is hoped that students were honest in completing surveys and with their interview responses. In any case, student responses were verified by parent responses, teacher responses, and researcher observations. Only key experiences stemmed from the student self-reporting alone, and these occurrences were followed up and verified in greater depth during interviews.

Despite these drawbacks, the action research approach has enough advantages to justify its use. As stated in the discussion on research quality, the action research approach is practical. It benefits by allowing members of the Design Team and me to address our own practice. At the same time, it substantiates our beliefs using data to support or validate our practice. This research helped bring our beliefs and values about teaching in closer alignment with our practices. Our involvement in the design and implementation of the program—just as my involvement with this study—served as valuable professional development that will reverberate

in other areas of our teaching practice. Such events, which at once help teachers develop while also providing new learning opportunities for students, are beneficial to all. And, they just might be contagious. Not only might teachers be more willing to accept research findings that stem from a colleague's work, but they might also be motivated to get involved with similar initiatives, program implementations, and studies. In the end, this reinforces the primary purpose of action research in education: to incite action that will improve educational practices.

Chapter 4: Findings and Discussion

As described in the previous chapter, 10 instruments were used to collect data related to the three research questions, as well as to provide general feedback about the program. This chapter will be organized along these four divisions. Each of the four sections will follow the same order. First, findings generated from the 10 data sets will be shared. Within each data set, the quantitative data will be presented first in summary tables, followed by the qualitative data, organized according to emergent themes. Last in each section, there will be an interpretive discussion of the findings. It is important first to review the participation rates for each of the data collection processes before reviewing the findings.

Participation Rates

There were a total of 24 participants in the study ($N = 24$). These participants are divided into three subgroups: students ($n = 11$), parents ($n = 11$) and teachers ($n = 2$). While the semester began with 15 students in the program, one student decided early on not to continue. Of the 14 eligible student participants, 11 agreed to be part of the study, which translates to a 79% participation rate. For each of these 11 students, one parent (or two parents working together) was invited to complete the parent surveys. The two program teachers this semester participated in all aspects of the study.

Table 2 below provides the participation rates by each sub-group within each data collection process which were overall high. It can be seen that the two teachers participated in all data collection procedures planned for them. It is also gratifying to report that 100% of the students took part in five of seven data collection procedures. The follow-up interviews were completed with the large majority (90.9% or 10 of 11) of participating students; however four

students were not present for one of the classroom observations, resulting in a lower participation rate of 63.6%. Most parents completed their two surveys, yielding a participation rate of 72.7% for the entrance survey and a slightly higher rate of 81.8% for the exit survey.

Table 2

Participation Rates in Data Collection by Sub-Group

Data Set (Collection Tool)	Total Participants in Sub-Group	Number of Participants	% of Total Sub-Group
Student Entrance Survey	11	11	100.0
Parent Entrance Survey	11	8	72.7
Initial Teacher Interview	2	2	100.0
Classroom Observation 1 – Students (number present)	11	11	100.0
Classroom Observation 1 – Teachers	2	2	100.0
Classroom Observation 2 – Students	11	7	63.6
Classroom Observation 2 – Teachers	2	2	100.0
Classroom Observation 3 – Students	11	11	100.0
Classroom Observation 3 – Teachers	2	2	100.0
Student Exit Surveys	11	11	100.0
Parent Exit Surveys	11	9	81.8
Student Exit Interviews	11	11	100.0
Teacher Exit Interviews	2	2	100.0
Student Records Review (Report Card Data)	11	11	100.0
Student Follow-Up Interview	11	10	90.9

The Impact of *PBLearn* on Student Engagement

This section presents findings related to my first research question, what impact does *PBLearn* have on the learning engagement of spike students. Much of the data collected through the ten instruments related to student engagement. The findings from each data set will precede a discussion related to this research question.

Student entrance survey. This survey asked students to provide feedback on their experiences in their home schools. Table 3 displays students' responses regarding their level of interest in different types of learning activities. The columns provide the distribution of students' responses and mean scores for each learning activity. Numerical values were assigned

to each response to calculate mean scores (Not at All = 1, Very Little = 2, Some = 3, Very Much = 4). A higher mean score represents a higher level of interest in that type of learning activity.

Table 3

Level of Interest: Distribution of Responses and Mean Scores by Activity
(n=11)

Activity	Level of Interest				Mean Score
	Not at All (1)	Very Little (2)	Some (3)	Very Much (4)	
Computers/technology	0 (0%)	0 (0%)	8 (72.7%)	3 (27.3%)	3.3 = Some
Group projects	1 (9.1%)	0 (0%)	8 (72.7%)	2 (18.2%)	3.0 = Some
Discussions/debates	1 (9.1%)	2 (18.2%)	5 (45.5%)	3 (27.3%)	2.9 = Some
Individual research	0 (0%)	3 (27.3%)	6 (54.5%)	2 (18.2%)	2.9 = Some
Art, drama, role-play	2 (18.2%)	3 (27.3%)	0 (0%)	6 (54.5%)	2.9 = Some
Writing projects	0 (0%)	3 (27.3%)	7 (63.6%)	1 (9.1%)	2.8 = Some
Individual readings	2 (18.2%)	2 (18.2%)	5 (45.5%)	2 (18.2%)	2.6 = Some
Giving presentations	4 (36.4%)	2 (18.2%)	1 (9.1%)	4 (36.4%)	2.4 = Very Little
Teacher lectures	4 (36.4%)	4 (36.4%)	3 (27.3%)	0 (0%)	1.9 = Very Little

Although there were some students who indicated their interest at the “very much” level in some types of activities at their home schools, there were no activities that particularly interested all students, with a mean score approaching 4.0. The most interesting activities for the group were those involving computers or technology (3.3), followed by group projects (3.0), discussions and debates (2.9), individual research (2.9), art, drama and role-play (2.9), and writing projects (2.8). Less interest was indicated for individual reading (2.6) and giving presentations (2.4). Perhaps not surprisingly, the least popular activity overall was teacher lectures (1.9).

Other survey items related to student engagement were asked on both the Student Entrance Survey and the Student Exit Survey. The data from both instruments are displayed together here as they provide for comparisons between students’ impressions of their levels of engagement at their home school and while participating in *PBLearn*. Table 4 shows the distribution of students who assessed their level of participation along a scale from “Never” to

“All the Time” in different activities in both settings. The mean score was calculated by assigning a numerical value to each of the four responses, as indicated in the table.

Table 4

Level of Interest: Comparison of Home and PBLearn School Experiences
(n=11)

School Experiences	Level of Interest				Mean Score
	Never (1)	Sometimes (2)	Often (3)	All the Time (4)	
Classroom Discussions - Home	3 (27.3%)	4 (36.4%)	2 (18.2%)	2 (18.2%)	2.3 = Sometimes
Classroom Discussions - <i>PBLearn</i>	0 (0.0%)	2 (18.2%)	2 (18.2%)	7 (63.6%)	3.5 = Often
Class Activities - Home	1 (9.1%)	2 (18.2%)	6 (54.5%)	2 (18.2%)	2.8 = Often
Class Activities - <i>PBLearn</i>	0 (0.0%)	0 (0.0%)	3 (27.3%)	8 (72.7%)	3.7 = All the Time
School Activities - Home	2 (18.2%)	4 (36.4%)	2 (18.2%)	3 (27.3%)	2.6 = Often
School Activities - <i>PBLearn</i>	0 (0.0%)	5 (45.5%)	1 (9.1%)	5 (45.5%)	3.0 = Often

The responses suggest that students participated more actively in all three types of school experiences at *PBLearn* than they did at their home school. Their mean scores for participation increased by a full level in both classroom discussions (from “sometimes” to “often”) and class activities (from “often” to “all the time”). There was also a mean score gain of 0.4 reported for participation in school activities. It is interesting that no students felt that they “never” participated in any of the three experiences in the program setting, and the “all the time” ratings increased in all three areas in *PBLearn* as well.

Students were asked about those things that caused boredom for them, both at their home school and in *PBLearn*. Table 5 shows the number of students who reported to be bored by each of the factors listed, in each setting. Students were permitted to check all factors that were applicable to them in both settings.

Table 5

Causes of boredom: Home School vs. PBLearn
(n=11)

Causes of Boredom	Number of Students Bored at Home School	Number of Students Bored in PBLearn
Material not interesting	10 (90.9%)	5 (45.5%)
Teaching methods not interesting	10 (90.9%)	2 (18.2%)
Work not challenging enough	9 (81.8%)	3 (27.3%)
Irrelevant material	6 (54.5%)	3 (27.3%)
Work too difficult	5 (45.5%)	1 (9.1%)
Lack of interaction with teacher	5 (45.5%)	1 (9.1%)
Lack of interaction with students	3 (27.3%)	4 (36.4%)
Students who were never bored	0 (0.0%)	2 (18.2%)

Overall, the data in Table 5 provide evidence that fewer students were bored by the factors examined in *PBLearn* than they were by those same factors at their home schools. The greatest reduction is that eight fewer students (72.7%) were bored by the teaching methods used in *PBLearn* as compared to those used in their home schools, followed by six fewer (54.5%) as a result of the work not being challenging enough. Next was five fewer students (45.4%) being bored by material that wasn't interesting, four fewer (36.4%) for each of the work being too difficult or the lack of interaction with the teacher, and three fewer (27.3%) as a result of the material being irrelevant. Smaller numbers of students reported boredom due to a lack of interaction with peers in both contexts, however, slightly more so in *PBLearn* (4 or 36.4%). While all 11 students were bored at least some of the time at their home school, 2 of the 11 (18.2%) students reported never being bored in *PBLearn*.

The Student Entrance Survey closed with three open-ended questions, which most students used to make comments about learning engagement. When asked what they were most looking forward to in *PBLearn*, their responses reflected aspects of the program that they anticipated they would enjoy or be active in throughout the semester. Seven of the 11 students

(64%) highlighted the potential to work on something of personal interest. In some cases, projects were specifically identified such as programming or starting a business, but in most cases students made general statements, like “being able to do things I actually care about” or “having the time to pursue my passions.” The final question asked for further comments about learning experiences at students’ home schools. Most of these responses reflected a lack of engagement in school. Some students were quite blunt: “It was really boring”, or “I care about almost none of the things I have to learn.” Two students suggested that the problem with their home school program was that it lacked appeal to all students, with one stating “I never really felt like it was for me,” and another suggesting the home school setting “isn’t ideal for every type of student.”

Parent entrance survey. This survey required parents to respond to many of the same items related to student engagement as did their children. Parents were also asked about their child’s perceived level of interest in various activities at their home school. Their responses tended to agree with those of their children, although it was interesting to find that most parents tended to report higher levels of interest in the activities than their children had expressed. Table 6 shows this pattern—the parents’ mean scores for each activity is higher than the students’ mean scores.

Table 6

Student Interest in Activities at Home School: Student vs. Parent Mean Scores

Activity	Average Interest (Students)	Average Interest (Parents)
Computers/technology	3.3 = Some (1)	3.6 = Very Much (2)
Group projects	3.0 = Some (2)	3.3 = Some (4)
Individual research	2.9 = Some (3)	3.5 = Very Much (3)
Discussions/debates	2.9 = Some (3)	3.9 = Very Much (1)
Art, drama, role-play	2.9 = Some (3)	3.1 = Some (5)
Writing projects	2.8 = Some (6)	3.0 = Some (6)
Individual readings	2.6 = Some (7)	2.9 = Some (8)
Giving presentations	2.4 = Very Little (8)	3.0 = Some (6)
Teacher lectures	1.9 = Very Little (9)	2.5 = Some (9)

Note: The numbers in brackets show the rank order for each of the student and parent groups.

The parents' mean score was higher for every activity, with the increase ranging from 0.2 to 1.0.

The greatest difference between parents' and students' mean scores was found for discussions and debates (1.0), followed by giving presentations, teacher lectures and individual research (0.6), computers/technology, group projects and individual readings (0.3), and the smallest difference for art/drama/role-play and writing projects (0.2). Although the students' and parents' rankings of the activities differed in most cases, the two groups agreed on the same five activities with the highest level of interest (computers/technology, group projects, individual research, discussions/debates, art/drama/role play) and the same four activities with the lowest level of interest (writing projects, individual readings, giving presentations, teacher lectures).

Another item on the parent survey provided data on student engagement. The question was asked of the parents on both the entrance and exit survey, and with six parents having completed both surveys, this provided for some before and after comparisons. The question asked parents to rate the frequency of three different, overt displays of engagement in the time at their home school and in *PBLearn*: doing school work at home, talking about school at home,

and engaging in learning that was not assigned from school. The distribution and mean scores generated by these six parents are shown in Table 7.

Table 7

Displays of Engagement: Home School vs. PBLearn
(n=6)

Display of Engagement	Frequency				Mean Score
	Not at All (1)	Very Little (2)	Some (3)	Very Much (4)	
Homework – Home	0 (0%)	0 (0%)	5 (83.3%)	1 (16.7%)	3.2 = Some
Homework – PBLearn	0 (0%)	0 (0%)	3 (50%)	3 (50%)	3.5 = Very Much
Talk About School – Home	0 (0%)	1 (16.7%)	2 (33.3%)	3 (50%)	3.3 = Some
Talk About School – PBLearn	0 (0%)	0 (0%)	3 (50%)	3 (50%)	3.5 = Very Much
Non-Assigned Learning – Home	0 (0%)	1 (16.7%)	4 (66.7%)	1 (16.7%)	3.0 = Some
Non-Assigned Learning – PBLearn	0 (0%)	1 (16.7%)	3 (50%)	2 (33.3%)	3.2 = Some

The parent responses indicate small mean score gains for student engagement in the *PBLearn* environment in all three categories.

The parents were also asked some open-ended questions about the program at the end of the entrance survey. When asked why their child wanted to attend the program, most made some reference to engagement. One parent flat-out stated that the existing home school setting was too often boring for their child. Other parents identified the features of *PBLearn* that might make it more engaging for their child. Four of the eight parents felt it intrigued their children because it allowed them to pursue a personal interest or passion. Three parents mentioned their child's appreciation for the opportunity to work with a greater sense of independence or responsibility.

Initial teacher interviews. The interviews provided a number of comments related to the impact of the program on student engagement. The teachers described a number of ways that the students had displayed engagement early in the semester. The most common indicator

noted by the teachers was students explicitly stating or demonstrating that they wanted to be in school in the project environment. They paraphrased what Carlos, who had frequently been absent in the home-school setting, was telling them about the program:

I want to be here. This is the first time I've ever wanted to go to school. I wake up in the morning and I'm excited to go to school. I do not have to make excuses or lie to my mom anymore for why I do not need to go to school. I like being here.

The teachers described three other students who regularly came to school early or stayed late at the end of the day. For these students and others, the teachers were surprised by how much of their time at school was spent on-task, often unsupervised and undirected. They described Hal as follows: "He's the kid that's here at 8:15 and he's working and at 4:00 he's still working and he's working through lunch and you don't even check in with him and he just keeps working." They mentioned four students who exhibited this tendency of independently staying on task for most of the day. They further described two of these students who shared independent work habits. In reference to Eric, teachers said, "He just needs to be left alone and have the ability to work on an idea without interruption." For Garth, the teachers reported that "he just needs time to do his thing." In addition to working on their own, the teachers commented on the extent to which many students seemed to truly care about their work. This kind of caring was shown by Eric, who often "redoes things to improve" and by Julie, who "puts herself into every word" that she writes. Other displays of engagement described by the teachers included a few students who independently learned content or skills required for their project work, and almost all students participating regularly in group discussions.

Despite generally good levels of engagement, the teachers did still note some students lacking engagement. One student, in particular, seemed to be having a hard time finding her place in the program early in the semester. The teachers suggested that Ingrid would only be productive when being individually supervised or supported by one of the teachers. Julie was described as being “maybe 55 to 60% engaged,” and Lou often displayed off-task behaviour and had to be pushed by the teachers to take on greater responsibilities in his project work.

During these initial interviews, teachers shared a number of insights related to the potential causes for the engagement. By far the most recurring idea was that students appreciated the opportunity to pursue a project of personal interest. There were comments of this nature related to six of the eleven students:

Barry: “He’s chosen an activity that interests him.”

Carlos: “He’s very excited by what he wants to do.”

Eric: “He’s always wanted to just have time to do what he wants.”

Garth: “He wants the extra time to engage with what he wants to do.”

Kim: “She loves the fact that she can do a project on what she wants to do.”

Lou: “He doesn’t have the time constraints and gets to do what he wants to do.”

For at least three of the students, it became apparent that the new setting provided by *PBLearn* was something that they appreciated. One of the teachers suggested that Eric “needed a change...he was struggling in the regular programming.” Kim also shared her preference for the new setting as she “didn’t really feel intellectually challenged and didn’t have a lot of say or choice” at her home school. Lou spoke more about the relaxed atmosphere of the *PBLearn* environment, where he could “sit around on the couch and hang out with his friends.”

Other students expressed not just the physical comfort, but also how the setting made them feel more comfortable in other ways. The teachers spoke of Barry, who “likes to be supported by his friends” and the value that he “feels needed, and that he has an important role in his project,” and Hal, who similarly feels valued because “his group depends on him.” The teachers share how Carlos values the welcoming nature of the environment: “Sharing that we’re happy to see him each day makes him feel seen,” and suggesting that “his engagement is based on his feeling safe.” Adult approval appeared to be beneficial to Carlos, as well as to David, who was often looking for feedback from the teachers to help him improve in areas of personal growth.

Other factors that the teachers suggested are contributing to student engagement are that the program motivates a student like Fran, who “likes to be pushed, to be challenged” and another like Kim, who “was bored, not engaged, not motivated” in her home school, and now “she would say that she loves to come to school.” The general consensus from the teachers at the time of this first interview was that of the eleven students involved in the study, eight seemed to be engaged almost all of the time, two were mostly engaged but occasionally fell off task, and only one student needed constant guidance to stay on task.

Classroom observations. Three separate class visits were made in each of the last three months of the semester. These observation periods provided some insight into the level of student engagement. With my visits occurring either first thing in the morning or first thing after lunch, I noted the time at which students would arrive to class. The day I visited in the morning, I arrived 20 minutes prior to the 9:00 start of the school day, and three students were already in class. One student walked in a few minutes after class began, and a second had emailed the

teachers to advise them that she would be late, and she arrived by 9:15. On one of my afternoon visits, all students were in class before the start-up time of 1:15. On the other afternoon visit, three students were already in class at 12:45, and almost all of them were there by 1:00. The final three came in 1:10, and all were ready to begin when the teachers rallied them at 1:15.

