Motivation towards learning: A study of Alberni District Secondary School's

Project Based Learning Grade 9 Program

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Abstract

The purpose of the current study was to determine if participation in Alberni District Secondary School's Project Based Learning (PBL) Program has had an impact on student motivation towards learning. This was done by measuring changes in a broad range of motivational constructs at the individual and group level. The study was a mixed method, explanatory design using a static group pre-test and post-test, and was conducted over a three month time period (September 6 – December 6, 2011). The participants in the study were 14 students enrolled in the ADSS Project Based Learning program. The results of the research were that participant self-reported motivation increased significantly for the following constructs: self-efficacy, intrinsic motivation, and group work as a positive experience. No significant decreases in motivational orientation were found for individual or group motivational orientations. The principal conclusion of the current study was that for participants in the ADSS Project Based Learning program, student motivation is a complex, multi-dimensional process that is mediated by both individual and group orientations and experiences. Implications for practice based on the present study discuss how teachers of PBL should critically examine the design of PBL environments to make student motivation an explicit design element.

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Chapter 1: Problem to be Investigated

Purpose of the Study

The purpose of the current study was to determine if participation in Alberni District Secondary School's Project Based Learning Program has had an impact on student motivation towards learning and to add to the existing body of knowledge on issues of student motivation in project based learning classrooms. As defined by Blumenfeld, Soloway, Marx, Krajcik, Guzdial, and Palincsar (1991), project based learning is "a comprehensive approach to classroom teaching and learning that is designed to engage students in investigation of authentic problems" (p. 369). Project based learning has also been described as a constructivist instructional approach which is designed to support engaged and meaningful learning in which projects are used as the primary tools to encourage motivation, engage learners in authentic activities, and foster a deep understanding of curricular content and skills (Blumenfeld et al., 1991; Ravitz, 2010). ADSS's Project Based Learning Program was developed by the Principal and school staff in 2008 as a pilot program to determine if this approach to learning would better serve the learning needs of the student population and increase graduation rates. The current study will be used to assess the motivational changes that students undergo after participation in the program and guide further project based learning program development at higher grade levels.

In project based learning environments, students are given a real world challenge, autonomy over how to overcome that challenge, and teaching support to help build skills that they could use to overcome the challenge. If educators believe that engaging students in classroom activities that call for a deep understanding of curricular content is important, then developing an understanding of how students engage in and work through those activities from a motivational perspective requires further research (Blumenfeld et al., 1991; Linnenbrink, 2005). Furthermore, an understanding from an educational perspective into how the environment of

project based learning classrooms can create situational interest, hold and sustain that interest, create and maintain opportunities for students to invest in deep learning, and transform that interest and those opportunities into cognitive engagement, requires research that makes students' motivation to learn an explicit focus (Blumenfeld, Kempler, & Krajcik, 2006; Maehr & Midgley, 1991; Pintrich, 2003).

Ames and Archer (1988) postulated that students' regulation of learning, their long term involvement in the learning process, and their overall level of interest in persisting in learning activities were related to issues of motivation and the classroom climate. In the context of human learning cognition, motivation, and emotion intertwine (Turner, Meyer, & Schweinle, 2003) and contribute to the development of each other, thus each has an important role to play in student learning (Hancock, 2004; Meyer & Turner, 2002). The current study has sought to determine the role of motivation in the complex web of student engagement in a project based learning classroom.

The current study builds upon the existing body of research in the field of motivation and project based learning to assist educators in developing and designing learning environments that can create and sustain student interest and participation, allow for student agency and efficacy, assist teachers in anticipating learner difficulties, and meet the instructional challenges of motivating students and maintaining cognitive engagement (Blumenfeld et al., 2006). The results of the current study will be used by Alberni District Secondary School staff to evaluate the impact of participation in project based learning on student motivation towards learning. These results may also be used by School District 70 staff in professional development activities and for building teacher acceptance of the project based learning pedagogy in order to increase the number of classrooms in which project based learning is implemented.

Justification of the Study

As schools grapple with integrating 21st century skills into the curriculum and prepare for

the next wave of educational reform to address the needs of the current information and

technology age, educators are being called upon to redesign how schools work and what the

goals of schooling should be (Barron & Darling-Hammond, 2010; Goodman, 1995). Current

literature from the British Columbia Ministry of Education is calling on educational institutions

to re-design educational practices to place a greater emphasis on learning skills versus content,

developing relevance and real world connections in subject matter, having an increased role in

student agency around content that they find meaningful, assessing students in meaningful and

ongoing ways, as well as encouraging lifelong learning (Premier's Technology Council, 2010). It

is increasingly recognized that traditional methods of teaching through abstract thought,

textbooks, and memorization do not meaningfully engage the learner in the real world

connections of the subject matter, and do not lead to learning at a deep, conceptual level

(Scheurich & Higgins, 2009). Further, educational researchers have observed an overall decline

in students' motivation as they move into middle school (Lepper, Iyengar, & Corpus, 2005) and

high school (Gottfried, Fleming, & Gottfried, 2001; Otis, Grouzet, & Pelletier, 2005).