The morning I visited, the day started with students viewing a TED Talk video chosen by one of the students. Although it took some prompting from one of the teachers, the discussion eventually got rolling to a point where most of the students shared their reactions to the video. Even though the topic was quite controversial, the students seemed to feel safe sharing their own opinions and beliefs. The group seemed to make an effort to allow time for those who had not contributed, and the teacher prompted those who hadn't yet said anything to share their thoughts. The students continued the discussion while the morning announcements were later read over the intercom. The students were divided such that half reported to each of the teachers. One teacher reviewed with the students a newly-implemented morning and afternoon check-in where students would have to sum up their accomplishments for each half-day of work in one sentence. The other teacher referred the students to their planning white boards, where they had to specify their project goals for the day. Aside from this, the direction during my visits was set by each student managing his or her project work and a few other priorities such as Physical Education hours and presentations for their Career Development credit.

The following scene, observed on one visit, was typical of the time spent on project work, with students divided up between the two classrooms—the “blue room” and the “red room”. In the red room, there is rap music playing over the speakers. One student is working at

a desktop computer, and also planning out the next few songs to play for students in the room. Another student is sitting on the couch, writing on paper and working on a laptop at the same time. Another student is sitting in a chair, working on a laptop and listening to music with earbuds. Two other students are socializing while one of them plays a video game on his laptop. As I walk into the blue room, where the volume is much quieter, the teacher in that room closes the door behind me to block the music playing in the other room. The students in this room are all working independently: one viewing videos on a desktop computer; one working on her laptop while sitting on a beanbag; three working on laptops at the counter. Three students are working in a small side-room off the blue room: two are working on laptops and the third is painting on a large canvas. One thing that strikes me is how forthcoming the students are when I ask them about their project work—they seem genuinely excited to share their progress, their struggles and what they have learned.

There were a few challenges communicated during my visits. One of the teachers shared that by the third month of the semester, there did appear to be some “project burnout” stemming from students spending a lot of time working on one topic. The feeling was that they were seeking more and more interaction with the teachers and other students. One student shared his frustration about being denied the \$300.00 cost for a domain name for his website project. With only a week left in the program, one student was resistant to doing the final, public presentation.

Student exit survey. Some of the findings related to engagement generated by the Student Exit Survey were already presented in a comparative way, as they related to similar information collected on the entrance survey. One new item on the exit survey that provided

additional information related to engagement asked students to indicate the extent to which they agreed with various statements about their experiences with *PBLearn*. While the first item required students simply to indicate their level of enjoyment for the semester, the other four asked students to draw comparisons on variables of engagement between their time at *PBLearn* and at their home school. Table 8 shows the students' responses for each of these statements. The letters B to L represent the first letters of the student pseudonyms. Eric's responses (a rating of 1 for each question) have been removed, as it is almost certain that he misunderstood the question. This student's feedback about the program on other questions of this same survey (and during interviews) was always positive, so triangulated evidence suggests that his responses of "Strongly Disagree" in this case are not an accurate reflection of his feelings about the program, but rather a misunderstanding.

Table 8

Student Responses to Engagement Statements and Mean Scores
(n=11)

Engagement Statement	Level of agreement (1 = Strongly Disagree to 4 = Strongly Agree)										Mean
	B	C	D	F	G	H	I	J	K	L	
I have really enjoyed school this semester.	3	4	4	4	4	3	3	4	4	3	3.6
<i>PBLearn</i> has increased my desire to learn new things.	3	3	4	4	3	4	3	3	3	3	3.3
I feel more at ease to participate in the <i>PBLearn</i> setting.	4	4	4	4	4	3	4	4	4	3	3.8
I have been more on task in my work this semester.	4	4	3	4	2	3	1	3	4	3	3.1
I have found the work in <i>PBLearn</i> more meaningful.	2	4	4	4	3	4	2	3	4	4	3.4
Mean score (for each student)	3.2	3.8	3.8	4.0	3.2	3.4	2.6	3.4	3.8	3.2	

The mean scores for the five engagement statements ranged from 3.1 to 3.8 which suggests that overall students were engaged in their learning in *PBLearn*. The highest mean score (3.8) resulted for students' feeling of ease when working in the project context. They

enjoyed their experience (3.6), found meaning in their schoolwork (3.4), increased their desire to learn new things (3.3), and remained more on task (3.1). With Eric's erroneous answers disregarded, there was only one student (Ingrid) with an average response under 3.0. These findings suggest that students' perceptions of the program were positive and deemed beneficial for factors linked to learning engagement.

One of the most detailed questions that appeared on both the entrance and exit surveys asked students to assess how frequently they demonstrated different forms of engagement (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often). Table 9 shows students' mean scores for each form of engagement in their home school and in their semester in *PBLearn*. The last column also shows the difference between the means for the last two semesters for each form of engagement.

Table 9

Frequency of Different Forms of Engagement (Home School vs. PBLearn)
(n=11)

Frequency in past semester of	At Home School	At PBLearn	Difference
Work with other students (not assigned)	2.64	3.82	+1.18
Asking or answering questions in class	2.55	3.64	+1.09
Discuss content with parents/guardians	1.82	2.91	+1.09
Make connections between content areas	2.18	3.09	+0.91
Discuss content with friends outside class	2.55	3.45	+0.91
Discuss what you had learned with teachers	2.27	3.09	+0.82
Put a complete effort into course work	2.91	3.64	+0.73
Ask for teacher feedback on work	2.73	3.45	+0.73
Learn outside of class time (not assigned)	2.64	3.27	+0.64
Discuss content with teachers outside class	2.18	2.64	+0.45
Discuss plans for learning after high school	3.09	3.45	+0.36
Complete all assigned work	3.64	3.91	+0.27
Discuss future career plans	3.18	3.18	0.00
Discuss grades with teachers	2.91	2.45	-0.45
Put very little effort into course work	2.45	1.73	-0.73

Students reported engaging more frequently in 12 of 15 types of experiences during *PBLearn* than was the case in their home school environments. For these 12 experiences, mean score gains ranged from +0.27 to +1.18. The most robust findings occurred for collaborative work with peers (+1.18), participating in question-answer discussions (+1.09), and interacting with parents about schoolwork (+1.09). Strong gains (+0.91) were also noted for making links between curriculum content areas and discussing project work with peers. Students reported to discuss their learning more often with *PBLearn* teachers (+0.82), request feedback from them (+0.73), and put forth a complete effort into their work (+0.73). More frequently, some even pursued learning outside of class that was not assigned (+0.64). Smaller gains were found for increases in numbers of times that students would discuss learning content with their teachers outside of class time (+0.45) and plans for post-secondary learning (+0.36). The smallest gain resulted for completion of assignments which students reported to be doing with more regularity in the project-based context (+0.27)

It was surprising to find no change in the mean score for discussing future career plans, as the students in *PBLearn* each completed significant work to obtain their Career Development credit. The greatest decrease found for frequency among the experiences surveyed using this tool resulted for students' lack of effort in work, which in essence indicates greater engagement and concurs with other findings. And finally, students discussed grades less frequently with teachers, which might also suggest that students were more interested in the work than in their grades.

The open-ended questions at the end of the Student Exit Survey produced few comments related to engagement. Ingrid offered one relevant comment: "I think we were given

too much freedom at times; it was really easy to get off-task.” This perspective suggests that the independent approach offered by the program has potential to help students, but may hinder engagement for some.

Parent exit survey. Just as what resulted for the entrance surveys, parents’ responses to items on the exit survey often aligned to those of their children. Parents were asked to provide parallel feedback to three of the items listed on Table 8 relating to indicators of student engagement. The trend continued with parents’ responses yielding higher mean scores than those of students, as demonstrated in Table 10. However, it can be noted that the rank orders for these items are the same for both groups. The table also shows two additional statements that were asked only of parents, related to the level of challenge and frustration for students in the program.

Table 10

Student vs. Parent Ratings of Variables of Engagement

Statement or Variable of Engagement	Student Mean	Parent Mean
<i>I have really enjoyed school this semester</i>	3.4	3.9
<i>I have found the work in PBLearn more meaningful</i>	3.2	3.8
<i>PBLearn has increased my desire to learn new things</i>	3.1	3.7
<i>My child seemed to find the work challenging</i>	n/a	3.2
<i>My child expressed frustration about the program</i>	n/a	1.8

Parents responding to the exit survey strongly agreed that their children enjoyed their semester of work in the *PBLearn Program* (3.9). From the parent perspective, students found project-based work meaningful (3.8) for them and seemed more interested in new learnings (3.7). Generally, parents agreed that their children found the work challenging (3.2), but not frustrating (1.8) in *PBLearn*.

Parents provided more feedback related to student engagement while responding to the open-ended items on the exit survey than did students. There were six comments suggesting that the students' level of enjoyment in the program was high. Five of the nine parents commenting reiterated thoughts expressed on the entrance survey related to their children's abilities to independently explore areas of personal interest. Two parents suggested that there were some limitations to engagement in the program, with one suggesting that "it was slow in the first two weeks and (my son) was wanting to go back to his school," and another who felt that the student "took advantage of the loose time frame" of the program, sometimes arriving late for school. Three individual themes emerged. One parent indicated that their child was "excited about what he was doing," while another claimed the program "made (the child) want to go to school and learn again." The third noted that her daughter "did not have any sick days which was rare for her in the past."

The following three testimonials were among the most glowing offered by the parents. David's parent asserted, "It helped push his comfort zones. It made him want to go to school and learn again." Excitement was evident in Kim's parent's words, "My daughter has become excited about her education. Every day she would come home and talk excitedly about her day which she didn't really do before. It inspired her to love learning." Similarly, Garth's parent reported that "he is excited about what he is doing; he tells me a lot about his day and his work, and his confidence in himself and not being embarrassed about his intelligence."

Student exit interviews. Nine of the eleven students shared that they felt more likely to engage in discussions in the *PBLearn* environment, and explained why this was the case. Five students felt that this increased participation stemmed from their level of comfort with

classmates; they were together every day all semester, and they built strong peer connections. Fran spoke of a genuine interest sharing in other students' successes. Carlos stressed that this sense of community and trust that had developed led students to "want to get involved because it (felt) good to get involved." Three students mentioned the importance of the reduced class size, because it made it easier to take risks, or it allowed for more contact time with teachers. Eric felt that the process that students had gone through to be selected for the program promoted discussion because project participants would be less likely to judge or react negatively to the comments of peers.

Nine students emphasized the importance of being able to pursue passions through project work in the program. Two of these spoke of the program affording them an opportunity to pursue a specific subject area of interest. In Lou's case it was Law, which he metaphorically described as a "window to really embrace what I'm passionate about." David appreciated the integration of subject area learning outcomes while studying a topic of interest: "I would do something in English while still working on the same project." Five students shared the perspective that they need to be interested in a subject area to want to explore it. Four of these five further suggested that the autonomy or freedom afforded to them in pursuing their subject areas of interest was equally important. These comments included: "taking my own lead", being "let loose," doing "things in a way that makes me the most comfortable," and being "treated like adults."

More than half (7) of the students interviewed shared comments about the extra time that they devoted to their project work outside of class time. Extra time meant students often showed up well before the 9:00 start time each day, working through lunch hours, and staying

late at the end of the day. As David summarized, “school doesn’t end at 3:45 anymore. You bring your project home with you.” In most cases, extra time for school work was a choice as much as or even more so than an obligation. Garth shared his experience of staying up all night near the end of the semester to finalize his project presentation:

I went to bed at 9:00 a.m. and slept through work because I was up working on my project all night. Not because I was stressed about the presentation, but because I wanted to impress people with what I’ve done.

A few other themes emerged from smaller groups of students. Four students provided explanations for why they were more interested in their learning than they had been at their home school. Barry experienced that the nature of teaching himself was more interactive than listening to “boring people talking in front of the class.” Lou felt that the program allowed students to experience new things and challenges by being “encouraged to step outside of our comfort zone.” David spoke of the boredom that could come from repeating the same types of tasks in the traditional environment. Four of the eleven students used the word “fun” to describe the *PBLearn* environment. Three students mentioned their increased inclination to interact with teachers. Hal felt more comfortable because they had the same teachers all the time. Carlos valued the opinions of these teachers and Barry wanted to consult with the teachers about new ideas. Two students shared a sense of how quickly time was going by. Fran noted “the day goes by much faster” and Hal thought the semester had “gone by a bit too fast.”

There were some individual comments from students related to their engagement that are worth noting. Eric spoke about the volume of work he produced in the program, by declaring “I’ve done more this semester than I think I’ve done in my entire life.” Garth

expressed a sense of self-pride in what he was able to accomplish in his project work. Kim revealed that excitement about her work motivated her to discuss it and the progress she was making with her parents. For Ingrid, the success was simply that she wanted to go to school every day.

Despite reported increases in engagement, all students shared that there were some moments during the semester that were less engaging. These specific events included: class challenges being too easy, a dislike for information presented via PowerPoint, and the time spent at the beginning of the semester designing the classroom space. Five students felt that the independent, project-based environment could lend itself to off-task behaviour. Sometimes the pacing was very slow and there were greater opportunities to procrastinate. Four students felt that there was too much time dedicated to planning (including Gantt charts) early in the semester, which limited the feeling of independence. Three students spoke of increased opportunities to socialize, with Garth suggesting that “the freedom was so overwhelming that we could literally sit on the couch and talk all day if we wanted to.” Fran felt that although the temptation to talk with peers could be a drawback, it also helped students to learn how to manage their own time: “In the real world, nobody’s there to smack your table with a ruler and say hey, get back to work!” One student talked about students getting irritable half way through the semester, either from sharing a lot of time with the same group of people, or working on the same topic.

Students pointed to some aspects of the experience at their home schools that might have advantages as well. Two students shared a fondness for some of the approaches followed by teachers at their home schools—one that offered a lot of interactive project work, and

another that followed a traditional approach with examples being shared on the whiteboard. Ingrid found that the home school environment was more challenging and that students were more consistently on task. In keeping with that comment, she tended to do most of her work at home while in *PBLearn* perhaps because she could not stay on task at school. Barry shared his feeling that although he loved the *PBLearn* program, he appreciated the mix of both environments, and wouldn't want to spend a full year in *PBLearn*.

Teacher exit interviews. According to the teacher comments, seven of the 11 students were highly engaged, one was engaged at an average level, one showed significantly improved engagement, and only two of the eleven students were reluctant learners in this setting. When asked to rate each student's level of engagement throughout the program, they felt that Kim's level was beyond that of all the other students, "nobody could be more engaged." Hal was called "extremely engaged" and Barry's level of engagement was described as "exceptional." Garth and Lou were depicted as being "actively" involved or engaged. David and Fran were designated as "very engaged." Eric was simply described as "engaged." Carlos—who was previously known to one of the teachers—was said to have shown a "significant improvement" in engagement. And finally, Ingrid was reported to have struggled as she wasn't passionate, and Julie was described as "sort of on the sidelines" and "wasn't really engaged."

The teachers provided examples of how some of the students demonstrated their engagement. Six of the examples referenced the extra time that students were putting into their project work outside of class time. This time included arriving early, working through lunch, staying at the end of the day until the teacher "kicked (Hal) out", volunteering or emailing the teacher over the weekend, and putting in as much as 200 extra hours. Four students were

described as having a “desire to learn” and two noticeably sought out more opportunities to debate and discuss with other students in class. Some students went further by earning one or two extra credits during the semester or by setting personal goals, such as David (a French Immersion student), who worked on improving his abilities in French. Two other displays of engagement included Ingrid displaying pictures in her room of a younger student she was working with on a project, and Hal, who was typically quiet and reserved, was observed doing backflips to entertain a crowd during a volunteer outing.

The teachers’ comments identified aspects of *PBLearn* that may have led to increased engagement for some students. Teachers believed that the sense of belonging, and many of the “elementary school” or “responsive classroom” approaches that they used encouraged students to feel comfortable participating. The teachers also observed a link between pride and engagement in four students: Carlos felt a sense of pride for completing his project and having the whole class applaud him upon the arrival of his finished project; Garth was delighted after developing his own company; Hal was pleased to have become an expert in the area that he studied in depth; Ingrid felt gratified to have uncharacteristically taken on a leadership role during one of the class activities.

The teachers did discuss some lack of engagement displayed by the students throughout the semester. There were some attendance issues with three of the students; Carlos was frequently late due to family-related issues, Eric was tardy but aware that showing up on time was an ability he had to develop, and Ingrid was sometimes absent but the reasons were justified. Julie, admittedly, did not do extra work outside of class time, often handed work in late, and the teachers had to help keep her on task. The teachers reported that Julie did show

considerable progress—and her parents commented that they hardly recognized their daughter during her final presentation—as she “struggles with getting her voice out there for other people.” The teachers also indicated that Fran may have been “too engaged” at times, showing a tendency to get involved with the work of other students which then at times had a negative impact on her experience, the experience of her peers, and the working relationship with her teacher-project manager. The teachers were perplexed with this student’s ability to “talk the talk, but not walk the walk,” as she was constantly saying the right things, but not always following through with substantial work of her own.

Report card data. The data contained in the report card for the semester in *PBLearn* and the previous semester at the home school provided some insights into student engagement as research indicates that student engagement is positively associated with school attendance and academic achievement. Table 11 compares the performance data, grade averages, and attendance, for these two semesters. Note that in this school division, there are roughly 100 days in each semester. Absences are typically reported for individual classes. As such, a student could be absent for one or more classes in a given day.

Table 11

Grade Averages, Tardies, and Absences by Semester

Student	Grade Average			Total Tardies			Total Absences		
	Sem. 1 (Home)	Sem. 2 (PBLearn)	Change	Sem. 1 (Home)	Sem. 2 (PBLearn)	Change	Sem. 1 (Home)	Sem. 2 (PBLearn)	Change
Barry	81	93	+12	1	2	+1	8	18	+10
Carlos	65	91	+26	5	9	+4	155	49	-106
David	83	92	+9	16	3	-13	19	5	-14
Eric	80	93	+13	11	27	+16	6	34	+28
Fran	81	90	+9	4	1	-3	18	0	-18
Garth	91	95	+4	3	9	+6	12	32	+20
Hal	69	91	+22	0	0	0	12	0	-12
Ingrid	82	90	+8	3	3	0	55	40	-15
Julie	84	89	+5	17	6	-11	10	25	+15
Kim	88	97	+9	5	0	-5	21	17	-4
Lou	66	92	+26	8	4	-4	5	15	+10
Overall	79	92	+13	73	64	-9	321	235	-86

The semester grade average for all of the 11 students participating in the study was higher at the end of the *PBLearn* semester than it was for the previous semester at their home school. The gain in grade averages ranged from an increase of 4% to 26% with an overall average increase of 13% for the whole group. Instances of absenteeism dropped from 321 to 235 classes for an overall reduction of 86 classes missed, though Carlos' dramatic reduction in absences (106) does account for much of that improvement. Five students missed more classes during the *PBLearn* semester and six attended more than they had during the previous semester at their home schools. Overall instances of tardiness among students were down slightly during the *PBLearn* semester, from 73 to 64 or -9, but this finding is less dramatic. Five students had fewer tardies, four had more, while two experienced no changes in coming to school late during *PBLearn*.