Developing pedagogies that can reverse this trend has been the focus of many educational

researchers (e.g., Ames & Archer, 1988; Blumenfeld et al., 1991; Blumenfeld et al., 1996)

The pedagogical model of project based learning has been put forward as one tool that

can be incorporated into educational practice to overcome some of these challenges (Blumenfeld

et al., 1991; Blumenfeld et al., 1996) and has been relevant to the educational reform discussion

for a significant period of time (e.g., Kilpatrick, 1918). To effectively address the challenges and

opportunities that project based learning can offer educators and students, a deep understanding

of the role motivation plays in the learning process is essential (Blumenfeld et al., 1991). Further, if educators view student mastery of a subject, versus performance, as being important then understanding how cognition, emotion, environment, and motivation intertwine is crucial for effective instructional design (Ames & Archer, 1988). A central assumption of this project, and one borne out by research through the Programme for International Student Assessment, is that students who are confident about learning, have a positive motivational orientation, and can utilize a range of cognitive and metacognitive learning strategies are more likely to have success as learners (OECD, 2004). The British Columbia Premier's Technology Council (2010) has also called for the increased use of project and problem based instructional strategies in order to meet the new realities of schooling in 21st century learning and to foster student interest and engagement in learning.

The studies reviewed in this project build a foundation for continuing research into project based learning, and identify the need for a more in-depth understanding of the linkages between cognition, emotion, environment, and motivation. Boaler's (1998) study addressed the differences in how students acquired content and procedural knowledge by comparing "traditional" instruction and project based learning. The results indicated that project based learning instruction may lead to a stronger ability among students to use and apply mathematics in interpreting different situations, developing meaning, applying procedural understanding, and increasing mathematical confidence. Boaler's (1998) study indicated that students may derive benefits from participating in project based learning, served as an ethical foundation for continued research into this field, and identified needs for further research into how students may have derived benefits through project based learning from a motivational perspective.

Barron, Schwartz, Vye, Moore, Petrosino, Zech, Bransford, and the Cognition and Technology Group at Vanderbilt's (1998) study outlined key design principles for project based learning and advocated for further research into how project based learning may affect students' attitudes and motivation toward learning with a holistic and fully integrated approach. Lam, Cheng, and Ma (2008) explored the linkages between intrinsic motivation and project based learning, as well as the interconnected nature of teacher and student motivation, teaching practices based on social-cognitive motivational theories, and affective supports for learning. In their study, Lam et al., (2008) provided tantalizing clues on the nature of intrinsic motivation in the project based learning classroom, an issue that is explored in the current study. Meyer, Turner, and Spencer's (1997) study explored important implications around project design, student agency, and emotional engagement in developing and implementing project based learning programs and called clearly for more research into the importance of affect, motivation, and volition in individual and group settings as they related to student decision making in formal learning environments.

Wurdinger, Haar, Hugg, and Bezon's (2007) study explored issues of teacher acceptance and student engagement in project based learning environments. Their results indicated a high level of acceptance of project based learning pedagogy among teachers, which was attributed to the significant benefits students derived from project based learning. These benefits were increases in problem solving skills, cooperative learning, critical and creative thinking, responsibility, motivation, and overall student engagement in the project based learning process. This study also called for more research into how motivational factors interact in a project based learning environment and impact on student achievement. Cheng, Lam, and Chan's (2008) study probed issues around student efficacy and group heterogeneity. They found that the quality of

group processes was a positive indicator of student efficacy regardless of the ability level of

students, and that this was an important factor in the academic achievement of students in project

based learning environments. This study also called for a deeper exploration between the

dynamics of group processes and student motivation in a project based learning environment,

which was explored as part of the present study.

Thomas (2000), in his review of project based learning research indicated that more

research needs to take place to determine "the effects of project based learning on domains other

than subject-matter knowledge" (p. 36). The current researcher's review indicated that more

research is necessary on the effects of motivation on student learning and how project based

learning environments can influence motivational orientations. These concepts will be the focus

of the current study.

Research Question and Hypothesis

The current study has sought to answer the following question: How does participation

in Alberni District Secondary School's (ADSS) project based learning program impact student

motivation towards learning? The researcher's hypothesis was that students' motivation towards

learning would be positively affected by participating in ADSS's project based learning program.

Definition of Terms

As defined by Blumenfeld et al. (1991), project based learning is "a comprehensive

approach to classroom teaching and learning that is designed to engage students in investigation

of authentic problems" (p. 369). Project based learning has also been described as a

constructivist instructional approach which is designed to support engaged and meaningful

learning in which projects are used as the primary tools to encourage motivation, engage learners

in authentic activities, and foster a deep understanding of curricular content and skills

(Blumenfeld et al., 1991; Ravitz, 2010). In project based learning (PBL) environments, learning

is facilitated through student projects. Students are given real world challenges, in authentic

learning environments where possible; teaching support to help make meaning of the project is

provided; and assessment is based on clearly defined criteria. In a comprehensive review of PBL

research Thomas (2000) identified the following criteria that a project must have in order to be

considered project based learning:

> PBL projects are central, not peripheral to the curriculum. PBL projects are focused on
>
> questions or problems that "drive" students to encounter (and struggle with) the central
>
> concepts and principles of a discipline. Projects involve students in a constructive
>
> investigation. Projects are student-driven to some significant degree. Projects are realistic, not
>
> school like (p. 3-4).

The ADSS Project Based Learning Program involves students spending 50% of their time

in a formal learning environment and 50% of their time in informal learning environments. The

informal learning environments are field trips to local woodlots and other areas of interest,

depending on the project students are working on. Student projects are based on the British

Columbia Ministry of Education's prescribed learning outcomes for Grade 9 Mathematics,

English, Science, and Social Studies, and are integrated among these curricular areas. The

students involved in the study were deemed to be participating if they were enrolled in the

Project Based Learning program and were attending more than 50% of their academic classes

when the study concluded.

For the purposes of this study, student motivation for learning was defined as the desire

for students to engage in, and persist in, learning activities in a school context (Blumenfeld et al.,

1991) and was measured with student self perceptions on a pre- and post-test survey instrument

that sought to measure changes in specific motivational constructs. Those constructs were self efficacy, intrinsic motivation, extrinsic motivation, academic self concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, and school-prompted interest. These constructs are discussed in detail in the theoretical review of Chapter Two.

Brief Overview of the Study

The current study aimed to determine if, and how participation in ADSS's project based learning program has affected students' motivation for learning. Fourteen students participated in the ADSS project based learning program during the course of this study. Participants were surveyed on the first day of entering the program (September 6, 2011), and three months later (December 6, 2011), using the same survey instrument. Students were asked to respond to 10 Likert statements relating to motivational constructs, and two open-ended questions relating to individual and group motivational orientation. All surveys were anonymous, delivered by a teacher independent of the program, and were completely voluntary.

Quantitative data was collected from 10 student survey responses on a five point Likert scale and qualitative data was collected from two open-ended questions related to how the Project Based Learning Program may have influenced students' individual and group motivational orientation towards learning. The survey's quantitative components sought to determine if changes occurred in students' self perceptions of self-efficacy, intrinsic motivation, extrinsic motivation, academic self-concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, and school-prompted interest during participation in the ADSS Project Based Learning Program. The qualitative questions asked students to respond to the following prompts; (a) what motivates you to learn, and (b) does

working on school projects in small groups motivate you? These questions sought to probe more deeply into students' individual and group motivational orientations in a project based learning environment. Survey responses to Questions 1 – 10 were summed by construct. Descriptive statistics were used to analyze pre- and post-test group totals and means for each question. These were then used to compare changes in motivational orientation for each construct after participation in the Project Based Learning Program. Open-ended questions were coded for imposed as well as emergent themes and grouped into appropriate categories to inform interpretations of quantitative data.

Chapter 2: Background and review of related literature

Theory

This chapter will examine the theoretical underpinnings and relevant research around project based learning and motivation. This section will briefly examine specific motivational constructs that are the focus of the current study. Those constructs are self efficacy, intrinsic motivation, extrinsic motivation, academic self concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, the role of school-prompted interest in student motivation. As the current study has sought to determine the role that participation in ADSS's Project Based Learning program may play in affecting students' motivation towards learning, this theoretical review will define and examine the specific motivational constructs that are measured quantitatively in the survey instrument. Table 1 provides a summary of the constructs. The relationship between these motivational constructs, current motivational theory, and project based learning as revealed in the results of the study, will be examined in Chapter Five.

Self efficacy can be defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). In an academic context, academic self efficacy relates to a person's belief in their ability to complete a given academic task at a desired level (Schunk, 1991). Students' efficacy beliefs can also be separated at the task-specific level (i.e., assignment), the domain-specific level (i.e., subject), and at the general academic level (Ferla, Valcke, & Schuyten, 2010). For the purposes of the present study, self efficacy was addressed at the task specific level, based on the work of Finney and Schraw (2003). Students' efficacy beliefs may play a significant role in their learning strategy use, effort, persistence, and choice of challenging activities (Blumenfeld et al., 2006). Research has indicated that students with strong self efficacy beliefs use more effective self

regulated learning strategies, choose to undertake more challenging academic tasks, demonstrate

greater persistence when faced with difficulties, use more effort to accomplish a task, have

greater cognitive engagement, and adopt a mastery goal orientation more frequently (Ferla,

Valcke, & Schuyten, 2010). As such, academic self efficacy is seen as a significant predictor of

academic performance (Pintrich & Schunk, 1996).

Intrinsic motivation has been broadly defined as when individuals engage in activities for

their own sake, and for the personal pleasure and satisfaction that they derive from their

performance in an activity (Deci, Vallerand, Pelletier, & Ryan, 1991). Thus, intrinsic motivation

relates to an internal desire to perform a task or engage in a particular behaviour (McDevitt &

Ormrod, 2004), is assumed to represent autonomous motivation, and has been linked with

student development of mastery goal orientations (Mouratidas & Michou, 2011). A mastery goal

orientation is considered to be associated with learning based on self referenced standards

(Ames, 1992), engagement in learning to understand, increased competence for personal reasons

(Boekarts, 2010), and leads to adaptive academic outcomes and behaviours (Koskey,

Karabenick, Woolley, Bonney, & Dever, 2010).

Extrinsic motivation has been defined as being instrumental in nature, where tasks or

behaviours are engaged in for reasons that are externally controlled (Deci et al., 1991). Thus

extrinsic motivation relates to an external source of motivation, or due to internalization

processes (Deci et al., 1991). Extrinsic motivation has been linked to student development of

performance goal orientations (Ames, 1992), and is thought to represent controlled motivation

(Mouratidas & Michou, 2011). Research on performance goal orientations has shown that

performance approach goals can have positive implications for motivation and learning

(Covington, 2000), self regulated learning strategy use (Deci et al., 1991), and higher academic

achievement (Urdan & Schoenfelder, 2006). Performance avoidance goal orientations are generally associated with negative patterns of motivation and behaviours related to school, and are characterized by reduced effort and task persistence (Covington, 2000). There is recent research to indicate that performance approach goals combined with mastery goals may lead to increased cognitive engagement and academic achievement (Boekarts, 2010).