The report card comments made by home school teachers during the previous semester were compared to the comments shared by *PBLearn* teachers during interviews. First are

comments from home-school teachers describing the nine students that were categorized as engaged by the *PBLearn* teachers (per the previous section). Of these nine, three received comments at their home school that seemed to suggest that they were also engaged in that environment:

Barry:

Class A: "Sets a consistently high standard for himself...wonderfully positive attitude."

Class B: "Work ethic is excellent."

Kim:

Class A: "Independent thinker...takes initiative...seeking out online tutorials."

Class B: "Fantastic work ethic...takes full responsibility."

Lou:

Class A: "Normally remained engaged."

The comments for the other six students suggest that their engagement levels were somewhat mixed and variable. It seems that there were at least some times when they were not fully engaged.

Carlos:

Class A: Did not submit a critical assignment, but "displayed interest and enthusiasm"; "completed some assignments with perseverance" and "worked very independently."

Class B: "Displays interest and enthusiasm but sometimes has difficulty concentrating and staying on task."

Class C: Demonstrated "trouble respecting due dates...assignments become rushed...rarely participates in discussions."

David:

“Tends to rush the learning process.”

Eric:

Class A: “Requires occasional reminders of course expectations and to stay on task.”

Class B: “Needs occasional reminders to stay on task.”

Class C: “Good attitude and effort.”

Class D: “Appreciation and interest of content; demonstrated critical thinking skills.”

Fran:

Class A (one of two classes for the semester): “At times an engaged learner.”

Garth:

Class A: “Shows pride in his work...works independently...works hard.”

Class B: “Often needed reminders to focus on instruction or the task at hand.”

Class C: Displayed “very good time management.”

Class D: “Showed effort and attention to detail.”

Class E: “Excellent student and an active participant in the classroom.”

*Interestingly, the same teacher taught Class B and Class E.

Hal:

Class A: “Success will depend on focus in class and willingness to complete work.”

Class B: “Always on task...positive attitude.”

Class C: “Very quiet.”

Here are comments from home-school teachers describing the two students who were categorized as less engaged by the *PBLearn* teachers. Again, teachers’ assessments of student

learning engagement is variable, indicating that in some home school classes these two students were indeed engaged.

Ingrid:

Class A: Did not submit a final assignment but was “regularly on task.”

Class B: Was “attentive during lessons and participated.”

Class C: “Demonstrated an enthusiasm for learning” and “made a conscientious effort.”

Class D: “Worked diligently on all tasks.”

Class E: Displayed a “positive attitude and good work ethic.”

Julie:

Class A: “Shows initiative...positive attitude.”

Class B: “Strengths are most evident when she chooses subject matter of interest to her.”

Class C: “Independent...shies away from taking learning risks.”

Student follow-up interviews. The interview conducted with students after a month back at their home schools allowed for some final thoughts regarding their engagement in the two environments. Carlos and Fran once again made reference to the appeal of pursuing personal interests in *PBLearn*, with Carlos going further: “It lets you learn what you actually want to, and it encourages you.” Kim and Hal used the word “fun” to describe the new environment, with the former referencing “activities that were fun and creative” and the latter suggesting that the enjoyment came from hands-on work that required problem solving. Carlos also suggested that it was the ability to “make something I was proud of” that made him care about his work in the program. He also felt that being compensated for the hard work was

valuable: “That was encouraging getting good marks doing projects that you put a lot of work into. It’s disappointing when you put in so much work and don’t get a good mark.” Ingrid’s comment that “my marks were higher because I enjoyed it and we got to write what we wanted to,” repeated the sentiments of appreciating a perceived relationship between enjoyable, engaging work and the higher grades. In saying “I was kind of sick of the regular way of doing things,” Eric suggested that the new environment at *PBLearn* provided a welcome change.

Many of the students’ comments after returning to their home school suggested that their engagement in the traditional environment did not improve. Of the eight students who expressed a decrease in engagement during their first month back, five shared their learning behaviours now back at their home school. Garth mentioned how he was now often showing up late for class because he didn’t feel the same motivation to get there on time, and Fran reported generally being bored. Two students stated that they were interacting much less with peers. Carlos described the change from “being in the discussion to just kind of sitting there and not really talking” and Kim admitted, “I don’t even talk to half the people in my class.” For David, decreased engagement was marked by a feeling that “in normal classes, I’m less likely to take risks.”

Five of the eight students also proposed reasons for their decreased engagement back at their home school. Garth felt that it was the idea of beginning his day with a class that he doesn’t like, rather than being in control with a more flexible schedule. Kim described the content as “kind of boring...much more mediocre,” with Julie similarly feeling that “a lot of the work just seems like it’s for nothing or meaningless.” Hal suggested that doing most of the work in the traditional environment with paper and pen didn’t stack up to his project work in

PBLearn, as “making a video game...was obviously a little more fun than paper work.” Carlos reiterated the lack of an internal motivation at his home school: “I don’t particularly care too much about the actual work—I just want to pass.”

For at least two students, *PBLearn* seems to be having a more sustained impact on engagement at school. One anomaly is Eric who seems to have continued to stay engaged in academic learning. He spoke about his current focus on academics as he begins his final year of high school, “I am definitely more engaged now.” This more academic orientation is coming from a student who felt that his semester in *PBLearn* was “probably the best experience that I’ve ever had...it was perfect for me at the time.” Barry also expressed positive impacts after one month back in his home school, but his experience points more to social engagement rather than academic engagement. He reported, “I’ve joined a lot more clubs and gotten myself out there more.” Since his participation in *PBLearn*, he has been participating in a greater number of activities at his home school.

Discussing Student Engagement

In response to the first research question, the data analyzed suggests that *PBLearn* had a positive impact on the learning engagement of participating students. In some cases, this impact appears to be higher levels of engagement than students had experienced in their home schools, and in all cases, the experience in the program was a positive one that helped the students in various ways. It can be recalled from the literature reviewed that definitions of engagement call for student participation (Newmann, 1989; Strambler & McKown, 2013). The overall decrease in student absences and tardies in the semester of the program provide for increased opportunities for students to engage with their learning. Participation in classroom

discussions rose from a mean score of 2.27 (“sometimes”) at the home school to 3.45 (“often”) in *PBLearn*, while participation in classroom activities rose from 2.82 (“often”) to 3.73 (“all the time”). On a four-point scale, these are notable increases.

While it can be argued that the majority of the class discussions and activities were on-task and productive endeavours, it is also worthwhile to consider the requirement that learning engagement requires participating in activities that contribute to learning and development (Finn, 1989). Table 9 shows that a range of indicators of participation—including asking questions, working with peers, discussing with teachers, putting in a complete effort, and working outside of class time—were reported to have increased for the semester spent in *PBLearn*. Furthermore, a theme that recurred across a number of data sets, including the Initial Teacher Interview, classroom observations, Student Exit Survey, Student Interviews, and Teacher Exit Interviews, was that students put in extra time outside of regular class hours. This sustained engagement in project work outside of school hours on the part of students, which was not mandatory or assigned, may be a more important indicator of active participation and learning engagement than school attendance measures. In an era when research tells us that fewer than half of high school students in North America are engaged in their studies (Marks, 2000; Newmann, 1989; Willms, 2003; Willms et al., 2009), reports from teachers during initial and exit interviews about the high level of engagement among most students in *PBLearn* points to the promise of using the project-based approaches to curriculum with disengaged high school students.

One of the most dominant reasons students offered when explaining their participation lends support for McCluskey’s (2012) assertion that effective programs are built upon student

interests. As Tables 3 and 6 illustrate, the most common activities offered in the home schools provided “some” or “very little” levels of interest for students. Conversely, qualitative findings from the Student and Parent Entrance Surveys, Initial Teacher Interview, and Student Exit and Follow-Up Interviews all made numerous references to students in *PBLearn* enjoying the opportunity to pursue topics of personal interest. During interviews, most students shared that they were engaged by their chosen topic; the least engaged student admitted having difficulty identifying a topic of interest. When Kim shared her belief that “if people [have] to tell you what to do, you’ll want to do it less,” she was speaking to the constructivist nature of the program which allowed students to choose their topic of study as well as to manage how that topic was explored. This sense of ownership relates to Littky and Grabelle’s point (2004) that nobody has to be forced to keep learning when they are interested in the work and have some choice.

Beyond congruence with student interests, the program maintained students’ attention by reducing boredom and providing appropriate challenges. The findings summarized in Table 5 provide evidence that boredom was reduced in a number of areas. Several students indicated they were less bored by the content and teaching methods; most found the work more challenging, and lower numbers found it too difficult. Two students said that they were never bored in *PBLearn*, while none felt this way in the home school setting. These findings relate to the concept of “flow” in education (Shernoff et al., 2003), that student engagement requires challenges that push the student, but without being unattainable. The references to students feeling a sense of time loss, staying on task for extended periods of time, and putting in numerous hours outside of class all speak to an appropriate level of flow for the majority of the students. The use of the descriptor “fun” on each of the Student and Parent Exit Surveys and

the Student Exit and Follow-up Interviews, suggests that the program offered enjoyment in addition to challenge and reduced boredom.

Eric's thoughts about the much higher volume of work that he completed this semester would likely be shared by other students. Table 8 shows that seven students agreed that they were more on task in *PBLearn*, while Table 10 shows that most parents expressed that their child found the work more challenging, without being frustrating. Both parents and students shared that some growth came from students being pushed beyond their comfort zones. There were also references to the student-led nature of the teaching approach reducing the number of repeated tasks and by extension limiting the amount of time spent passively learning from a teacher. Again, the two students described as being less engaged may have felt limited either by a perceived lack of ability or the absence of an interest or passion to pursue.

The data suggested a number of other factors that contributed to increased engagement for most students in the program. The novelty of the program contrasted with what some students considered to be the more traditional setting at their home school. Eric's comment during the Follow-up Interview about being sick of the established approach seems to echo Littky & Grabelle's feeling that the education system is due for an overhaul (2004). Also, teachers mentioned that the attraction of this new setting reflects the idea of an unfamiliar environment offering a fresh zest to the learning process (Ribeiro, 2011).

The setting and atmosphere offered at *PBLearn* were key contributors to engagement for many of the participants. The learning environment was described as safe and comfortable by teachers in their Initial Interview and by several students in their Exit Interviews. Eric's belief that much comfort stemmed from all students having applied to be accepted into the program

mirrors Marks' (2000) statement that student self-selection provides for higher levels of engagement. The classroom observations further highlighted the comfort that students seemed to have in choosing where and how they completed project work. Three students referenced the increased opportunities to interact with the teachers during the Exit Interview. Although Table 5 displays data showing that four fewer students were frustrated by the absence of interaction with the teacher in *PBLearn*, there did not seem to be similar gains for students interacting with each other. While they may not have had as much interaction with their peers, students and teachers did share that these interactions provided some students with a sense of belonging and the feeling that their work was of value to their group. These connections seem to support the belief that social interactions provide for powerful learning (Hackmann, 2004). The notion that PBL environments promote collaboration more than competition (Achilles & Hoover, 1996) was exemplified when program students gathered around Carlos to congratulate him upon the delivery of his printed, final project. Such moments provided meaning for all participants.

Compared to the traditional setting where many students see the curriculum as irrelevant (McCluskey, 2012), most students in this study found their work in *PBLearn* more relevant than the work they were completing in their home school programs (see Table 5). Eight students also agreed on the Exit Survey that the program work was more meaningful than the work they had done at their home school. The sense of pride that the teachers saw in at least four of the students seems to reflect the kind of learning that Whelage deemed worthy of engagement (Finn, 1989).

Although the program seemed to have positive impacts overall, it did not always provide for complete student engagement. Many students and one parent shared that they were not overly interested in what they deemed to be an excessive amount of planning at the beginning of the semester. The students likely arrived at *PBLearn* expecting a typical PBL environment where they would construct the process themselves (Newmann, 1989), and the teachers admitted that many of the early events were planned to provide scaffolding that would assist the students in their later, independent project work. Ingrid suggested that there might have been too much freedom at times, and other students agreed that the environment did allow people to veer off task. For some, this meant taking advantage of loose time frames, and for others, it meant spending class time socializing. Such was the case for Fran, who the teachers felt might have been “too engaged,” as she participated actively, but did not produce on her own project. During my visit near the mid-point of the semester, one of the teachers shared that students were starting to feel some project burnout, and seeking more interaction with each other. Though overall attendance was improved for most students, four students had more tardies in *PBLearn* than in the previous semester (one student having 16 more), and five students had more absences (one student having 28 more). Interestingly, the majority of student participants (8 of 11) expressed a drop in engagement upon returning to their home school. This finding is difficult to explain; it could be a critique of the home school environment or students expressing a preference for the kind of learning they experienced in *PBLearn*.

Learning Characteristics of Students

The second research question sought to identify particular types of learners who appeared to be better suited for the *PBLearn* program, based on some of the learning

characteristics displayed by students who experienced differing levels of success with the program. The challenge in answering this question is in identifying which students benefitted the most or the least from the program, as data indicated that all of the students benefitted in some way. The benefits varied in form from increased engagement, increased academic attainment, to greater socio-emotional comfort. Given that all students benefitted in some way, then it may be beneficial to consider the data in student groupings as well as more wholly. I found four sub-groups of students that demonstrated higher and lower levels of fit for the program, based on all of the data collected. The first group—as I will refer to as the *Excellent Fit* group—is comprised of two students, Carlos and Eric, who did very well in this program and would not likely have done nearly as well in the traditional setting. Three students—Barry, Garth and Kim—make up the *Very Good Fit* group, who would be considered ideal students in this setting, although they likely would have done very well in the traditional setting. A third group is made up of three students—David, Hal and Lou—who showed improvements in the program but would have done well in any setting, the *Satisfactory Fit* group. The *Unsatisfactory Fit* group is made up of three students—Fran, Ingrid and Julie—who are suggested to be the least well suited to the program. These groupings are both informed by and intended to be a lens through which to consider the data (particularly the quantitative data) from the various collection tools related to this research question.

Student entrance survey. One survey question asked students to rate the extent to which different factors influenced their choice of classes or activities at school. With ratings ranging from 1 (Not at All) to 4 (Very Much), Table 12 shows the responses from each student.

The lettered columns each represent the first initial of students' pseudonyms for each of the four student sub-groups.

Table 12

Influences on Choice of Class/Activity by Student Sub-group
(n=11)

Student fit group: Influence on choice of class/activity:	Excellent		Very Good			Satisfactory			Unsatisfactory			Mean
	C	E	B	G	K	D	H	L	F	I	J	
To learn something new/interesting	1	4	4	4	3	4	4	4	4	1	3	3.3
Prepare for learning after high school	2	3	4	4	2	4	3	4	4	2	2	3.1
Prepare for potential career	2	3	4	3	2	4	3	4	4	2	2	3.0
To be challenged	1	4	3	4	3	4	3	4	4	1	2	3.0
Have some free time in schedule	4	2	4	3	1	4	3	4	3	3	2	3.0
To get good grades	2	2	4	4	2	2	3	4	4	1	3	2.8
Courses friends are taking	2	2	3	4	2	1	3	3	2	2	2	2.4
To please parents	1	2	2	2	3	1	2	4	3	1	2	2.1
Student mean score:	1.9	2.8	3.5	3.5	2.3	3.0	3.0	3.9	3.5	1.6	2.3	2.8

While the highest rated influence overall was the desire to learn something new or interesting (3.3), it was rated very low (1) by both Carlos and Ingrid, whose course and activity selection did not appear to be influenced by much other than having free time in their schedules. The order of the group mean score seems to indicate that these students were more influenced by factors that affected their learning or their futures—prepare for learning after high school (3.1), prepare for potential career (3.0), to be challenged (3.0)—than by those that provided them with short term benefits, such as having free time (3.0), getting good grades (2.8), sharing courses with their friends (2.4), or pleasing their parents (2.1).

A similar question asked students to rank those activities that were most important to them at the beginning of the semester from 1 (most) to 6 (least). The responses are summarized in Table 13, again by student grouping and first initial of their false names. The lower mean scores in this case represent the most important activities to students.

Table 13

Importance of Different Activities by Student Sub-Group
(n=11)

Student fit group: Different activities or motivations:	Excellent		Very Good			Satisfactory			Unsatisfactory			Mean
	C	E	B	G	K	D	H	L	F	I	J	
Learning new things in school	4	3	3	2	2	1	3	3	1	5	2	2.6
Getting good grades in school	3	1	2	1	1	5	1	1	3	6	5	2.6
Working (having a job)	1	2	1	3	4	2	6	2	2	3	6	2.9
Making friends and socializing	2	5	4	4	3	4	2	4	6	2	3	3.6
Activities outside of school	5	4	5	6	6	6	5	6	4	1	1	4.5
Activities at school	6	6	6	5	5	3	4	5	5	4	4	4.8

These findings seem to agree with data presented in Table 12 that this group of students values new learning, indicated in this case by a low mean score of 2.6. It is interesting, however, that grades (2.6) also seemed to be an equally important motivator for students in the project-based program, and in fact received many more 1 ratings than any other option. Working was also important to many students (2.9), followed by making friends (3.6), activities outside of school (4.5), and lastly in-school activities (4.8). If one looks more closely at individual cases, the high ranking of activities outside of school for Ingrid and Julie might demonstrate that interests outside of school are much more important to them than anything they are involved in at school.

Another item asked students to indicate their level of agreement (from 1 = Strongly Disagree to 4 = Strongly Agree) to statements related to different types of tasks or how students address these tasks. The results are summarized in Table 14.

Table 14

Student Task Preferences by Student Group
(n=11)

Student fit group: Task related statements:	Excellent		Very Good			Satisfactory			Unsatisfactory			Mean
	C	E	B	G	K	D	H	L	F	I	J	
I like taking on new challenges	2	4	3	4	3	3	3	4	4	2	3	3.2
I like tasks that are laid out step by step	3	2	3	3	3	3	3	3	4	4	4	3.2
I like choosing my own way to complete a task	4	4	3	2	3	4	2	3	3	3	4	3.2
I like taking on difficult tasks	2	4	3	4	3	3	2	4	4	2	2	3.0
I prefer new tasks that I have never tried	3	3	3	3	3	3	3	4	3	2	2	2.9
I prefer tasks that are easier to understand and complete	3	2	3	3	2	3	4	3	3	3	2.5	2.9
I prefer tasks that I have done before	2	2	2	3	2	2	2	2	3	3	3	2.4

Students under study indicated a high level of agreement with taking on new challenges, tasks that are clearly laid out and choosing their own way to complete a task (3.2). There was still agreement, though declining, with taking on difficult tasks (3.0), preferring new tasks and tasks that are easier (2.9). The least preferable choice was tasks that had been done before (2.4). The only exceptions to the group's preference for new tasks over those that they had done before were Ingrid and Julie who are included the *Unsatisfactory Group*.

Parent entrance survey. There are two questions on the parent survey related to the second research question. The first question asked parents how they thought their child would rank the importance of different activities which are the same as those reported by students in Table 13. The individual responses from students and their parents for this item, however, are too mixed to provide much meaningful insight into this research question, and in most cases parents and students responses did not align. Students and parents were asked to rank the six choices from 1 (most important) to 6 (least important). The comparison between the student and parent mean scores are interesting, as displayed in Table 15.

Table 15

Importance of Different Activities – Student vs. Parent Rankings

Different activities or motivations:	Student Average	Parent Average
Learning new things in school	2.6	3.8
Getting good grades in school	2.6	2.8
Working (having a job)	2.9	3.4
Making friends and socializing	3.6	2.8
Activities outside of school	4.5	3.3
Activities at school	4.8	3.5

While parents seemed to know that grades would be important to their children, indicated by close mean scores for both sub-groups (2.6 and 2.8), their responses were quite different from their children's for all other statements. Parents put a lower importance value on some activities than their children did. For instance, parents felt that their children would value learning new things much less (3.8) than the children reported (2.6). This pattern held true for working as well, which was more important to students (2.9) than parents assessed it to be (3.4). On the other hand, parents believed that their children placed more importance on friendships, socializing (2.8), and activities outside of school (3.3) than their children reported.

Another question on the parent survey included some content that was similar to the students' questions, but offered mostly unique content. With only 8 of the 11 families responding to this survey, the missing data is for the two students in the *Excellent Fit* group, and one student in the *Satisfactory Fit* group. The questions asked the parents to say to what extent (1 = Not at All, 4 = Very Much) they believed their child felt about each activity or student behavior. The responses are displayed in Table 16.

Table 16

Parents' Perceptions of Student Activities & Behaviours
(n=8)

Student fit group: Activity or Student Behaviour:	Very Good			Satisfactory		Unsatisfactory			Mean
	B	G	K	H	L	F	I	J	
Motivated by wanting to learn new things	4	4	4	3	4	4	3	3	3.6
Puts a complete effort into work	4	3	4	3	4	3	3	4	3.5
Looks forward to going to school	4	3	3	3	3	4	3	3	3.3
Motivated by wanting to earn good grades	4	3	4	2	4	3	2	4	3.3
Completes all school work	4	3	4	3	4	3	3	2	3.3
Likes taking on challenging/difficult tasks	4	3	4	3	4	3	2	2	3.1
Willing to take risks	4	3	4	3	4	3	2	2	3.1
Student average:	4	3.1	3.9	2.9	3.9	3.3	2.6	2.9	

Aside from the parent perceptions of their children's value of grades as compared in the previous table, the parent responses show agreement about the students valuing learning new things (3.6) above all else. With the mean scores all falling between 3.1 and 3.6, the ratings of 2 ("Very Little") are the anomalies or outliers in the data. They demonstrate the parents' perceptions that Hal and Ingrid are less motivated by grades and that Julie is the only student who isn't likely to complete all of her school work. Ingrid and Julie's parents agreed with their daughters about their aversion to risk and taking on challenging tasks.

One open-ended question asked parents to share any further information about their child that they felt would help teachers understand them as learners. The comments relevant to this research question will be presented by student sub-groups. For the three students in the *Very Good Fit* group, Barry was described as not learning in the same way as other students, Garth's ADHD diagnosis contributed to struggles with lecture-style classes, and Kim was described as self-directed and self-motivated. For those in the *Satisfactory Fit* group, Hal was described as bright but lacking ambition, and Lou's parents felt he was a social learner and this strength was limited in the traditional setting. For the *Unsatisfactory Fit* group students, Fran

was described as a visual learner who engages in areas of interest, Ingrid's parents felt their daughter had no discernable passions to pursue, and Julie was described as a chronic procrastinator.

Initial teacher interview. Part of the interviews asked the teachers to describe each of the students, which provided some insights into their approaches to learning. This qualitative data are being summarized in Table 17 by student grouping, with student aliases on the left and teacher descriptions of the students on the right.

Table 17

Teacher Descriptions of Student Approaches to Learning

Excellent Fit group	
Carlos	Motivated by adult approval , positive reinforcement and praise. Demonstrates pride in his work and sharing his work. Anxious about giving presentations and speaking in front of others.
Eric	Cares about his work: wants to do well and improve . Intrinsically motivated : takes on extra and independent course work.
Very Good Fit group	
Barry	Holds himself accountable to his own goals and to members of his group. Passionate about his project as it is related to a personal interest. Quiet learner (for fear of embarrassment?) who needs to be asked for what help is needed. Independent worker who “takes the ball and runs with it.”
Garth	Independent : can complete work with minimum help or supervision. Quiet : doesn’t talk or share a lot; possibly nervous ? Results-oriented : does everything he has to do to get marks and to move forward.
Kim	Intrinsically motivated : independent, motivated to do well, reflective Shares her opinion selectively : speaks when it’s of value or brings the group together (caring, kind).
Satisfactory Fit group	
David	Cares about what he is doing and takes care of his work. Perfectionist : sets own goals and seeks teacher feedback on how to improve. Mark hungry : needs justification for any lost marks.
Hal	Quiet : thoughtful, reflective, flies under the radar. Independent : shows an inner drive, dedication, commitment to work hard.
Lou	Passionate : driven by what he wants to do. Motivated by marks : does what he has to do for requisites (marks, university) but not much more.
Unsatisfactory Fit group	
Fran	Likes to be challenged : does extra work either for additional credit or for independent stimulation. Social learner: talks a lot with others, helps others, is kind and thoughtful.
Ingrid	Vocal : shares her opinion and can even dominate a conversation. Needs external support : can’t focus, hard to get grounded, gets bored easily. Does not have a passion.
Julie	Independent : quiet, shy Puts effort into her work when on task, but doesn’t work outside of class and falls behind .

Eight of the eleven students were described as displaying inner motivation such as: pride, caring, wanting to improve, intrinsically motivated, passionate, commitment, and likes to be challenged. Only Garth from the *Very Good Fit* group and Ingrid and Julie from the *Unsatisfactory Fit* group are not associated with these kinds of descriptors. Only three of the students—Garth (*Very Good Fit*), David and Lou (*Satisfactory Fit*)—were described as being

motivated by marks. Seven of the students were described as independent, the four who were not: Carlos (*Excellent Fit*), David and Lou (*Satisfactory Fit*) and Ingrid (*Unsatisfactory Fit*). Four of the students were described as quiet: Barry and Garth (*Very Good Fit*), Hal (*Satisfactory Fit*) and Julie (*Unsatisfactory Fit*).

Classroom observations. With respect to the student attitudes toward learning, all of the students generally displayed a positive attitude toward their learning environment; they all seemed content to be “present” at school in the *PBLearn* environment. Just as in any setting, student dispositions changed depending on the task at hand. Even students in the *Very Good Fit* group occasionally displayed or shared a frustration with completing some tasks that were not related to their project work. Perhaps the most telling displays, therefore, were those of students during the time allotted for individual project work. During my observations, the majority of students used this time to work on their projects, but at a relatively relaxed pace, which included appropriate levels of socializing and off-task behaviour. One student—Fran from the *Unsatisfactory Fit* group—appeared to be much more social than all other students. Almost at all times when I was in class, she would be connecting with others: students, the program teachers, and me. Only three students consistently appeared to be consumed with their project work. One of these students (Carlos) was in the *Excellent Fit* group, and the other two (Barry and Kim) were in the *Very Good Fit* group. Only one student (Ingrid from the *Unsatisfactory Fit* group) seemed to consistently struggle in moving forward with her project. These struggles seemed to stem more from not knowing what to work on, create or present, than from a lack of desire or effort to move forward. Often lamenting a lack of passion or interest to pursue, this student’s project work seemed to stall, with it taking most of the semester to finally decide on a

final project to create and present. Although all students made changes to their project goals throughout the semester, only the two other students in the *Unsatisfactory Fit* group appeared to make significant concessions in their intended final project by the end of the semester.

Student exit survey. Of the four questions related to research question two on the survey, one is quantitative. It asked students to state their level of agreement (1 = Strongly Disagree to 4 = Strongly Agree) with statements about the program. These statements relate to learning preferences, as displayed, by student and “fit” sub-group, in Table 18.

Table 18

Student Agreement with Learning-Related Statements
(n=11)

Student Fit group: Learning related statements:	Excellent		Very Good			Satisfactory			Unsatisfactory			Mean
	C	E	B	G	K	D	H	L	F	I	J	
<i>PBLearn</i> gave me the right amount of freedom to choose	3	4	4	4	3	4	3	3	4	3	3	3.5
I found this semester more challenging	3	4	4	3	2.5	4	2.5	1	3	2	3	2.9
Project work in <i>PBLearn</i> was confusing	2	2	4	2	1	1	2	1	2	3	3	2.0
I wish more instructions/direction had been given	1	1	3	2	1	1	2	2	2	3	3	1.8
I prefer the learning environment at my home school	1	1	4	2	1	2	2	2	1	1	1	1.6

Overall, the mean score of 3.5 for the first statement shows that students felt that the program offered an appropriate amount of freedom and choice. The group as a whole also agreed (2.9) that the *PBLearn* semester was more challenging, without being too confusing (2.0 or “Disagree”)—greater evidence that the program helped most students find a suitable state of “flow”. It is interesting that the five students who seemed to be better suited to the program generally found it more challenging than the six less suited students. The less suited students also felt a greater need for instruction and direction—particularly Ingrid and Julie. Students

tended to disagree with the final two statements, indicating a lack of desire for more direction (1.8) and lack of preference for the home school environment (1.6).

The other three questions were open-ended. When asked what they liked most about their time in the program, five students used the word “freedom.” This freedom appealed to all types of students, as the responses were from Garth and Kim from the *Very Good Fit* group, Hal from the *Satisfactory Fit* group, and Fran and Ingrid from the *Unsatisfactory Fit* group. Eric (*Excellent Fit*) and Lou (*Satisfactory Fit*) mentioned working more independently, while Carlos (*Excellent Fit*) and Barry (*Very Good Fit*) spoke to the advantages of being left alone to work on their projects. When asked what they liked the least about *PBLearn*, five students (one *Excellent*, two *Very Good*, one *Satisfactory* and one *Unsatisfactory*) complained about time used to complete work that was less valued or deemed unnecessary, such as planning, reporting and doing presentations. David and Lou from the *Satisfactory Fit* group did not enjoy the amount of “hand holding at the beginning” of the semester. Two students in the *Unsatisfactory Fit* group had other comments; Fran expressed that “it was hard to think for yourself,” and Ingrid felt that the program provided “too much freedom at times.”

The final question on the survey asked students to provide any other feedback they wished to share. Three students provided suggestions for student selection for future iterations of the program. Eric from the *Excellent Fit* group felt that “letting anyone in this program would be a mistake” and that organizers should “let those that really want it fight for it and get it.” Garth from the *Very Good Fit* group described *PBLearn* as “an amazing program, but you need to find the right people.” Ingrid from the *Unsatisfactory Fit* group suggested that she was not

ideal for the program, and expressed that “they should only pick the people who are really passionate about something.”

Parent exit survey. There are only five comments generated from parents via the open-ended questions on the survey that related to this second research question. Two of them involve parents who provided descriptions about their child prior to the program. Eric’s parents (*Excellent Fit* group) described him as “getting good marks but wasn’t motivated by school.” Julie’s parents (*Unsatisfactory Fit* group) expressed that their daughter historically “had a very difficult time vocalizing” or sharing her thoughts with others in social settings. Two other parents, both of whom had children in the *Unsatisfactory Fit* group, shared insights about their child during their time in the program. Ingrid’s echoed their daughter’s frustration in the program stemming from not having a clear passion to pursue, and Fran’s parents shared that their daughter “enjoyed learning outside of class time on her own personal time.” The final comment came from Eric’s parent who wished for organizers to “make the program available to more students,” which contradicts his belief that the program should be very selective.

Student exit interviews. Students shared both characteristics about themselves as learners as well as feedback about characteristics of students that they felt would be most successful in *PBLearn*. Table 19 presents the students’ self-descriptions about what motivates them at school as well as other traits they used to describe themselves. The divisions in the table represent the separations between the four student sub-groupings.

Table 19

Students' Motivations and Learning Characteristics

Student	Sources of Motivation at School	Other Personal Traits
Carlos	At Home School: Not failing classes. At <i>PBLearn</i> : Completing my project.	Had been selected for a number of programs. Values content and work over grades. Very independent.
Eric	At Home School: Did what I had to for the grade. At <i>PBLearn</i> : Autonomy.	Worked hard to be part of <i>PBLearn</i> .
Barry	Get good grades to get into a good school. Success is overcoming one of my challenges.	Willingness to work on my own.
Garth	Achievement, challenges, learning new things. Intrinsic motivation.	Willing to fail and reflect on failures. I don't like most classrooms but love learning.
Kim	Including my interest in my work.	
David	Learning about a personal interest.	Willing to learn on my own time.
Hal	Topics of interest to me.	I learn on my own and from my mistakes.
Lou	Things I like to do, learning more about passions. Challenge: not as interesting if too easy. <i>PBLearn</i> allowed me to boost my GPA.	Willing to step outside my comfort zone. I'm a hands-on, visual learner. I push myself to improve.
Fran	Things I'm interested in; I love to learn.	I don't know how to stay on task very well.
Ingrid	I don't really have any motivation. Getting it done on my own terms; grades are nice.	I end up doing everything last minute. I have kind of always been drifting.
Julie	Getting to do my own thing.	I took a while to choose a project and got bored. Hard to stay on task; I just sat there sometimes.

Five of the students mentioned personal interests in discussing their motivations to succeed at school. Interestingly, five also made references to grades as part of their motivation. Only one student (Lou) fell into both groups. Three students highlighted challenges as sources of motivation. Both of the students in the *Excellent Fit* group, Barry from the *Very Good Fit* group and David and Hal from the *Satisfactory Fit* group all felt that they work independently. Rather than suggesting that they share this quality—or other positive qualities—the three members of the *Unsatisfactory Fit* group were more inclined to share personal limitations such as procrastinating and struggling to stay on task.

When asked if they thought some types of students were better suited to the program than others, most shared similar feedback. One student referenced a fifteenth student who had

been admitted into the program but who left after a short time as an example that the program might not be for everyone. Two suggested that some students are comfortable and happy with their existing high school programs, particularly those who like being told exactly how to complete tasks. Two students—Eric who felt well-suited to the program and Ingrid who did not—deemed it important that only students who had applied to the program or made an effort themselves to be included should be admitted, showing a personal desire to be there. When asked to describe which traits a successful *PBLearn* student would possess, the two most common responses (each suggested by four of the participants) were that they be “self-motivated” and have a passion they would like to pursue. Other traits that were each mentioned only once were that the student should have “initiative and extra-mile behaviours,” not procrastinate, and know how to stay on task. Suggestions of characteristics of students who wouldn’t be well-suited included those without intrinsic motivation, or those who “need a teacher showing them each path they should take.” While most of the students expressed that they felt some students were better-suited to this type of program than others, two students suggested that they felt the program was for everyone. Lou dismissed the requisite for a specific passion, suggesting “every student is passionate about something, and even if they aren’t, this program allows them to find out what they are passionate about.”

Teacher exit interviews. The teachers were asked to describe the type of student who is best suited for this program. The first suggestion for both teachers is that the student must have a passion or something they are willing to pursue for an entire semester. They both also highlighted the importance of being open to change or wanting to do something different, and they both said success in the program is only available to hard workers. When describing

students who they felt were successful in the program—those in the *Excellent Fit* group—they talked about these students seeking out and accepting feedback on their work, and taking the time to reflect on their own work and to make improvements.

The teachers were also asked to describe traits of students who likely wouldn't benefit much from the program. Laziness or a lack of willingness to rework or improve things, were traits identified. One teacher also cautioned against including students who are not comfortable with processes like peer editing and giving constructive criticism, students who are too social, or who have poor time management skills. The other teacher expressed that all students could benefit from the program if they could self-direct rather than requiring constant teacher direction. When describing students who they felt struggled in *PBLearn*—members of the *Unsatisfactory Fit* group—they cited poor time management, talking about ideas without completing the work, a lack of honesty or transparency in sharing progress with the teachers, a lack of desire to go above and beyond the basic expectation, and learning passively rather than seeking out assistance from others.

Report card data. All relevant comments describing the characteristics of the students were shared in the previous section of results related to student engagement. These characteristics can be found on pages 97 to 101.

Student follow-up interviews. There were only three relevant comments from the student follow-up interviews. When asked to describe her engagement upon returning to her home school, Julie of the *Unsatisfactory Fit* group described herself: "I've never really been much of a participator." A second comment came from Ingrid (of the same group) explaining why she didn't think students could work exclusively in settings similar to *PBLearn*: "I don't think

it would be possible to have a program like that all the time. There would be kids who would do nothing.” The last comment came from Eric from the *Excellent Fit* group reiterating his feeling that such programs should not be open to all students:

If you just made it available to everyone, it would lose that sense of being for those that want to do it. I think it should stay a little more selective. You have to want to do it. Part of the reason I felt so safe there, was because everyone wanted to be there.

Discussing the Learning Characteristics of Students Benefiting Most from *PBLearn*

Any students that regularly attend school in any setting are likely to benefit as a result. Perhaps what is different about programs such as *PBLearn*—as the following section will illustrate—is the growth of students beyond the academic realm. Accepting that all students benefitted in some way by attending the program, the second research question sought to identify the learning characteristics of students who would benefit more or less than others. Using the student groupings used to review the data, this section will show that there appear to be some characteristics that could help to identify students for future iterations of the program.