Academic self concept can be defined as an individual's knowledge, perceptions, and beliefs about themselves in academic settings, may be based on multiple self, and domain specific concepts (Ferla et al., 2010), and is developed in part through the student's experience in, and interpretation of the school environment (Guay, Ratelle, Roy, & Litalien, 2010). Therefore, academic self concept differs from self efficacy in that it examines the role of students' perceived ability within an academic domain, or school in general. Research has shown that academic self concept is related to intrinsic motivation, persistence in academic tasks, achievement goal orientation, academic performance, self-regulatory processes (Ferla et al., 2010), and has a significant positive effect on students' academic achievement, emotion, and motivation towards school in general (Bong & Skaalvik, 2003). Recent research has indicated that academic self concept may lead to more autonomous motivation and increased academic achievement (Guay et al., 2010).

Academic interest has also been referred to as personal interest (Hidi & Harackiewicz, 2000), and refers to a student's desire to undertake particular academic tasks, engage in those tasks, and develop expertise in academic domains from a personal level (Brophy, 1999). While similar is scope to intrinsic motivation, this motivational construct seeks to determine the antecedents of intrinsic motivation (i.e., the aspects of the learning environment may play a role in developing short term academic interest in a topic or domain) and how that interest is

translated into long term academic interest (Blumenfeld et al., 2006). Research on academic interest has indicated that a student's strong academic interest in a topic may lead to increased retention of information, deeper processing (Brophy, 1999), and adoption of mastery goal orientations (Ames & Archer, 1988).

    Academic value can be defined as the value that a student places on academic tasks in relation to their everyday life, future goals (Blumenfeld et al., 2006), and how the nature of learning activities relate to a student's understanding of the benefits that they may derive from undertaking academic activities (Brophy, 1999). The value aspects of motivation and engagement relate to how well students can perceive self-relevance, possible real-life applications, and future goals (Giota, 2010). Academic value is directly related to how students view the relevance and authenticity of their academic work (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). Increasing academic value can have a positive impact on cognitive engagement, academic interest (Blumenfeld et al., 2006), and motivation to engage in specific learning activities (Brophy, 1999).

    Situational motivation has also been referred to as situational interest, and can be defined as the environmental features of the learning context (Hidi & Harackiewicz, 2000) that 'catch' and 'hold' students' interest (Mitchell, 1993). Catch factors are those aspects of the classroom environment that stimulate students' attention in beginning academic tasks, and can include innovative instructional techniques and the use of group work. Hold factors are those aspects of the classroom environment that may empower students by making the topic or content meaningful, useful, and of value to the students (Linnenbrink & Pintrich, 2002), or through encouraging active student involvement in the task (Mitchell, 1993). Situational motivation has been positively associated with the use of deeper cognitive strategies, increased attention and

persistence, increased student engagement, and increased academic achievement (Linnenbrink &

Pintrich, 2002).

 Academic agency can be defined as a person's beliefs about their ability to exercise

control over their thought processes, motivation, actions, and events that affect their lives in an

academic context (Bandura, 1989). Academic agency has been linked to students' self efficacy

beliefs (Bandura, 1989), situational motivation (Mouratadis & Michou, 2011), student

engagement (Shernoff et al., 2003), achievement goal orientation (Pintrich, 2000), self-regulation

of cognition and behaviour (Pintrich & De Groot, 1990), and teacher supportive behaviours

(Blumenfeld et al., 2006), to name a few. Students who viewed their learning environment as

promoting student agency had higher levels of intrinsic motivation, greater self esteem, higher

perceived competence, greater use of self-regulating strategies (Deci et al., 1991), develop more

meaningful social relations, experience more positive emotions (Mouratadis & Michou, 2011),

and have increased willingness to approach challenges (Blumenfeld et al., 2006). Further,

students with higher levels of perceived academic agency are more motivated in school, have

more adaptive attribution (Bandura, 1989), adopt a mastery goal orientation more frequently, and

promote student engagement in the learning process (Meece, Herman, & McCombs, 2003).

 Adaptive attribution is defined as the level to which students believe that their success or

failure in a given task is related to internal (internal locus of control) or external (external locus

of control) factors (Ames, 1990; Bandura, 1989). Students' self perceptions about the causes of

their successes or failures can shape their motivational beliefs, and expectancies for future

performance. Viewing stable links between their own actions in an academic setting and their

achievement (i.e., strategy use) is viewed as positively adaptive for students (Boekarts, 2010).

Adaptive attribution on the part of students that view success or failure as being due to stable and

internally controlled factors can increase metacognitive strategy use, motivation, self regulating

learning strategies, self efficacy, academic agency, effort, lead to increased academic

achievement (Ames, 1990), develop an adaptive achievement goal orientation (Greene, Miller,

Crowson, Duke, & Akey, 2004), and higher student self reports of positive emotions (Boakerts,

2010).

 School-prompted interest is defined as "the relationship between what occurs in the

classroom and students' motivation to continue their learning beyond the confines of the school"

(Ciani, Ferguson, Bergin, & Hilpert, 2010, p. 377). It has been argued by Pugh and Bergin

(2005), that continuing motivation towards learning in out-of-school contexts, and developing a

perspective on life-long learning, should be outcomes of schooling that are valued and pursued.