Much data speaks to the different types of motivators for students. The assumption from the literature was that such a program would appeal most to those with mastery learning goals rather than performance goals such as grades (Ames, 1992). While Table 12 shows that the participants claimed to be more motivated by learning than by earning good grades, this was not consistent for all students. For example, of the only two students who shared that the desire to learn new things did not influence their choice of activity, one was from the *Excellent Fit* group and the other from the *Unsatisfactory Fit* group. While the two students in the *Excellent Fit* group were among those to value grades lower than other factors in choosing

activities, there were equally low rankings in the other groups, with the lowest ranking being from a member of the *Unsatisfactory Fit* group. Table 13 showed that all but three of the students included getting good grades in their top three motivators or activities. The five students who ranked grades as their primary choice included members of all groups except for the *Unsatisfactory Fit* group. In fact, two of the three members of this group ranked grades among their bottom two motivators. Rather than showing an emphasis on grades to have an inverse relationship with success in the program, the data seem to show that obtaining high grades and wanting to learn something new are not mutually exclusive motivators. The students, parents, and teachers all shared their belief that a self-directed or self-motivated student with some internal motivation to succeed is likely the type to succeed in such programs. The other factor of importance that was suggested by all three participant groups was the need for a student to have a passion or focus that he or she wants to pursue and that can sustain an entire semester. The lack of such passion appeared to limit the success of the three members of the *Unsatisfactory Fit* group. Ingrid and her parents were very up front about the absence of a passion to pursue. Although there was a topic of interest, it was unclear whether it warranted a semester of project work, and much of the time allotted for project work was used to choose a subject or a product to create rather than working on it. Julie and Fran had an area of interest that they wanted to pursue, but as I witnessed during my classroom observations, they made frequent and significant changes to their projects, including alterations to their product and presentation late in the semester.

The student data also suggests that those students who are most open to risk, comfortable with uncertainty, change, and welcome a challenge might be more likely to

succeed. These students are the academic risk takers referenced in Meyer et al. (1997). Table 12 shows that Ingrid and Julie (*Unsatisfactory Fit* group) did not like to be challenged. This preference was shared, however, by Carlos of the *Excellent Fit* group. Table 14 also shows that Ingrid and Julie are less open to new tasks than the other students, and they also avoid taking on challenging tasks. These thoughts were shared by their parents on the Parent Entrance Survey. In contrast, Eric—one of two members of the *Excellent Fit* group—was the only student to say that he did not like it when step by step instructions are provided to complete a task. This attitude might reflect a willingness to embrace uncertainty that served him well in the program. Table 18 suggests that those students who were best suited to *PBLearn* were those that found it the most challenging, providing support for the notion that an appropriate level of challenge is good for learning (Shernoff, et al., 2003). The teachers also shared that students either looking for a change in their learning approach or at least open to change are likely those best suited for success in this program.

The teachers felt that another helpful quality was the ability of a student to work independently. Responses on the Student Exit Interview purport that most of the students who are better suited to the program (*Excellent* and *Very Good Fit* groups) expressed an ability to work independently. In contrast, Fran (*Unsatisfactory Fit* group) shared a feeling that it was sometimes hard to “think for herself” throughout the semester. Perhaps she is indicating a preference for being told what to do that some students expressed on the Exit Interview that would limit some students in the project setting. Dweck (1986) suggests that students with an adaptive mindset are more resilient, which would be helpful in a new setting. When looking at Table 19, it is interesting that only Fran, Ingrid and Julie shared their limitations rather than

strengths. Julie also shared on the Follow-Up Interview that she had never been much of a participator, while her parents shared on the Entrance Survey that she was a procrastinator. Such comments could reflect a less confident, mal-adaptive mindset.

One response on the Parent Entrance Survey suggests that *PBLearn* might be a more productive setting for social learners. This idea meshes with Hackmann's (2004) belief that students should be socially engaged in their learning. The program teachers caution against the potential for some students to be too social, which can impact the amount of time spent working independently on their project. They feel that Fran might have been such a student, and this was supported by my observations as well.

When asked directly for their suggestions about student selection for such programs, the students, parents, and teachers could not agree on how many students should be eligible. If there was a consensus, it was, as this student sample demonstrates, that all students could likely benefit in some way from many of the features of the program. The benefits include the sentiment from several parents that *PBLearn* might better respond to students with unique challenges or approaches to learning. Expanded to more students, the PBL features might help a greater number of neglected, but capable students (McCluskey, 2012) or students who are getting by in the current system without being engaged (Newmann, 1989). However, there was much support for limiting student admittance if the program continues to operate in its existing format and separate location. Either because it helped create the safe environment that many students appreciated or because admission into the program provided motivation for student engagement (Marks, 2000), some students felt that admission should continue to be controlled by an application process.

Learning in the Program

A conscious goal of the program, and one that was discussed openly and frequently with students was to develop the life skills referred to as the Six Cs. The third research question sought to discover to what extent this goal was reached, as well as to discover what else was learned by students in their work in the program. The data shared in this section offers descriptions of some of the knowledge, skills, and other abilities students acquired throughout the semester.

Student entrance survey. One question on the survey asked students to identify their current level of ability with each skill area of the 6 Cs (from 1 = None to 4 = A Lot), as well as career goals and abilities with technology. Since the same question was repeated on the Exit Survey, both responses are included in Table 20 for comparison.

Table 20

Students' Self-Ratings on Skills – Before and After
(n=11)

Skill/Attribute:	Survey:	Number of Responses for Each Rating (1 = None, 4 = A Lot)				Mean Response
		1	2	3	4	
Creativity	Before	0	0	4	7	3.64
	After	0	0	2	9	3.81
Collaboration	Before	0	3	3	5	3.18
	After	0	1	1	9	3.73
Citizenship	Before	0	2	5	4	3.18
	After	0	0	6	5	3.45
Communication	Before	0	0	7	4	3.36
	After	0	0	2	9	3.82
Critical Thinking	Before	1	0	3	7	3.45
	After	0	1	4	6	3.45
Character	Before	0	3	3	5	3.18
	After	0	1	4	6	3.45
Career	Before	0	3	4	4	3.09
	After	1	1	3	6	3.27
Technology	Before	0	0	6	5	3.45
	After	1	0	5	5	3.27

While students indicated self-efficacy across these areas at their home schools and while in the project, mean increases can be observed in six of the eight categories. The greatest increases in mean scores occurred for Collaboration (+0.55) and Communication (+0.46). Smaller gains were found for: Citizenship (0.27), Character (0.27), Career (0.18), and Creativity (0.17). There was no change for Critical Thinking and a decrease noted for Technology (-0.18).

There were also interesting changes to note for individual cases, as there were students who reported an improvement of one or more rating levels in each category: Creativity (2 students), Collaboration (4 by one level and 1 by two levels), Citizenship (3), Communication (5), Critical Thinking (1), Character (3 by one level and 1 by two levels) Career (2 by one level and 1 by two levels), and Technology (2). Some students felt that their level decreased in some categories: Critical Thinking (1 student), Character (2), Career (2), and Technology (2 by one level and 1 by two levels). And finally, when asked what they hoped to learn in *PBLearn*, six students mentioned specific areas of study (coding, writing/editing/publishing, programming, finance/accounting, video game creation, Art), and five mentioned personal skills such as tenacity, socialization, and public speaking.

Parent entrance survey. When parents were asked what they hoped their child would gain in the program, all but one spoke of either skills or personal areas that they hoped would be developed. Five made reference to awareness about the future (career or education) and four mentioned confidence. Other learning resulting from the program that parents mentioned were: taking a concept from start to finish, managing time, making presentations, contributing to group discussions, and critical thinking skills.

Initial teacher interview. In the first part of the interview, the teachers were asked to identify which of the Six Cs that each student had demonstrated in the first month of the program. The teachers explained that many of the learning experiences that they chose early in the semester were designed to expose students to these skills and to give them specific opportunities to work on them, and that the students would have more time throughout the semester to use these skills to continue their development. The settings in which students could demonstrate these skills early in the program varied depending on the skill in question. Creativity was shown by students working through learning challenges designed by the teachers or the original ideas they brought to their project work. Collaboration was also shown by students working together on their projects and in groups for learning challenges and activities. Opportunities for citizenship were available through volunteer activities organized by the teachers, as well as urging students to consider how their projects could have a positive impact on others, our community or the environment. In addition to sharing ideas during project work, communication was developed through the Responsive Classroom approach used by the teachers as well as the numerous presentations students had to give in class. In addition to public speaking, students were required to incorporate visual aids, video, and sound to enhance their presentations. While the learning challenges typically demanded critical thinking, students had to use this skill to find information and resources and to determine the next steps to take to drive their projects forward. Character seemed to be slightly less targeted early on, though there were student discussions about empathy. And finally, the students appeared to demonstrate an increasing amount of confidence through the early activities. Table 21

summarizes the 6 Cs that the teachers felt each student was demonstrating in the first month of the program.

Table 21

Students' Display of 6 Cs in First Month

	Creativity	Collaboration	Citizenship	Communication	Critical Thinking	Character
Barry	Yes	Yes	Limited	Yes	Yes	Limited
Carlos	Yes	Limited	Yes	Yes	No	Yes
David	No	Yes	No	Yes	Yes	Limited
Eric	Yes	Yes	Yes	Yes	Yes	Yes
Fran	Yes	Yes	Yes	Yes	Yes	Yes
Garth	No	Yes	Limited	Yes	Yes	Yes
Hal	Yes	Yes	Limited	Yes	Yes	Limited
Ingrid	No	Limited	Yes	Yes	No	Limited
Julie	Yes	No	No	No	Yes	No
Kim	Yes	Yes	Yes	Yes	Yes	Yes
Lou	No	Yes	No	Yes	No	Yes

The average student in this group was demonstrating four of the Six Cs regularly in the first month, with three students showing all six and only two showing fewer than three.

Throughout the interview, the teachers also shared many of the activities and events that were geared either toward curricular learning outcomes or the development of other skills and abilities. One teacher described the intended weighing of content, skill development, and pursuing student interests: "I've tried to find the balance between teaching specific content and also finding times for kids to drive their own engines of learning...Let me get out of the way and support you as you see fit." The Physical Education credit was earned at and managed by the host school by logging hours of activity and completing two inquiry projects. With respect to the curricular content for the Transactional English credit, the teachers referenced the following activities: technical and authentic writing (including project proposals, blogs and reflections), reading (mostly to learn about own project content or for peer-review), peer-assessment and personal assessment, discussions, debates, video assessment, and presentations. One teacher

made the comparison to a traditional classroom: “The kids did a lot more writing, reviewing, and viewing than they might have in a normal language class.” They also suggest that they got much more practice with presentations as well, as they completed a number of hours in Toastmasters as well as the Time to Teach activities where students became experts on a chosen topic that they presented to the class.

Outside of the English-related outcomes, the teachers cited a number of other forms of learning that had taken place early in the semester. Planning was a big part of their scaffolding, with time spent reviewing the inquiry process and the importance of essential questions, and work with time management, including the project proposals and creating Gantt charts. Time was specifically set aside for the students to design and set up the rooms at the beginning of the term, as well as for learning challenges such as the outing to an escape room. Other intentional approaches included arranging a number of volunteer opportunities for the students, the Responsive Classroom approach to guide daily sharing sessions, lessons in digital literacy, and the creation of portfolios to promote accountability. A more general strategy was to have students guide their own work as much as possible, and “time to get messy and let them figure it out on their own.” Some lessons developed organically from the students, including discussions about sexuality, mental illness, empathy, and acceptance of others. The teachers also referenced some of the learning topics broached by students in their individual project work, including website development, starting a business, and the work performed by animal shelters.

Classroom observations. The three visits allowed me to get an idea of what the students were learning by watching what they were working on, be it guided activities, project work, or

completing other tasks. On my first visit, students began the morning viewing a TED Talk video on racism chosen by one of the students. This led to a group discussion with some debate, with the teachers ensuring that all students had an opportunity to share. On my second visit, the afternoon began with students viewing a video and having a discussion on paranormal activity. For the majority of my three visits, students were working independently. With respect to project work, there was some planning guidance provided, with one teacher reminding students to update their planning white boards, and the other teacher instituting a morning and afternoon check-in with each student to review progress. The learning I observed reflected the content of various projects on the go: writing a novel, researching into mental health disorders, creating a public service announcement to promote the spaying and neutering of pets, researching different operating systems, writing a practice LSAT to prepare for future studies in Law, creating videos for a YouTube channel, creating a mental health survey and analyzing the resulting data, starting a car maintenance and detailing service (creating a website, a list of necessary materials, online invoicing), and integrating original maps and characters into a role-playing video game. In addition to the project work, other learning was taking place. The group discussed the work with their “learning buddies” from an elementary school they were working with, one student was completing work for an additional Math credit, several were preparing presentations for their Career Development credit (including working with the Career Development teacher who was present for a portion of one visit), one student was completing an inquiry project for Physical Education, and some were writing their final reflections about their time in the program.

Student exit surveys. Students were asked to rate how much they felt their time in *PBLearn* helped them learn in certain content areas or develop certain skills, as compared to their experiences at their home schools (from -2 = much less to +2 = much more). Table 22 displays the responses, with the columns B to L each representing a student alias. First listed are the 6 Cs, followed by Career (7th C), Technology, and other course concepts.

Table 22

Students' Self-Perceptions on How PBLearn Supported Learning Development
(n=11)

Perceived growth in:	B	C	D	E	F	G	H	I	J	K	L	Mean
Creativity	1	2	1	2	2	1	1	2	2	2	2	1.6
Communication	0	2	2	2	2	1	1	1	2	2	2	1.6
Collaboration	0	2	1	1	2	1	1	2	2	2	2	1.5
Critical Thinking	1	2	2	2	2	1	1	1	1	1	2	1.5
Citizenship	1	1	1	1	2	0	1	2	2	2	2	1.4
Character	0	2	2	2	2	1	1	0	1	1	2	1.3
Career Goals	1	2	2	1	1	2	1	0	2	2	2	1.5
Technology Skills	0	1	2	1	0	2	1	1	0	2	2	1.1
ITC Concepts	2	1	2	1	1	1	1	0	1	2	0	1.1
ELA Concepts	0	1	2	2	1	1	-1	1	0	1	1	0.8
PE Concepts	0	1	2	0	-1	1	0	1	1	0	0	0.5
Other Course Concepts	0	1	2	1	-1	-1	1	0	0	1	0	0.4
PE Participation	0	1	2	0	-2	0	0	2	0	-1	0	0.2

There were no declines reported for the Six Cs, with only 5 zeroes (no change) indicated amongst all the students. According to students, time in *PBLearn* positively impacted their creativity and communication most (1.6), followed by collaboration and critical thinking (1.5), citizenship (1.4), and character (1.3). In their assessment, students felt they had learned more about career goals (1.5), technology (1.1), and ELA concepts (0.8) when compared with learning about these areas at their home schools. Similarly, but slightly less so, students learned (0.5) and participated (0.2) more in Physical Education and other courses (0.4).

Students were asked to estimate the amount of time spent working in different types of activities throughout the semester. Table 23 show students' estimates of the percentage of time spent in each activity.

Table 23

Students' Estimates of % of Time Spent in Different Types of Activity
(n=11)

% of Time Spent in:	B	C	D	E	F	G	H	I	J	K	L	Mean
Independent Work	30	50	50	70	60	40	63	40	30	70	45	49.8
Working with Other Students	20	20	20	15	20	20	12	25	30	10	25	19.7
Lessons led by teacher	10	20	15	10	10	20	12	15	10	5	20	13.4
Field trips or outings	40	10	10	5	10	10	6	10	10	10	10	11.9
Other			5			10	7	10	20	5		5.2

On average, students felt that about half (49.8%) of their time was spent working independently, while 19.7% was spent working collaboratively with other students. The remaining 30% of their time was participating in teacher led lessons (13.4%), going on field trips (11.9%), or other activities (5.2%).

When asked what they liked most about their semester in the program, four students referenced ways that they were able to develop which included: building the necessary attributes to learn, collaboration, time management, and increased confidence. Three students mentioned their appreciation for being able to learn about a topic of interest, and two students cited the volunteering opportunities and other outings as what they most appreciated. When asked what they liked least, seven of the students mentioned the scaffolding or planning activities implemented by the teachers, which they regarded as "hand-holding," "unnecessary," or "extra work."

Parent exit survey. Similar to the student responses displayed in Table 22, parents were also asked to rate how much they felt the time in *PBLearn* helped their child develop in certain

content or skill areas, as compared to their experiences at their home schools using a scale from -2 = much less to +2 = much more. The responses of the nine participating parents are displayed by student alias in Table 24. Note that the last three categories are slightly different, including the new question asking parents to evaluate whether the program had impacted their child's willingness to take risks.

Table 24

Parents' Perceptions of PBLearn Impacts on Student Development
(n=9)

Perceived growth in:	C	D	E	F	G	H	I	J	K	Mean
Critical Thinking	1	2	2	1	2	2	1	2	2	1.7
Collaboration	2	2	1	2	1	2	0	2	2	1.6
Communication	1	2	1	2	2	2	0	2	2	1.6
Creativity	1	1	1	2	2	2	1	1	2	1.4
Citizenship	0	1	1	2	2	2	0	1	2	1.2
Character	1	1	2	2	2	1	0	1	1	1.2
Career Goals	1	1	2	1	2	0	0	2	1	1.1
Technology Skills	0	1	2	2	2	1	1	2	2	1.4
Course Concepts	1	1	1	2	1	0	1	1	1	1.0
PE Participation	0	0	0	0	0	-1	0	0	0	-0.1
Willingness to Take Risks	1	1	1	2	2	1	1	1	2	1.3

Parents reported that *PBLearn* helped their children learn the 6 Cs more than the home school programs. Students learned “much more” in the areas of critical thinking (1.7), collaboration (1.6), and communication (1.6) and “more” in the areas of creativity (1.4), citizenship (1.2), and character (1.2). Although the parents agreed with the four most developed areas suggested by the students, they flipped critical thinking and creativity for first and fourth ranked. Technology and creativity were equally impacted by the project learning context. All parents felt that the program helped students become more willing to take risks (1.3). Career goals (1.1) and other course concepts (1.0) were positively impacted but to a lesser degree. When compared with the

home school experience, students' participation in PE was slightly less (-0.1) so this observation should be examined in the future.

When asked what they felt were the most helpful features of *PBLearn*, two parents mentioned preparation for the workforce and two appreciated a perceived increase in the student's confidence. Other skills mentioned were collaboration, accountability, organization, and a feeling that the program helped push the students' comfort zones. One parent expressed that the program was "very helpful in life learning and personal development as well as all aspects of academic learning." When asked to share what they felt were the least helpful features, there was one suggestion that work was a bit rushed, and another that more guidance with project timelines would have been helpful. One parent felt that the Physical Education credit was "a bit of a farce," another felt that the Career Development wasn't helpful for their child, and one expressed concern that their child had been removed from the French Immersion environment for a semester.

When asked to share any changes observed during the semester, six of the nine parents felt that their child was showing more confidence. Other improvements in the area of personal development included: thoughtfulness, responsibility, being more vocal, and being a better listener. Other notable changes identified included: improved communication, problem solving, collaboration, and taking initiative to participate in additional volunteering. When prompted for suggestions for improvement, one parent shared that the student was somewhat disappointed that he wasn't able to make business contacts and thought that arranging these contacts or inviting guest-speakers from different fields would be appreciated by the students.