School-prompted interest has been positively related to the development of students' intrinsic

intellectual motivation (Bergin, 1999), use of self regulating learning strategies (Bergin, 1996),

self efficacy, academic self concept, development of mastery goal orientations, situational

interest, and academic interest (Ciani et al., 2010). Interestingly, student achievement was not

positively correlated to school-prompted interest; however, students' motivation and perceptions

of academic agency were predictors of school-prompted interest (Ciani et al., 2010).

 Table 1 is a summary of the motivational constructs explored as part of the current study.

Operational definitions are included as are the primary source documents.

Table 1: Summary of motivational constructs

Construct	Definition	Source
Self efficacy	"People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances."	Bandura (1986, p. 391)
Intrinsic motivation	When individuals engage in activities for their own sake, and for the personal pleasure and satisfaction that they derive from their performance in an activity.	Deci, Vallerand, Pelletier, & Ryan (1991)
Extrinsic motivation	Instrumental in nature, where tasks or behaviours are engaged in for reasons that are externally controlled.	Deci, Vallerand, Pelletier, and Ryan (1991)
Academic self-concept	An individual's knowledge, perceptions, and beliefs about themselves in academic settings.	Guay, Ratelle, Roy, and Litalien (2010)
Academic interest	A student's desire to undertake particular academic tasks, engage in those tasks, and develop expertise in academic domains from a personal level.	Brophy (1999)
Academic value	The value that a student places on academic tasks in relation to their everyday life and/or future goals.	Blumenfeld et al. (2006)
Situational motivation	The environmental features of the learning context that 'catch' and 'hold' students' interest.	Hidi and Harackiewicz (2000)
Academic agency	A person's beliefs about their ability to exercise control over their thought processes, motivation, actions, and events that affect their lives in an academic context.	Bandura (1989)
Adaptive attribution	The level to which students believe that their success or failure in a given task is related to internal (internal locus of control) or external (external locus of control) factors.	Ames (1990)
School-prompted interest	"The relationship between what occurs in the classroom and students' motivation to continue their learning beyond the confines of the school."	Ciani, Ferguson, Bergin, and Hilpert (2010, p. 377)

In the complex web of student motivation, these constructs intertwine. The present study has sought to determine the role that ADSS's project based learning program may play in developing these motivational constructs. Further, the current study sought to determine the complex and dynamic relationship of these motivational constructs as they were manifested in a project based learning classroom (Dowson & McInerney, 2003). This theoretical review sought to identified motivational constructs linked to student achievement (Pintrich, 2000) and expanded on motivational research conducted in PBL environments to include a broad range of motivational constructs.

The current study examined the breadth of motivational constructs included in this review in order to better understand the complex nature of motivation in a PBL environment. Prior studies have examined several of these constructs in depth. Boaler's (1998) study looked at achievement in a PBL environment but did not explore motivational issues. Barron et al.'s (1998) research looked more deeply into design elements of PBL that may support motivation, Lam, Cheng, and Ma's (2008) study explored intrinsic motivation, and Meyer, Turner, and Spencer's (1997) research considered extrinsic motivation, intrinsic motivation, self efficacy. Further, Wurdinger, Haar, Hugg, and Bezon (2007) examined general motivational strategies anecdotally, and Cheng, Lam, and Chan (2008) explored efficacy beliefs and the role of heterogeneous ability groupings relating to student achievement in PBL environments.

While collectively these studies cover many of the motivational constructs explored in the current study, they do not provide a 'big picture' of the nature of motivation in the ADSS Project Based Learning Program. As noted by Thomas (2000), further research needs to take into consideration the complex nature of learning in a PBL environment from a motivational perspective. In order to meet this challenge, the current study explored a broad range of

motivational constructs currently being discussed in educational literature to determine if, and how these constructs manifest themselves in students participating in ADSS's Project Based Learning Program. This broad approach may assist in making explicit the specific motivational areas that are enhanced through PBL environments.

Studies Directly Related

The research base in project based learning as a comprehensive teaching and learning tool has begun to demonstrate common outcomes around student achievement and motivation that form the basis for expanding and focusing research around this issue.

Boaler's (1998) study of two British schools sought to determine in which ways traditional instruction and project based learning instruction encouraged different forms of mathematics knowledge. Each school was selected for the study based on their approach to mathematics instruction. Amber Hill had a content-based or "traditional" approach, and Phoenix Park had a process-based, or project based learning approach. The author conducted ethnographic case studies on participants in both schools over a three year period. The author used a variety of qualitative and quantitative techniques to understand the students' experiences in math; including, participant observation of 80 – 100 lessons in each school, interviewing of 20 students and four teachers each year, questionnaires to 300 students, and various mathematical assessment instruments. The author conducted a longitudinal cohort analysis of a year group in each school as they moved from age 13 to age 16. Students of both schools were of similar socioeconomic background and considered to have comparable ability based on educational testing (Boaler, 1998).

The outcome of the study demonstrated that students using a traditional approach to mathematics, which utilized textbook-based lessons and methods, developed a procedural

understanding of math that was only relevant to them in textbook situations. The students who engaged in project based learning environments developed conceptual understanding of the subject matter that lead to better performance on assessments and in classroom work. The results indicated that students using mathematics with a range of authentic activities began to view procedural knowledge as a tool that could be adapted and used in different situations. Conceptual knowledge was characterized by the use and application of mathematics in different situations, developing meaning, and applying procedural understanding and was more likely to be developed through project based instruction. The author concluded that procedural knowledge characterized by computation, procedures, and rules was more likely to be developed through traditional classroom instruction (Boaler, 1998).

There were several significant limitations to this study when examining the outcomes through a project based learning lens. The teachers at Phoenix Park were not specialists in project based learning pedagogy (Boaler, 1998), and descriptions of learning activities more closely resembled cooperative learning (Perez et al., 2010). While project based learning encompasses many of the principles of cooperative learning, the results of this study must be viewed as emerging from a mix of the two pedagogies. Further, the author did not provide the qualitative survey and the quantitative assessment tools for the reader; while the author did include a description of what these tools were, and how they were administered, a critical examination of these would have been useful to determine any underlying validity issues and the use of the results to compare student achievement in the different schools. Another significant limitation of this study is that conceptual understanding and procedural knowledge were not explicitly defined. These terms form one of the cornerstones of the author's conclusion, and while meaning was inferred throughout the article, a specific definition would have been

beneficial to readers. A final limitation of this study was that Boaler (1998) did not refer to a

significant body of research into motivation and project based learning when interpreting the

results of the research. This may have provided a different lens through which the author could

have interpreted the results of this study, and could have provided significant insights into how

project based learning motivates students and student learning.

An important conclusion of Boaler's (1998) study was that students who engaged in

project based learning did not know more mathematical content as measured by traditional

assessments of content knowledge. Instead students developed a conceptual understanding of

mathematics, and a stronger ability to use mathematics to interpret different situations, develop

meaning, and apply procedural understanding. Students who participated in the project based

learning environment also reported an increase mathematical confidence. Boaler's (1998) key

critique of the traditional system, with its focus on developing procedural knowledge of

mathematics was that "a traditional textbook approach that emphasizes computation, rules, and

procedures at the expense of depth of understanding, is disadvantageous to students, primarily

because it encourages learning that is inflexible, school-bound, and of limited use" (p. 60).

Boaler's study related directly to the current study in several ways. One important

limitation noted was that there was no clear description of the project based learning classroom

activities and no definition of the underlying pedagogical philosophy. In this action research

project the pedagogy was clearly defined and based on current research. The current study also

aimed to determine qualitatively how a conceptual understanding of subject matter impacts

students' motivation towards school. This project also included all of the survey tools used, not

simply an explanation of the data, to allow readers the opportunity to critically examine

questions and issues of validity. Boaler's study provided evidence to support some key research

outcomes around student achievement and project based learning; however, it called for more research into motivation and student attitudes towards 'traditional' school, and project based learning environments. The current study aimed to address those issues.

Barron, Schwartz, Vye, Moore, Petrosino, Zech, Bransford, and the Cognition and Technology Group at Vanderbilt's (1998) mixed methods research study on problem and project based learning sought to explore the effects of problem and project based learning methodologies on student learning. They identified four key design principles that they incorporated into a project called "Smart Blueprint". These key principles were, "(a) defining learning appropriate goals that lead to deeper understanding; (b) providing scaffolds such as embedded teaching, teaching tools, sets of contrasting cases and beginning with problem based learning activities before initiating projects; (c) ensuring multiple opportunities for formative self-assessment and revision; and (d) developing social structures that promote participation and a sense of agency" (Barron et al., 1998, p. 271). The researchers developed a quantitative and qualitative research project to determine the effectiveness of the project based learning methodology designed around these four principles. The participants in this study were 111 Grade five students and five teachers from a middle school in Nashville, Tennessee. Student learning was reported on using three measures, a performance based measure, a standards based measure, and a measure that reflected the success of students in engaging in a collaborative design process. Students participated in project based learning tasks that were reviewed and evaluated by outside observers, and completed pre-tests and post-tests of mathematics concepts covered during the project. Quantitative analysis of the results was conducted by splitting the students' results on pre-tests and post-tests into three groups, high achieving, average achieving, and low achieving, and then comparing the results in a grouped percentage format. Students' results "showed

substantial gains in their abilities to understand, use, and present geometric concepts" (Barron et al., 1998, p. 303) across all levels of ability. The researchers then undertook a qualitative analysis through structured interviews to explore the revision process undertaken by students in the project based learning environment, based on teacher feedback. The results of the interviews indicated that the feedback and revision process was very important to the students' work process.

A significant limitation of this study was the pre-packaged nature of the projects and the 'novelty' aspect. In a critique of Barron et al.'s (1998) study, Blumenfeld et al. (2006) asserted that a key limitation in the research was that student choice of project was not included as one of the design features and that this study was undertaken in a 'traditional' classroom which may have lead to results that were more reflective of how the change in instructional practice affected student motivation. The pre-packaged nature of the program may also have allowed for the possibility that the student test results were "more attributable to the direct instruction and guided inquiry included in the project package than it was to the more widespread features of project based learning" (Thomas, 2000, p.17). This was noted as a shortcoming of Barron et al.'s, (1998) study by Thomas (2000) in a comprehensive review of project based learning literature. Further, the study relied on pre- and post-tests of student knowledge of the subject matter as measures of how effective the project based learning activities were; however, they did not perform a deeper analysis of how, or why, students achieved these results. Thus the current project sought to explore student attitudes towards learning as a result of a project based learning program, and to more deeply explore the relationship that may exist between learning and motivation in a project based learning environment. Barron et al.'s (1998) study highlighted the need for further research into how project based learning can affect students' attitudes and motivation toward

learning in a holistic and fully integrated approach; this formed the guiding research question of this action research project. Boaler (1998) and Barron et al.'s (1998) studies formed a significant portion of the foundation of determining if project based learning has educational benefits and produced results that illustrated the cognitive learning gains that can result from a project based learning approach. These studies also highlighted the need to investigate the affective and motivational domains of learning, and how these domains may be developed through non-traditional instructional methodologies such as project based learning.