Student exit interviews. Most of the students touched on activities related to the ELA credit and outcomes. Two students mentioned writing blogs, public speaking, and creating video reflections. Other activities mentioned once included: writing out project planners, viewing TED Talks, and writing an essay. Two students also discussed the ability to meet many of the ELA outcomes through their project work, and one was conscious of the fact that they hadn't read any books or written an exam, as their peers at the home schools likely would have done. Four students discussed the weekly work they had completed to earn the Career Development credit, with one student stating that some of the hours required were earned through career-related project work. Many of the students mentioned the time that was allotted every day for earning activity hours or working on the projects required for Physical Education, and two students talked about the time they spent out of the *PBLearn* classrooms earning additional course credits.

The students mentioned a number of activities that were organized by the teachers to provide learning. These included volunteering and mentorship activities, morning meetings, team-building activities, presentations, and practice with project planning. They were also asked about which of the 6 Cs they felt that they had most and least developed. Four students felt that they had most improved their communication, and three other students shared their considerable improvement with this skill, by being able to connect and feel more at ease talking with others, or becoming an easier person to talk to. Character was cited as the most improved by three students, with another three talked about their improved confidence. One felt his motivation and quality of work had increased, while another believed he had matured considerably. Two people felt that their greatest improvement was with collaboration, but for

two others, it was their critical thinking that had most progressed. This type of critical thinking was explained by students as being able to figure out the steps to take to complete their project work. In contrast, two students felt that critical thinking was least improved. Two students reported that their creativity had improved through their project work, while two others felt that their creativity was the least improved of the 6 skills. Only one student explicitly discussed improvements in citizenship; five students said they felt this was the area in which they grew least. Four students discussed increases in career awareness, either because they had had the opportunity to explore different career options, or because the program gave them the chance to experience aspects of a potential career.

Other personal skill improvements were mentioned by students. These included: how to stay on task, project management, organization, work ethic, tenacity and grit, and learning how to learn. Four students strongly felt that the semester allowed them to learn more about themselves, as one student described: "I guess since we are working on what interests us, we're able to learn about ourselves as well." One student felt she knew more about what she was interested in learning, a second felt he had a better handle on himself as a learner, and a third said that *PBLearn* "allowed me to learn what being me was like." Two of the French Immersion students shared that they had either missed some of the French content or felt a bit out of practice with their second language skills.

Teacher exit interviews. The teachers also spoke of the ELA outcomes that were covered, mentioning peer-editing, reflections, debates, lots of purposeful writing, and giving numerous presentations. One teacher lamented the lack of emphasis on reading, noting that the original intention was to have students read at least one novel, which never materialized.

The teachers noted an intended emphasis on helping the students learn how to learn, including creating meaningful questions, and persevering through failure. They also mentioned the early emphasis on project planning, including the use of Gantt charts and white boards for daily goals, though only one teacher used these regularly with half of the students.

With respect to the targeted skills, communication was the one teachers felt was most improved for four project students. Collaboration was delineated as the most improved for three students, with a fourth student demonstrating strong collaboration within his project group, but not with the larger group. Teachers reported that collaboration was the least improved of the 6 Cs for at least one student. They listed two students who they felt had most improved their character, and shared details about three other students who had matured, became more confident, or grew as a person. The teachers had targeted social-emotional learning as a goal, hoping for improvements in student confidence and self-concept, while at the same time hoping that all students felt cared for in the program. There was one student who had most improved in each of citizenship, critical thinking, and creativity. In the teachers' assessment, two students had least improved in the area of citizenship. With respect to career, they specified four students who surely felt more informed or certain about their future direction given their exploration in the program. This growth was related to areas of specific content learning, such as learning to use writing software, psychology, law, and creating a business. The teachers shared progress in time management and managerial skills for one student and growth in mentorship skills for three others.

Report card data. The credits obtained by students in their semester in the program should be an indication of the content learning that occurred. All 11 students in the project

earned four credits: English Language Arts – Transactional Focus 30S, Physical Education 30F, Life-Work Building 30S (Career Development), Interactive Media 35S (0.5 credit) and Print Communications 25S (0.5). Two students earned an additional credit for Script Writing 30S through their project work, and two students earned credits (in Chemistry 30S and Pre-Calculus Mathematics 30S, respectively) by attending classes at the host school.

Student follow-up interviews. Several students again referenced the ELA knowledge they had gained in the program, with three students noting improvement in their presentation skills. One student mentioned that there was no grammar in *PBLearn*, and that she was not enjoying reading classic novels back at her home school. Two students felt the English work integrated into their project work was more relevant than what they experienced as more random content at their home schools. One student said that he got more and deeper learning in the program, and another student felt that she just got more out of it in general.

Three students suggested their character had improved, referencing increased confidence. Two students noted their improved communication, either for voicing their opinion or for working as part of a group. One student also mentioned that he is now more likely to collaborate in a group. One student referred to much practice with creativity in *PBLearn* and another expressed that it promoted critical thinking. Eight students felt more enlightened about possible career directions, feeling that the program helped them to explore or narrow possible career options or get some exposure to a probable future career. Two students even felt that their project work in *PBLearn* might open up a future employment opportunity. Two students sensed that their work ethic had improved, and one student said that he had developed more grit. While two students felt that the program work hadn't changed or helped how they

approach school now, six reported that it did. Students commented that they are better able to navigate through tough times (such as exams), plan out their studies, and more effectively identify important information. For some, their perspectives on school and learning had improved.

Of the French Immersion students who were asked about the impact of the semester on their second language skills, perspectives were mixed. Four felt that the primarily English setting left them at least a little rusty with their French. Three students noticed no impact on their French (though one would have preferred to do the project work at a French school), and one student felt that his French improved by the end of the semester, as a result of some extra French work he had initiated himself.

Expressing their general feelings about the two separate school settings, two students shared a sentiment that the *PBLearn* learning was more useful or more related to “real life stuff.” A third student felt this so profoundly that she found herself thinking “how pointless half the things are” that are being learned while back at her home school. Another student, however, felt that students in *PBLearn* “wouldn’t learn as much as you would in normal school,” which is a better environment to prepare a student for post-secondary studies.

Discussing Student Learning in the Program

As the previous sections suggest, the learning done by students in *PBLearn* extends beyond the academic education offered by all schools. As discussed in the literature review, one of the reference programs, *Terrascope* at MIT, divides their learning objectives into the categories of process and content learning, skill improvement, and personal development

(Lipson et al., 2007). These would be appropriate categories to describe the learning in the program under study as well.

Besides the PBL focus, perhaps what distinguishes *PBLearn* most from other traditional high school offerings is the emphasis on skill development. Most of the participants had likely never heard of the Six Cs before arriving at the host school, and these were discussed regularly throughout the project semester. Students arrived with abilities in each of these areas, as they reported a mean rating of 3.33 (closest to a “Some” rating of 3) across the six skills on the Student Entrance Survey. The teachers also felt that the average student was regularly displaying four of the Six Cs in the first month of the program. The rankings provided on the Student Exit Survey suggest that the students improved with five of the Six Cs, including collaboration, communication, character, creativity and citizenship, with critical thinking unchanged from the entrance point. The surveys show that communication and collaboration were the most improved skills, which is not surprising as the teachers felt that they were most emphasized. Communication was most reinforced by Responsive Classroom practices that ensured that all students voiced their thoughts every day, as well as numerous oral presentations. Four students mentioned in the Exit Interview that this skill was what they thought had improved the most, with three others expressing a significant improvement. The teachers also felt that four of the students had improved in this area more than any other. Collaboration was practiced in assigned learning tasks and challenges, as well as by numerous students working on their project work together. This type of group work is supported by Hackmann’s (2004) statement that social engagement allows students to learn in a

constructivist setting. The teachers felt that three of the students improved with collaboration more than in other areas.

Findings around the growth in development of character occurring in the program are more challenging to confirm. Students self-reported a marginal increase in this area on the surveys and only three of them expressed during the Exit Interviews that this was their area of greatest improvement. Three others spoke of increased confidence, which was a sentiment shared by six of the nine parents surveyed. Parents, teachers and students also spoke of most students demonstrating increased motivation, quality of work, maturation, thoughtfulness, responsibility, or growing as a person. It could be argued that many of these qualities could be included either as skills or as areas of personal development, though Fullan (2013) includes most of them—including confidence—in his description of the makeup of character. Fullan's description considered, it appears that character development was observed more readily by the adult participants in the study and suggests that students may find it more difficult to self-assess in this area.

Beyond some specific project work, little was said about creativity. Critical thinking did not get discussed much beyond references to learning challenges and having to navigate one's own way through the steps of individual project work. Participants felt that citizenship was least developed, with five students identifying it as their area of least growth. This finding is coupled with teachers identifying it as the area of least growth for at least two students. However, there was much discussion about the numerous volunteering opportunities offered to students, including their time spent mentoring younger students at a partner school in the district. Perhaps the reservation in the participants to acknowledge this work as citizenship is that most

of it was mandated by the program or they did not have an operational definition of what kinds of activities constituted citizenship. Still, some students completed volunteer work that was not required, and the hope would be that learning about the importance of citizenship would lead them to maintain such consideration in their future endeavors.

The learning related to career likely falls somewhere in between the categories of personal development and skill development. The teachers referenced four students whom they felt were now more informed about future work interests, and eight of the students felt they were now more enlightened about possible career direction. Two of the students even felt that their work in the program might have attracted the attention of a potential employer. Two parents expressed that the program helped them to prepare their children for the workforce; this point may indicate students had some opportunity to practice employability skills such as planning and time management (Lees, 2002). Spending roughly half of the classroom time on project work (and only an estimated 13% with teacher led activities) demanded that students work a lot either independently or collaboratively, which should serve them in future work at school or in the workforce. All parents noted that their child developed a willingness to take risks or to push comfort zones in the program. This observation likely speaks to development personal skills as well.

Most of the comments on content learning relate to meeting objectives for the English Language Arts credit. During the Exit Interviews, students spoke of completing blogs and video reflections, as well as numerous opportunities they had to improve their public speaking. The teachers were adamant that the students had considerably more exposure to ELA learning outcomes than they would in the traditional setting, with the exception being reading. Although

students were constantly reading for their project work, they did not read or discuss any novels, which was a goal of the teachers heading into the semester. Many of the students seemed to appreciate that the ELA (and Career Development) outcomes were mostly met naturally by completing work on their project. This integrated approach provided for deeper learning on project content while benefiting from links to curricular content (Blumenfeld et al, 1991). During the final Follow-Up Interviews, several students shared that the ELA integration with other subject areas also made it seem more relevant. Two students referencing the “real life stuff” learning in the program speaks to the benefit of seeing how learning and exploring personal interests can be relevant beyond the classroom (Marks, 2000).

Beyond the credits for ELA, Career Development, and Physical Education, there was content learning within each student’s chosen area of study. These areas included: creative writing, mental health, domestic animals, operating systems, website creation, law, creating online videos, vehicle maintenance, and video game creation. In addition to being of personal interest to the students, one could argue that learning about this content while earning credits they would typically earn was a bonus, as it is learning that would not occur in the traditional setting. It also puts the emphasis simply on learning, rather than learning to meet the expectations of a curriculum or a teacher, as cautioned by Hendry (1996). This idea provides a reason for why six of the students say that the semester in the program changed or helped the way they approach their learning in school.

General Feedback on the Program

All data sets were reviewed specifically for revealing information that could improve future iterations of the program. Several data sets provided helpful, general feedback about the

program. These data sources included: Initial Teacher Interviews, Student Exit Surveys, Parent Exit Surveys, Student Exit Interviews, Teacher Exit Interviews, and Student Follow-Up Interviews.

Initial teacher interview. The importance of providing students with voice and choice was something emphasized by both teachers as one of the most important aspects of the program. They also sought to infuse the 6 Cs into all aspects of their work. Both teachers seemed to agree that they wanted to expose the students to a lot of experiences up front that would later help them in their project work: “You need to be scaffolding and set up the necessary skills at the start, but then you have to let go.” They described this process as the balance of rigidity and looseness that they felt would be most effective. They also felt that this approach differed from the approach of the teachers in the first semester of the program, who they felt tended to be more reactionary in addressing shortcomings as they presented themselves.

The general feeling of the two teachers involved in the project was that the second semester offering was based on the work from the inaugural semester—such as the schedule and the handbook, offering non-traditional, out of the box thinking—but with several additions and improvements. In addition to increased scaffolding, they referenced augmented ELA content (especially writing and presenting) and open discussion about 6 C development. They felt that they shared a general vision with the Term 1 teachers, which was facilitated by three of the four teachers being from the Design Team, but that their delivery was significantly different. The teacher participants in this study were also up front about their belief that the first semester would have been more challenging as this inaugural teacher group was starting from scratch; there would be an expectation that the next iteration of the program would show

improvement. The two teachers involved in this study believed that one of the contributors to their success was the teaching partnership that they formed. They felt there was benefit in planning everything together and especially appreciated the combination of a high school and elementary teacher working together.

Student exit survey. Students were asked to rank the importance of seven different factors on their learning in the program. The results, by student alias, are summarized in Table 25. Although students were asked to rank the factors from 1 (most important) to 7 (least important), at least one student (David) appeared to misunderstand this instruction.

Table 25

Students' Perceptions of Factors Influencing their Learning in PBLearn
(n=11)

Factor	B	C	D	E	F	G	H	I	J	K	L	Mean
Chosen project or topic	5	1	2	2	1	1	1	2	1	1	1	1.6
School/classroom/learning environment	4	2	3	1	6	3	4	4	4	2	3	3.3
Program Teachers	1	4	5	4	2	4	3	6	3	3	4	3.6
Presenting/Sharing What was Learned	2	5	7	3	4	2	2	3	5	6	2	3.7
Other Students in the Program	6	3	2	6	3	7	5	1	2	4	5	4.0
Field Trips or Outings	3	6	6	7	5	6	6	5	7	5	7	5.7
Other Adults in the Program	7	7	4	5	7	5	7	7	6	7	6	6.2

The student responses converged around three factors. There was much agreement that the choice of topic for their project work was by far the biggest influence on their learning throughout the semester. Almost universally, the least influential aspects of the program were other adults (such as the Career Development teacher, other teachers or administrators in the host school, or this researcher) and the various excursions outside of the school. There was little consistency amongst the rankings of the other factors, which might reflect the notion that the impact of factors on the learning of individual students may be quite different.

Parent exit survey. The parents were asked which aspects of the program they found the least helpful for their children. Responses included the feeling of one parent that there was too much rushing, a suggestion from another parent that more adherence to project timelines would have been helpful, and another parent expressed concern about the potential for a major adjustment for students returning after a semester removed from a French Immersion milieu. When asked about how the program met expectations, one parent expressed concern about reintegration back into the regular program and whether this would pose a greater challenge heading into the Grade 12 year.

The last question on the survey asked what suggestions parents might offer to improve *PBLearn* for the future. One felt that the major project work should be started earlier in the semester. There was a suggestion about utilizing students who had participated in *PBLearn* to help promote the program for future students and to increase parent involvement throughout the semester. One parent suggested that there was too much emphasis on passions, which wasn't fair to teenagers since some adults aren't aware of their passions. Another suggested that further guidance was needed with respect to project timelines and reaching milestones.

Student exit interview. While responding to various questions, many students offered suggestions for improving the program. Lou suggested that some of the hand-holding done by the teachers early in the semester should have been avoided as this did not equate to "giving the students enough independence to figure out for themselves what they wanted to do." He felt that Grade 11 students were smart and capable enough to do more themselves. When I asked Carlos what he thought the value might be in learning some content in areas of less personal interest, his two-sided response was interesting. He said he appreciated how it might

help keep a person's options open, but also felt that if a person changed his or her mind and decided later that they really wanted to pursue a different area, that he or she would probably just take the class at that time. When discussing the relationship between learning and grades, Fran admitted that her favorite courses were likely the ones where she got only average marks instead of those where she got the highest grades. Julie expressed that while getting a good grade is nice, she was more interested in getting things done on her own terms and to her own standards. When discussing engagement, Kim spoke to the value of driving your own learning by sharing "if people have to tell you what to do, you'll want to do it less." Ingrid discussed ignorance of the program in many schools, suggesting that few of the teachers at her home school knew what the program was all about.

A number of students shared thoughts about their anticipated return to their home schools for the following school year. Garth wondered if the program would have any impact on his future work; Eric was similarly nervous that he would go back to his old routine; Fran felt the days would be longer but was excited to see how the improved skills would translate over to regular classes; Carlos was worried about how he would react to regular classes again. Several students in the project expressed concern that returning to more traditional programming could be difficult, with Garth saying it would be a letdown after experiencing *PBLearn*, Hal stating simply that he felt "it's going to suck a little bit" and Ingrid feeling it was going to be a difficult transition. Fran shared that she didn't want to go back because the students were more separated at her home school compared to the friendly nature in *PBLearn*.

Teacher exit interview. The teachers reflected on a number of suggestions for improving the program. One suggestion was to do some small inquiry projects or some problem-based

learning, either for all students in addition to their big project, or as an option for students struggling to choose a big project. One teacher expressed that colleagues at a PBL conference “thought that the idea of one large project for a semester was not a good idea.” One teacher felt that one of the most important things was considering a child’s social-emotional needs to ensure they are in a position to learn, and conceded that this likely wasn’t always a consideration for many high school teachers. Both teachers expressed their appreciation for working closely with a teaching partner and a desire to do more of this in the future. Other ideas included putting more emphasis on time management and providing proof of what had been done, making it mandatory for students to find a mentor in a relevant field, while also inviting more experts to visit the class.

When discussing specific students, Lou was said to show a lot of interest in learning about one area, but that this didn’t translate into a desire to learn in other areas. It was mentioned that one student would be benefitting from increased support upon the return to her home school, and noted that not all home schools offered any support to the program or discussed continuity for their students. They also expressed concern about another student’s social-emotional supports at her home school due to the lack of a core group of friends.

Student follow-up interviews. Some students had thoughts or suggestions about the program after having a few months to reflect. Garth proposed that an effective program might be comprised of a morning of elective courses based around project work followed by an afternoon of regular course work. Ingrid wondered why project work similar to *PBLearn* couldn’t be done at her home school as well. She also felt that doing project work all the time wouldn’t allow her to learn everything that she needed. Fran shared that she wouldn’t want to

experience the *PBLearn* environment for a second time as she felt that it could negatively impact the first, positive experience. She also noticed that many teachers at her home school were beginning to integrate features similar to *PBLearn*. Kim shared that she would have preferred to do the project work in a French Immersion school. Ingrid expressed that it wasn't surprising that many students didn't know about the program since most teachers at her school didn't appear to know anything about it. A unique comment was from Fran, who felt that the teachers in the program were more passionate about the students wanting to learn because they had chosen to be there and "weren't just doing their job." Some students shared thoughts about how they were adjusting to being back at their home school. Barry felt that his approach hadn't changed at all, Hal said that it was different having to study for tests and David shared that he had deadlines again which he found more stressful.