Lam, Cheng, and Ma's (2008) study sought to determine if there was a relationship between teacher and student intrinsic motivation and project based learning. The participants were 126 teachers and 631 Grade seven, eight, and nine students from Hong Kong schools that had implemented project based learning as a curriculum delivery model. Students were assigned groups and tasked with studying a topic of interest with a teacher supervising each group. Topics were multidisciplinary, diverse, and lasted for two to three months, after which students were asked by the university researchers to complete a voluntary, confidential, evaluation questionnaire without the presence of their teacher. Teachers were also asked to complete a questionnaire in their free time. The objective of the study was to determine if there was any relationship between teacher and student intrinsic motivation and if this was mediated in any way by teachers' instructional practices. The researchers' hypothesis was that "teacher motivation has both direct and indirect effects on student motivation" (Lam et al., 2008, p. 569).

Quantitative data from a six point scale was gathered from teacher and student responses to questions relating to four measures: teacher intrinsic motivation, student intrinsic motivation, cognitive support, and affective support. Multi-level analyses were performed using hierarchical linear modeling. The results of this study demonstrated that students tended to perceive higher

levels of instructional support from teachers when those teachers reported having higher levels of

intrinsic motivation, and that student-reported intrinsic motivation was positively correlated to

teacher-reported levels of intrinsic motivation (Lam et al., 2008). Further, "when students

perceived more instructional support from their teachers, they reported higher intrinsic

motivation in the project-based learning activity" (p. 573). These results supported the

researchers' hypothesis at a statistically significant level. Another significant result of this study

was the interconnected nature of teacher and student motivation and teaching practices based on

social-cognitive motivational theories and affective supports (Lam et al., 2008).

A significant limitation of this study was that none of the raw data or survey instruments

were presented as a part of this study. Another limitation of this study was that the researchers'

measures were all self-reports and did not include objective measures such as third party

observations: these may have lead to expectancy formation in the form of students perceiving

more instructional support due to the small group sizes and the novelty of the project based

learning instructional methodology. A final limitation existed in the cultural differences of

teaching and learning in Hong Kong versus a western school system when seeking to generalize

the results of this study to a western school system (Lam et al., 2008). The results of this study

indicated that teacher motivation was an important consideration when undertaking research into

student motivation in project based learning environments. Research questions in this action

research project were specifically designed to reflect student beliefs around learning and attempt

to minimize teacher influence in survey administration. This study also clearly outlined the need

for further research into motivation and instructional practices in project based learning

environments and how project based learning classrooms affect individual student attitudes and

motivation towards learning.

Meyer, Turner, and Spencer's (1997) qualitative and quantitative study examined student motivation and learning strategies in a project based learning mathematics classroom. The researchers hypothesized that students with a mastery orientation towards learning mathematics in a project based classroom would report a deeper understanding of content, more intrinsic motivation toward the subject, view error as constructive, use cognitive, metacognitive, and volitional strategies, and maintain a realistic and positive affect (Meyer et al., 1997). The researcher sought to answer two research questions, "(1) how were students' attitudes towards risk taking or challenge seeking related to their perceived goal orientations, self efficacy, and strategy use in math class. (2) How were students' responses to both motivational surveys related to the choices they made during a mathematics project and their reactions to the outcomes of that project" (Meyer et al., 1997, p. 506).

The study's participants were 14 5th and 6th Grade math students of average ability as determined by California Achievement Test scores. Six weeks prior to undertaking the project based learning component of the study, students were asked to complete two surveys, the School Failure Tolerance Scale, to measure baseline data on students' constructive responses to failure, and the Patterns of Adaptive Learning Survey to measure baseline data on learning focused goals, ability focused goals, student self efficacy, use of surface level learning strategies, and the use of metacognitive strategies (Meyer et al., 1997). The researchers also conducted interviews with all of the participants before, during, and after the project, and observed daily instruction throughout the study period, to build on survey results and more deeply examine motivational, volitional, and affective patterns throughout the study. Data analysis was conducted by the third researcher who had no contact with the students during the study.

The results of the research indicated two broad categories of student self-views on learning: challenge seekers and challenge avoiders. Challenge seekers were characterized by having a higher tolerance for failure, a mastery goal orientation, and a higher reported self-efficacy. Challenge avoiders were characterized as having a higher negative affect related to failure, more of a performance goal orientation, lower self efficacy, and increased utilization of surface learning strategies (Meyer et al., 1997). Interview results indicated that "students had developed general motivational, volitional, and affective patterns over time and probably would adopt them again in similar circumstances" (Meyer et al., 1997, p. 515). This result holds important implications around project design, student choice, and emotional engagement in developing and implementing project based learning programs. Specifically, issues such as creating projects that are at an appropriate level of challenge, incorporating elements of student choice to promote self-efficacy, and how classrooms can provide a supportive challenge seeking environment. The researchers identified three key implications for research and practice in project based learning: (a) clarification on the importance of affect, motivation, and volition in individual and group settings as they relate to student decision making; (b) contextualizing student responses to projects designed to elicit metacognitive skills and learning strategies; and (c) that process related skills should be included in the discussion around educational reform (Meyer et al., 1997).