Discussing the General Feedback on the Program

Emphasized again in this section is the importance of providing students with the opportunity to pursue their own passions. The students' feedback in Table 25 highlights the chance to pursue projects of high interest as the biggest factor impacting their success in the program. While the program does much to consider the needs (socio-emotional as well as academic) of individual students, there seems to be some evidence that further options might better suit the needs of certain students. The example of allowing some students to pursue a number of smaller projects might provide increased flexibility to those without the singular-focused passions of most students.

Teachers, students, and parents all shared that increased mentorship opportunities would be helpful to program students. This idea of giving students access to people beyond the

school with more specialized knowledge (Lipson, Epstein, Bras & Hodges, 2007), would provide them with exposure to a greater breadth and depth of knowledge. Though mentorship might take some effort to arrange, it would also alleviate the need for program teachers to learn about such a variety of topics.

The reality is that with such a breadth of topics no teacher can have expertise in all and therefore students will always hold much of the responsibility for managing their learning. Although most students argued that they would appreciate even greater levels of independence, some students (and their parents) felt that further guidance would have been beneficial. Strambler and McKown (2013) remind us that inquiry learning can be less effective for student learning than guided approaches, and some of these participants would agree that more support in the way of managing timelines and project demands, might have improved their performance.

Another recurring issue was the concern on the part of some students and parents regarding the return to the home schools after spending a semester in *PBLearn*. The preoccupation was that students who had shown increases in engagement and performance might see a significant decline upon reintegration. While the student Follow-Up Interviews conducted shortly after returning to their home schools seem to indicate some frustration, a more detailed look at their engagement and academic achievement at another later point in time would be informative. The suggestion of one of the teachers to ensure that supports are in place at the home school for students who need it appears to be a step toward mitigating such concerns.

Chapter Summation

This chapter presented the quantitative and qualitative data from each of the ten data sets for each of the three research questions, in addition to some general feedback about *PBLearn*. Data suggest that the program had a positive impact on the learning engagement of students, and the major reasons for increased participation include a focus on student interests, appropriate levels of challenge, and an inviting learning environment—though some students were more engaged in their work than others. In general, the best-suited learners for this program are those whose motivations at school include a desire to learn and a topic of study that they are passionate about, and who possess such qualities as a growth mindset, openness to change and risk, and the ability to work independently. Learning in the program included content gains in ELA, Career Exploration, and various areas investigated in the project work, as well as greater exposure to and skill development with the 6 Cs (some more than others), career awareness, and other personal skills. Suggestions for improvement in the program included offering the option to explore several projects during the semester, greater mentorship opportunities, increases in benchmarks and accountability, and greater support for students returning to their home schools at the end of the program. While these findings were supported with tables and recurring themes in this chapter, they will be sharpened into specific conclusions in the next chapter, which will also explain how the findings can be used to support the program and the school division in improving practice.

Chapter 5: Conclusions and Implications for Practice

The goal of this chapter is to draw out some specific conclusions from the data presented in the previous chapter. Though they are still numerous and outlined in reference to the relevant research question, they will be stated concisely in a numbered list in an effort to outline the major findings resulting from the study. To respect the desired action piece of the study, these conclusions will lead into a discussion about some specific directions that I suggest would be beneficial to the program and to practice in the district in general. The chapter will conclude with some considerations regarding the strengths and limitations of the findings given the scope and methodology of the study.

Concluding Statements

The conclusions are clustered in response to the distinct research questions related to student engagement in the program, student approaches to learning and the suitability of students for *PBLearn*, and what was learned in the program. The following conclusions can be drawn from the study findings which were presented in the previous chapter.

The following summary statements were formulated for student engagement in the program.

1. Overall, students were engaged in the program.
2. Student participation was higher in the program than in the students' home schools, including increases in classroom discussions, in class and school activities, asking questions, working with peers, discussing with teachers, putting in a complete effort, independently starting work and staying on task, engaging in non-assigned learning,

completing homework and working outside of class time, and talking about school experiences.

3. Students were less bored in *PBLearn* than they were at their home schools.
4. Participants stressed the appeal of working on topics of personal interest.
5. Students found the work more relevant than most work at their home schools.
6. Students felt more challenged in *PBLearn*, resulting in productive states of flow for most students.
7. Student grades increased for all students, with an average increase of 13% and increases ranging from 4% to 26%.
8. Overall, students had 86 fewer absences and 9 fewer tardies than in the previous semester.
9. Participants felt more comfortable in the *PBLearn* setting, citing the benefits of familiarity amongst students and teachers, a reduced class size, the physical layout (including two separate rooms suiting different learning styles), and the responsive classroom approach.
10. Three students were noticeably less engaged than the other eight students.
11. Many students were not engaged by much of the project planning required.
12. Some of the increased engagement was of a social nature.
13. Eight of the 11 students experienced less engagement upon returning to their home schools for the first semester of the following year.

Regarding approaches to learning, it can be concluded that following characteristics appear to make some students better suited to this specific type of learning environment:

1. An identified passion to pursue and can sustain for an entire semester;
2. The ability to become easily consumed by project work;
3. An openness to risk, uncertainty, change, and being challenged; and
4. An inclination to seek out feedback and make improvements to one's work.

The following approaches to learning would likely serve students in any school setting, but were possessed by those who had success in *PBLearn* as well:

5. Self-directedness or the ability to work independently and think for yourself; and
6. Internal motivation or a personal desire to learn and improve.

The opposite learning characteristics of those just mentioned also apply to those students who appear to be less suited to the *PBLearn* environment:

1. The lack of a passion or interest to pursue a desired direction and final product;
2. An aversion to risk-taking or a preference for tasks that have been done before over new tasks; and
3. A preference for constant instruction and direction.

Other approaches to learning and characteristics that are unlikely to be helpful in *PBLearn*:

4. A high need for socialization during academic learning time or constantly needing to connect with others; and
5. A tendency to share limitations or negative feelings about themselves rather than describe their strengths and abilities.

The following conclusions were also drawn from the data regarding student approaches to learning and the suitability of students for *PBLearn*.

1. Being motivated by grades was not mutually exclusive to wanting to learn something new.
2. Some students who were not thriving in their home schools did very well in *PBLearn*.
3. Some participants felt that student admission to the program should be limited, whereas others felt that the program should be available to all students.

The following set of conclusions can be offered about what students learned while in the project program setting.

1. All students had much exposure to, discussion about, and practice with the intended skills (6 Cs and career).
2. As a group, students felt that they improved throughout the semester in each of these skill development areas.
3. The greatest gains were reported for communication, collaboration, and character.
4. The most recurring area of personal improvement was confidence.
5. A small number of students reported slight declines in critical thinking, character, and career.
6. The majority of students reported to have found possible career directions.
7. Other areas of personal improvement included: risk-taking, staying on task, organization, work ethic, tenacity, grit, and a new appreciation for how they approach school.
8. ELA outcomes that received more attention than at the home schools—while often being integrated into project work—included presenting, writing, viewing, and reviewing.

9. The ELA outcome that received less attention than at the home schools was reading (especially reading novels).
10. Other content learning included project management (planning, inquiry process, and time management), content related to career exploration, and content specific to the individual projects (which in some cases could possibly relate to future careers).

Recommendations and Implications for Practice

Much of the success of *PBLearn* results from offering a setting different from the one offered to most students. Given the benefits of the flexibility provided in the program, teachers and organizers should be sure to be open to different pathways for different students. In addition to the two classrooms (catering in this semester to students with a preference for either a quiet and individual setting or a more social environment), one variation appeared to be the amount of support that each student received from the teachers. Given the numerous calls for increased accountability for those students who had a hard time staying on task, there is likely room to further individualize the support and expectations for students. Some students would have benefitted from more delineated benchmarks and check-ins, to ensure that they were moving along at an acceptable rate. These accountability measures could benefit all students, as they shouldn't have a negative effect on those who were able to progress at an appropriate pace despite the relatively loose framework. Another possibility to accommodate different learners would be the option to work on several, smaller projects throughout the semester. In addition to potentially reducing anxiety for students struggling to identify a passion, smaller projects could also help to avoid the burnout that some students experienced from spending an entire semester on the same topic.

Results related to increased engagement of students in the program aside, there were aspects of the program that the students did not find as engaging—most notably the emphasis on planning. Does this mean that these aspects should be removed? Hardly. Education is always a balance of trying to keep students active and interested while improving and acquiring valuable skills and abilities. This realization speaks to the distinction between engagement in general and learning engagement, specifically. One particular student participant also highlights the importance of engagement and productivity. The case of Fran is an interesting one, as she was at one time described as the most engaged student in the program, yet her success in the program was limited. By the end of the semester, the teachers felt that she was “perhaps too engaged,” referring to her tendency to be socially involved with others without being productive in her own project work. The implication here is that stakeholders in the program should be encouraged by the engagement level of participants, and should feel empowered to continue to push students toward increased learning without any fear that growing expectations will hinder engagement. In addition to the increased accountability already mentioned, further emphasis could be placed on the reading activities that students and teachers alike admitted were absent during the semester of study. Some of the findings also show that many of the students would benefit from further peer connections and collaboration, since some of the participants mostly worked independently through their projects. Another area to push students would be in finding suitable mentors in their respective areas of study. Teachers could certainly facilitate this task by welcoming further visitors and guest speakers, and by helping students make helpful contacts in the professional community.

The data sets provide a number of other recommendations for improving the *PBLearn* program in the future. With respect to student selection for the program, there appears to be some benefit to restricting admission to those who apply and selecting the students who seem to understand the rationale for the program and who want to contribute to a positive environment. Although spike students are optimally desired over non-spike students who would do well, finding suitable students could likely be augmented with a bit of promotion, given the comments that most students and teachers in the school division are unaware of the program. As suggested by one participant, using former attendees to promote the program with students and teachers at their home schools would likely help. Increased awareness by home-school staff would also likely help to reintegrate students returning from the program, which appeared limited for this group of students. Clearly, some students have concerns about returning to the traditional setting and could use the support that only some of these students received to ensure a smooth transition both academically and socio-emotionally. It also seems worthwhile to evaluate the feasibility of a *PBLearn* offering in a French Immersion milieu.

Other recommendations stemming from the study are those that might benefit the school division in its practices outside of the *PBLearn* program. Student voice and choice needs to factor into learning in all settings. PBL approaches are gaining popularity in schools and there appears to be justification that having options like *PBLearn* in all high schools would appeal to students who could benefit from a different approach. The study shows that such offerings will not result in decreased productivity, and in fact some students will choose to work harder when they can lead their own learning. That being said, just as a traditional approach is not effective for many students, PBL is also unlikely to be the answer for all students.

The study illustrates the importance of addressing students' socio-emotional needs at school. There were numerous comments from participants suggesting that engagement was driven by students feeling welcome, safe and comfortable in class. There are many ways to provide this support, but what likely makes the strategy from this study unique is that the Responsive Classroom and other approaches typically used in elementary classrooms were used with high school students. Having taught in a high school, I can relate to a common sentiment from high school teachers that time is too limited for such practices and is better served by a strictly academic focus. What many primary teachers would likely argue is that although there is a time investment to such practices, they will result in a more productive learning environment. This marriage of elementary and high school practices by the teachers in this study highlights the benefit of teacher collaboration, and possibly provides motivation for less traditional teacher partnerships.

Suggestions for Future Research

The most logical next step from an action research perspective would be to make adjustments given the feedback from this study and from each of the semesters of the program, and to measure the impact of such improvements. Selecting students in a future semester of the program and following up on their progress given improvements made to the program would allow for a natural next step (or loop) in the research cycle, while providing for increased transferability of any recurring results to a larger group of students.

Given the short time frame of the study, a natural extension would be to look at the impact of the program on both student and teacher participants over a longer term. It would be interesting to meet with students after their Grade 12 year to see if they felt that their

participation in the program affected their approach to learning. Were they more engaged in school as a result? Did their participation (and attendance) improve? Did they perform better (and obtain higher grades) in the following year of studies? Further questions to pose after another year of studies would be to determine how much their skills (6 Cs and others) had continued to improve. Were students demonstrating increased collaboration and communication at their home schools? Were students including acts of citizenship in their school work and in their personal lives? A look at how the program might have influenced the participants' career choices and progress might be even more logical another year or two down the road. Obviously, it could be difficult to isolate the impact of the students' time spent in *PBLearn* as compared to other factors impacting them after the program that might have weighed just as heavily on their development

An original goal of rotating different teachers through the program each semester in the hope that they would alter and improve their teaching practices is also worthy of exploration. What did the two teachers from the semester of study learn through their participation and how did it change their approaches to teaching upon returning to their home schools? Did they benefit from the contrasting elementary and high school approaches of their partnership? Beyond these specific teachers, it would also be interesting to explore whether the *PBLearn* offering served as a catalyst for further PBL and exploration practices within the school division. After seeing the success of the program, did other schools put programs with similar components in place? Are Immersion high schools offering PBL programs for their students in French? While the impact on teachers and teaching practices was not the focus of this study, it was one of the intended benefits of the program that should be explored.

As related to the second research question of this study, it would be beneficial to see if the long-term impacts or benefits of the program were different for the different student participants. Which students were most and least impacted over the long term by the program? Do the suggested student groupings from this study reflect those students who seemed to most and least benefit throughout the rest of their high school careers and into their post-secondary endeavours? In all of these cases, some longitudinal follow up would likely be as informative about the success of the program as those gathered during data collection for this study.

Strengths and Limitations of the Conclusions

The greatest strength of the conclusions is that they are confirmed using multiple data sets, each benefiting from high participation rates. The deductions are thus a consolidation of the student, parent, and teacher perspectives. Although the following paragraph cautions against the generalizability of the results, it is difficult to refute that the student participants demonstrated increased participation and engagement, and less boredom. The combination of multiple research questions also generates increased confidence that *PBLearn* will especially benefit the engagement of those students with the best suited approaches to learning. For all learners, it is difficult to imagine a setting in which the resulting support for program goals such as providing students with choice and challenge while allowing them to pursue projects of personal interest, would not be beneficial.

It must be taken into account that the conclusions are drawn from a relatively small group of participants studied over just one semester of the program. On the other hand, this case was studied in depth and offers a rich illumination of how this project worked with one cohort of students. The rich, thick description offers potential to resonate with educators

working in similar school contexts. As such, it is difficult to say whether the results are generalizable for most students, but they are transferable to like contexts. In fact, there was some variation even within this group of 11 participants, with three who appeared less engaged than the others, and with some students demonstrating less growth in certain desired skill areas than others. With respect to student admission into the program, there is some doubt as to whether all students in the semester of study would be considered the ideally targeted spike student. While the students who would likely most benefit include spike students matching many of the learning characteristics outlined in the study, it is hard to ensure that these will be the students who ultimately apply or are selected for each semester of the program. That being said, there are certainly some students who do not possess these exact traits who might do quite well or quite poorly in the program, for a number of other reasons. It even begs the question of whether the students who should be selected for *PBLearn* are those who would do the best within the program's parameters or those who need it the most—academically or otherwise.

In a perfect action research scenario, the results of this study would have been available in a timeframe to provide feedback to guide the following semester of the program. The reality is that these results will largely be shared and published some time later, after future iterations of the program have already occurred. In fact, some changes have already taken place within the program for other reasons, which could influence the applicability of certain findings. For example, two permanent teachers were put in place to lead the program from the semester immediately following this study and for the foreseeable future. As a result, some of the initial

thoughts around teacher development through the program—as well as some suggestions based on the findings—have evolved since the inception of this study.

Summation

With or without this study, *PBLearn* planners would benefit from observing the experiences and participants of each semester, and would apply learning to improve the program. This project is a positive, alternative option for Grade 11 students, which appears beneficial to underperforming spike students, and may benefit all students. It certainly responds to the guiding principle for this school division and perhaps many others, which is to ensure improved offerings and opportunities for learning for students. Does it meet the needs of all students who are not engaged and thriving in the existing system? Despite the overall, positive feedback gathered in this study, it was not a perfect match all of the 11 participating students. Despite that, it had positive effects on engagement and learning for all of the participants. This outcome does not mean that it is a program that should be rolled out to replace existing programming for all students. I wouldn't have needed it when I was in high school. I did just fine in the system that existed at the time, which is not too different from the current one. But some of my classmates—as some of the students from this study—needed something like this. With the current research suggesting that as many as half of high school students are disengaged by their studies (Willms, Friesen & Milton, 2009), it would seem that any program that combats this phenomenon is worthwhile. Given that no system or program is likely to come along that will appeal to all students, it is encouraging that people are willing to try and learn from new programs such as *PBLearn*, to take us at least another step in the right direction to helping all students find success in school.

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Appendices

Appendix A: Provincial Graduation Requirements

The following table and list show the requirements for graduation in the English program, which consist of 17 compulsory credits and 13 optional credits (Manitoba Education and Training, 2017):

Compulsory Credits (17)

Subject Area	Grade 9 (5)	Grade 10 (5)	Grade 11 (4)	Grade 12 (3)
English Language Arts	ELA 10F/E/M	ELA 20F/E/M	One of: Comprehensive Focus 30S/E/M Literary Focus 30S/E/M Transactional Focus 30S/E/M	One of: Comprehensive Focus 40S/E/M Literary Focus 40S/E/M Transactional Focus 40S/E/M
Mathematics	Mathematics 10F/E/M	One of: Essential 20S/E/M Introduction to Applied and Pre-Calculus 20S/E/M	One of: Applied 30S/E/M Essential 30S/E/M Pre-Calculus 30S/E/M	One of: Applied 40S/E/M Essential 40S/E/M Pre-Calculus 40S/E/M
Physical Education/ Health Education	PE/HE 10F/E/M	PE/HE 20F/E/M	PE/HE 30F/E/M	PE/HE 40F/E/M
Science	Science 10F/E/M	Science 20F/E/M		
Social Studies	Canada in the Contemporary World 10F/E/M	Geographic Issues of the 21 st Century 20F/E/M	History of Canada 30F/E/M	

Optional Credits – 13 credits from subject areas such as:

- English Language Arts (in addition to those taken as compulsory credits)
- Mathematics (in addition to those taken as compulsory credits)
- Sciences (in addition to those taken as compulsory credits)
- Social Studies (in addition to those taken as compulsory credits)
- French
- Other Languages
- The Arts: Visual, Music, Drama, Dance
- Career Development
- Psychology
- Computer Science
- Technology Education (Technical-Vocational, Human Ecology, Business & Marketing, Industrial Arts)
- Others: School-Initiated-Courses, Student-Initiated-Projects, Special Language Credits, etc.

Note: At least one optional credit must be at the Grade 11 level and at least two optional credits must be at the Grade 12 level.

Appendix B: Student Entrance Survey

Thank you for your participation in this survey. Please answer thoughtfully and honestly as your responses will provide helpful feedback on PBLearn and other programs in the school division.

Put a checkmark in the circle that best describes your answer.

1. How often do you participate in the following activities at your **home** school (not in PBLearn)?

	Never	Sometimes	Often	All the time
a) Classroom discussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Classroom activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) School activities outside the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. How much do each of the following classroom activities and assignments interest or engage you?

	Not at all	Very Little	Some	Very Much
a) Teacher lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Discussions and debates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Individual readings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Writing projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Individual research projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Group projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Giving presentations and speeches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Art, drama activities, role plays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Assignments involving computers or technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Which of the following have caused boredom for you at school? (Check all the choices that apply.)

- | | |
|--|--|
| <input type="radio"/> Work that wasn't challenging enough | <input type="radio"/> Material that wasn't relevant to my life |
| <input type="radio"/> Work that was too difficult | <input type="radio"/> Not enough interaction with the teacher |
| <input type="radio"/> The material wasn't interesting | <input type="radio"/> Not enough interaction with other students |
| <input type="radio"/> Teaching methods weren't interesting | <input type="radio"/> I haven't been bored at school |

4. In the last semester at your **home** school, how often did you do each of the following?

	Never	Rarely	Sometimes	Often
a) Ask or answer questions in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Ask for teacher feedback on your work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Complete all of the assigned work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Learn outside of class time without it being assigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Work with other students without it being assigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Connect ideas between two different classes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Discuss grades with teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Discuss what you had learned with teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Discuss class concepts with teachers outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Discuss class concepts with friends outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Discuss class concepts with parents/guardians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Discuss plans for learning after high school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Discuss future career plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Put a complete effort into your course work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Put very little effort into your course work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. How much do the following items influence your choice of classes or activities at school?

	Not at all	Very Little	Some	Very Much
a) Wanting to get good grades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Wanting to learn something new or interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Wanting to please your parents or guardians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Preparing for learning after high school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Preparing for a potential career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Wanting to be challenged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Having some free time in your schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) The courses that your friends are taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Which of the following are most important for you right now? Put these items in order from 1 (most important) to 6 (least important).

- | | |
|--------------------------------------|--|
| _____ Getting good grades in school | _____ Learning new things in school |
| _____ Making friends and socializing | _____ Activities at school (sports, plays, etc.) |
| _____ Working (having a job) | _____ Activities outside of school (sports, music, etc.) |

7. How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Agree	Strongly Agree
a) I like taking on new challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I like taking on difficult tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I prefer tasks that I have done before	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) I prefer new tasks that that I have never tried before	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) I prefer tasks that are easy to understand and complete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) I like tasks that are laid out step by step	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) I like choosing my own way to complete a task	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Identify your current level or ability in each of the following areas.

	None	Limited	Some	A Lot
a) Creativity: imagination, pursuing new ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Collaboration: teamwork, learning with and from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Citizenship: respect for others and the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Communication: listening, connecting with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Critical thinking: problem solving, decision making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Character: honesty, responsibility, self-confidence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Career: goals and awareness of workplace skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Technology: computers, applications, video	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. What are you looking forward to most during your semester in PBLearn?

10. What do you hope to learn in PBLearn that you might not have been able to learn at your home school?

11. Please add other comments that you would like to share about...

a) PBLearn?

b) Learning experiences at your home school?

c) You as a learner?

Appendix C: Parent/Guardian Entrance Survey

Student Name (first and last): _____

Parent/Guardian Name (first and last): _____

Relationship to the student (example: father, mother, uncle): _____

Thank you for your participation in this survey. Please answer thoughtfully and honestly as your responses will provide helpful feedback on PBLearn and other programs in the school division. Please note that the researcher might contact you to clarify or seek elaboration on some responses.

Put a checkmark in the circle that best describes your answer.

1. Which of the following school activities do you believe **your child** finds interesting or engaging?

	Not at all	Very Little	Some	Very Much
a) Teacher lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Discussions and debates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Individual readings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Writing projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Individual research projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Group projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Giving presentations and speeches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Art, drama activities, role plays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Assignments involving computers or technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. List any activities outside of the classroom – either at school or otherwise – that your child seems to enjoy or find engaging? (Example: sports, music, etc.)

3. How often does your child:

	Not at all	Very Little	Some	Very Much
a) Do school work at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Talk about school at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Talk about other activities at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Engage in learning that is not assigned from school?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Which of the following do you feel are most important for your child right now? Put these items in order from 1 (most important) to 6 (least important).

- | | |
|--------------------------------------|--|
| _____ Getting good grades in school | _____ Learning new things in school |
| _____ Making friends and socializing | _____ Activities at school (sports, plays, etc.) |
| _____ Working (having a job) | _____ Activities outside of school (sports, music, etc.) |

5. Indicate the extent to which you believe your child:	Not at all	Very Little	Some	Very Much
a) Looks forward to going to school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Is motivated by wanting to learn new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Is motivated by wanting to earn good grades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Puts a complete effort into his/her work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Completes all of his/her school work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Likes taking on challenging or difficult tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Is willing to take risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Displays creativity (in schoolwork or otherwise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Likes working with others (in group work, on a team, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Is mindful of other people's needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Is mindful of his/her impact on the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Communicates (written or orally) well with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Solves problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Makes independent and informed decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Takes responsibility for his/her actions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) Demonstrates self-confidence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q) Has an idea of future career goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r) Shows competency using cell phone applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s) Shows competency using other forms of technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Why did your child want to attend the PBLearn program?

7. What do you hope your child will gain from the PBLearn program?

8. Do you have any other comments that would help us to understand your child as a learner?

Appendix D: Initial Teacher Interview

Teacher name: _____

Date: _____ Start time: _____ End time: _____

Thanks for taking the time to complete this interview. I am recording the interview in order to transcribe it to facilitate data collection and analysis. A reminder that any responses that you provide that might be referenced later on would only be done so using a pseudonym or with your consent. I would ask you to be as honest as possible with your responses.

In the first part of the interview, we will discuss each student in the program. The point of these questions is to get a feel for the characteristics of each student and his/her progress and engagement in the program. Let's begin with (Student's name).

1. Tell me how (student name) is doing so far in the program.
2. How would you describe (student name)'s level of engagement?
3. What types of activities or other factors seem to influence (student name)'s engagement?
4. What motivates (student name) to perform or succeed in school?
5. How would you describe or characterize (student name) as a learner?
6. Why do you think (student name) is or is not well suited to this program?
7. With respect to the 6 Cs (a list will be provided), which if any characteristics does (student name) seem to demonstrate or possess?
8. With respect to the 6 Cs (a list will be provided), which if any characteristics does (student name) seem to struggle with?

In the second part of the interview, we will discuss some of the program and content goals.

9. How would you describe your approach to the PBL pedagogy that you are implementing this semester? Are there any theories or models that have informed this approach?
10. In your planning and in the classes you have had so far, how would you describe the balance between students acquiring content knowledge and developing skills?
11. What skills are you consciously trying to develop? What teaching strategies are you employing to do so?
12. How does the content knowledge that students are gaining in this program compare with what you have developed in a traditional classroom approach?
13. How does the skill acquisition and development that students are gaining in this program compare with those acquired and developed in a traditional classroom?
14. How would you say that this semester is the same or different from the last semester of PBLearn?

Appendix E: Student Exit Survey**Student Name (first and last):** _____

Thank you for your participation in this survey. Please answer thoughtfully and honestly as your responses will provide helpful feedback on PBLearn and other programs in the school division.

Put a checkmark in the circle that best describes your answer.

1. How often have you participated in the following activities during your time in PBLearn?

	Never	Sometimes	Often	All the time
a) Classroom discussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Classroom activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) School activities outside the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Which of the following have caused boredom for you this semester? (Check all the choices that apply.)

- | | |
|--|--|
| <input type="radio"/> Work that wasn't challenging enough | <input type="radio"/> Material that wasn't relevant to my life |
| <input type="radio"/> Work that was too difficult | <input type="radio"/> Not enough interaction with the teacher |
| <input type="radio"/> The material wasn't interesting | <input type="radio"/> Not enough interaction with other students |
| <input type="radio"/> Teaching methods weren't interesting | <input type="radio"/> I haven't been bored at all this semester |

3. How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Agree	Strongly Agree
a) I have really enjoyed school this semester	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) PBLearn has increased my desire to learn new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I feel more at ease to participate in the PBLearn setting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) I have been more on task in my work this semester	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) I found the work in PBLearn more meaningful than my home school course work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Throughout this semester in PBLearn, how often did you do each of the following?

	Never	Rarely	Sometimes	Often
a) Ask or answer questions in class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Ask for teacher feedback on your work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Complete all of the assigned work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Learn outside of class time without it being assigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(4 Cont'd): Throughout this semester in PBLearn, how often did you do each of the following?

	Never	Rarely	Sometimes	Often
e) Work with other students without it being assigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Connect ideas from two different courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Discuss grades with teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Discuss what you had learned with teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Discuss class concepts with teachers outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Discuss class concepts with friends outside of class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Discuss class concepts with parents/guardians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Discuss plans for learning after high school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Discuss future career plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Put a complete effort into your course work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Put very little effort into your course work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Identify your current level or ability in each of the following areas.

	None	Limited	Some	A Lot
a) Creativity: imagination, pursuing new ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Collaboration: teamwork, learning with and from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Citizenship: respect for others and the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Communication: listening, connecting with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Critical thinking: problem solving, decision making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Character: honesty, responsibility, self-confidence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Career: goals and awareness of workplace skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Technology: computers, applications, video	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Compared to your experiences at your home school, how much do you think PBLearn has helped you:	Much Less	Less	Same	More	Much More
a) Learn concepts in English Language Arts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Learn concepts in Information Technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Learn concepts in Physical Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Participate in Physical Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Learn concepts from other courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Develop your creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Develop your collaboration (working with others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Develop your citizenship (respect for others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Develop your communication with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Develop your critical thinking and problem solving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Develop your character (honesty, responsibility, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Consider future career goals and requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Develop your technology skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. How much do you agree or disagree with the following statements?	Strongly Disagree	Disagree	Agree	Strongly Agree
a) Project work in PBLearn was confusing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I wish that more instructions/directions had been given	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) PBLearn gave me the right amount of freedom to choose	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) I prefer the learning environment at my home school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) I found this semester more challenging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Estimate the percentage of time that you spent in each of the following activities (the total should add up to 100%):

____% Classroom lessons lead by teacher	____% Working with other students
____% Going on field trips or outings	____% Other: _____
____% Working independently (learning lead by yourself)	

9. What do you feel were the most important factors affecting your learning this semester? Rank the following factors from 1 (most important) to 7 (least important).

- | | |
|---|---|
| _____ The teachers | _____ Other adults who helped in the program |
| _____ Other students in the program | _____ The school, classroom or learning environment |
| _____ Field trips or outings | _____ Your project or topics that you learned about |
| _____ The way that you shared or presented what you had learned | |

10. What have you liked most about your semester in PBLearn?

11. What have you like least about your semester in PBLearn?

12. Do you have any other comments about PBLearn that you would like to share at this time? If so, please write them below.

Appendix F: Parent/Guardian Exit Survey

Student Name (first and last): _____

Parent/Guardian Name (first and last): _____

Thank you for your participation in this survey. Please answer thoughtfully and honestly as your responses will provide helpful feedback on PBLearn and other programs in the school division. Please note that the researcher might contact you to clarify or seek elaboration on some responses.

Put a checkmark in the circle that best describes your answer.

1. During his/her time at PBLearn this semester, how often has your child:	Not at all	Very Little	Some	Very Much	
a) Done school work at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
b) Talked about school at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
d) Engaged in learning that was not assigned from school?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. How much do you agree or disagree with the following statements regarding your child's experience this semester in PBLearn?	Strongly Disagree	Disagree	Agree	Strongly Agree	
a) He/she has really enjoyed school this semester	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
b) PBLearn has increased his/her desire to learn new things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
c) He/she seems to have found the work more meaningful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
d) He/she seems to have found the work more challenging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
e) He/she expressed frustration about the program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3. Compared to what your child was like before this semester, how much do you think PBLearn has helped:	Much Less	Less	Same	More	Much More
a) Him/her learn or understand course concepts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Him/her participate in Physical Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Develop his/her creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Develop his/her collaboration (working with others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Develop his/her citizenship (respect for others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Develop his/her communication with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Develop his/her critical thinking and problem solving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Develop his/her character (honesty, responsibility, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(3 cont'd) Compared to what your child was like before this semester, how much do you think PBLearn has helped:	Much Less	Less	Same	More	Much More
i) Him/her consider future career goals and requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Develop his/her technology skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) His/her willingness to take risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. In your view, what are the most positive or helpful features of PBLearn?

5. In your view, which features of PBLearn are the least helpful?

6. Tell me about any changes you saw in your child during this semester, positive or negative.

7. Explain the ways that the program did or did not meet your child's expectations.

8. What suggestions would you make to improve PBLearn for students in the future?

Appendix G: Student Exit Interview

Student name: _____

Date: _____ Start time: _____ End time: _____

Thanks for taking the time to complete this interview. I am recording the interview in order to transcribe it to facilitate data collection and analysis. A reminder that any responses that you provide that might be referenced later on would only be done so anonymously or with your consent. I would ask you to be as honest as possible with your responses.

1. Tell me about your experience this semester in PBLearn.
2. Tell me about a typical day for you this semester.

The following questions are follow-ups to your responses on the Entry and Exit surveys that you completed.

Possible follow-up for Question 1:

3. You have indicated that your participation in _____ has increased in PBLearn. Why did this change occur for you?

Possible follow-up for Question 2:

4. You have indicated that this semester, you have been bored with _____. What do you mean by this?

Possible follow-up for Question 3:

5. You have indicated that your desire to learn new things has increased this semester. Why do you think that is?

Possible follow-up for Question 4:

6. You have indicated that this semester you were more likely to complete the assigned work. Why do you think you were more willing to do this?

Possible follow-up for Question 5 or 6:

7. You have indicated that your Critical Thinking skills have improved throughout this semester. Give me an example of how you have demonstrated this improvement.

Possible follow-up for Question 7:

8. You have indicated that you prefer learning in the environment at your home school. What is it about the learning environment at your home school that you prefer?

9. Knowing what you know now about this program, if you had to go back and decide whether to attend, would you? Explain why you would or wouldn't want to do it again.

10. How do you feel about returning to your home school to begin your Grade 12 year?

I just want to remind you that I will be contacting you at your school in early October to discuss how your experience in *PBLearn* is impacting your learning or attitude after settling back into the traditional classroom.

Appendix H: Teacher Exit Interview

Teacher name: _____

Date: _____ Start time: _____ End time: _____

Thanks for taking the time to complete this interview. I am recording the interview in order to transcribe it to facilitate data collection and analysis. A reminder that any responses that you provide that might be referenced later on would only be done so anonymously or with your consent. I would ask you to be as honest as possible with your responses.

In the first part of the interview, we will discuss each student in the program. The point of these questions is to get your perspective on their progress and engagement in the program. Let's begin with (Student's name).

1. How would you describe (student name)'s level of engagement throughout the program?
2. How would you describe his/her desire to learn throughout the semester?
3. Earlier in the semester, you described (student's name) as _____ (from Question 5 of Initial Interview). How would you alter that description at this time, if at all?
4. Do you feel that he/she was well suited for the program? Why?
5. What traits (such as the 6 Cs) did he/she demonstrate or improve this semester?

In the second part of the interview, we will review some of the content and program goals you stated earlier in the semester.

(Possible follow-up to Entrance Interview, Question 10)

6. You had planned the balance between students acquiring content knowledge and developing skills to be _____. Explain whether this balance occurred or not, and why.

(Possible follow-up to Entrance Interview, Question 11)

7. You had stated that you hoped to focus on developing (name of skill). Did this work out as planned? If so, provide some examples of how this skill was integrated and developed.
8. Compared to a traditional classroom, how would you describe the content acquisition for the average student this semester?
9. If you were to go through this experience again, what are a couple of things that you would want to do differently?
10. How would you say that this semester was the same or different from the last semester of PBLearn?
11. Do you have any suggestions for improving future PBLearn program offerings?

Appendix I: Student Follow-up Interview

Student name: _____

Date: _____ Start time: _____ End time: _____

Thanks for taking the time to complete this interview. I am recording the interview in order to transcribe it to facilitate data collection and analysis. A reminder that any responses that you provide that might be referenced later on would only be done so anonymously or with your consent. I would ask you to be as honest as possible with your responses.

1. After spending the second semester of last year at PBLearn, you have spent a month taking classes back at your home school. Tell me what the transition back to your home school has been like.
2. Have any students asked you about the time you spent at PBLearn? What have you told them?
3. How do you feel about coming to school this semester?
4. What learning strategies did you acquire in PBLearn that you are using in school now?
5. In what way did your experience in PBLearn influence or not influence the courses you have chosen to take this year?
6. How have your plans for the future (after Grade 12) changed since you participated in the PBLearn Program?
7. If you had the chance to participate in PBLearn learning all of the time, or just for one semester, what would you chose and why?
8. Are there any comments you would like to make about your experience with PBLearn at this time?

Appendix J: Ethics Approval Certificate



UNIVERSITY
OF MANITOBA

Research Ethics and Compliance
Office of the Vice-President (Research and International)

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APPROVAL CERTIFICATE

April 5, 2016

(Advisor – F. Morin)

TO: Tyler Milloy
Principal Investigator

FROM: Zana Lutfiyya, Chair
Education/Nursing Research Ethics Board (ENREB)

Re: Protocol #E2016:041 (HS19625)
"An Action Research Study Exploring the Effects of Project-Based Learning on the engagement of High School Spike Students"

Please be advised that your above-referenced protocol has received human ethics approval by the Education/Nursing Research Ethics Board, which is organized and operates according to the Tri-Council Policy Statement (2). This approval is valid for one year only and will expire on April 5, 2017.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- If you have funds pending human ethics approval, please mail/e-mail/fax (204-333-2825) a copy of this Approval (identifying the related UM Project Number) to the Research Grants Officer in ORS in order to initiate fund setup. (How to find your UM Project Number: <http://umanitoba.ca/research/ors/mrt-faq.html#pr0>)
- If you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

The Research Quality Management Office may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/orec/ethics/human_ethics_REB_forms_guidelines.html) in order to be in compliance with Tri-Council Guidelines.