One of the limitations of this study was the small number of students involved in the study. This issue made generalizations to broader contexts difficult around issues of motivation, affect, and volition. Further, the use of surveys prior to the implementation of the project based learning unit and not after, did not offer any quantitative measure of student development of motivational, metacognitive, and learning strategy development; although this was discussed as

part of the interview process, a pre- and post-survey may have clarified student development of these outcomes.

Of specific relevance from this study to the present action research project were the survey instrumentation and research design. Several elements of Meyer et al.'s study design were implemented in the current study. The Patterns of Adaptive Learning Survey was modified for use in this action research project, and questions around student motivational strategies and attitude orientations have been specifically adapted for the current study. The PALS instrument was chosen as it provided a valid and reliable instrument for the grade level of the students in the present study, and addressed most of the motivational constructs included in the present study's research design. As well, the surveys were administered immediately prior to, and then three months after the implementation of project based learning and were conducted by a teacher independent of the program. This component of Meyer et al.'s research design was adopted by the researcher of the current study to provide baseline data, and to minimize threats to validity related to the survey instrument and survey procedure.

Wurdinger, Haar, Hugg, and Bezon (2007) conducted a qualitative study of teacher acceptance in implementing project based learning and student engagement in this teaching and learning format. Researchers conducted this study in conjunction with the staff of Duncan Meadows Middle School as they implemented a project based learning curriculum. Their research question was "what is the effectiveness of using project based learning in a middle school format" (Wurdinger et al., 2007, p. 153). Participants in the survey included 35 staff members who were a part of the initial professional development sessions on implementing project based learning. Surveys of these teachers were used during these training sessions to determine baseline data around teacher understanding of project based learning and the degree of

implementation of PBL in their practice. Halfway through the year the teachers were surveyed to

determine if they were using project based learning in their classrooms, to what degree they were

using this methodology, and what their perceptions were on how project based learning

contributed to student engagement. Follow up interviews were conducted three months later to

gather in depth data on student engagement and teacher acceptance.

The study showed that at the beginning of the process teachers has a very rudimentary

understanding of what project based learning was; however, most teachers were able to identify a

number of benefits that project based learning could have for their students. Five months later,

during the second round of surveys, 76% of teachers responded that they were using project

based learning in their classroom, 88% of those responded that they had incorporated a problem

solving component and that their students' ability to use a problem solving process had

increased. Three months later, the researchers interviewed seven of the teachers who had

identified that they were using project based learning in their classroom. The interviews focused

on three questioning strands: (a) student use of problem solving skills, (b) student engagement in

problem solving through project based learning, and (c) general strengths of project based

learning and teacher acceptance. Teachers indicated a high level of acceptance of the project

based learning methodology and that there were significant benefits to their students in the areas

of problem solving skills, cooperative learning, critical and creative thinking, responsibility,

increased motivation, and overall student engagement in learning (Wurdinger et al., 2007).

A significant limitation of this study rested in the authors' contention that students in the

project based learning classes were highly engaged in learning activities. While there were strong

anecdotal references from their teachers indicating that students were highly engaged and excited

about this teaching methodology there was no direct data from the students supporting these

observations. In the absence of any direct data regarding student reporting of levels of engagement, these observations may be related to other factors, such as novelty, as noted by Thomas (2000), as opposed to deep cognitive engagement (Blumenfeld et al., 2006), or student responses to teacher intrinsic motivation (Lam et al., 2008).

The author of this research project noted the limitation of not including student responses as an indication of student engagement in the learning process, and has attempted to ensure that student surveys will be used to determine motivational orientation towards learning in this action research project. Surveys were designed to elicit students' motivational orientations and attitudes towards school in a pre-project based learning environment and were contrasted to student responses while they were immersed in a project based learning classroom. Further, specific question strands from Wurdinger et al.'s study were modified and used in the action research as part of the student surveys. Overall, this study raised a series of questions around effective survey instruments, internal validity, and the need for direct student responses on their experiences in a project based learning classroom. This lead directly to the inclusion of several open-ended questions in the current study's survey around student perceptions of project based learning and possible linkages to motivation.

When addressing the complex nature of project based learning and the potential for impacts on student success and motivation it is crucial to examine the potential impacts on the role of group heterogeneity for high, average, and low achievers. Cheng, Lam, and Chan (2008) conducted a comprehensive, quantitative study of 1,921 Grade seven, eight, and nine; project based learning students in Hong Kong. The purpose of the study was to determine the effectiveness of this pedagogical approach, where it was a compulsory program for a full academic year. The researchers specifically set out to investigate "the roles of group

heterogeneity and processes on high and low achievers' self and collective efficacy in doing group work" (Cheng et al., 2008, p. 209). A survey tool was administered to determine measures of group processes, and self and collective efficacy. Student achievement and group heterogeneity were determined by midterm examination marks, and group size and gender composition were observed and recorded by the researchers. The researchers hypothesized that student achievement would predict higher self, or collective efficacy, that group process quality would be a positive predictor for student efficacy, and that group process and student achievement would show an interaction effect (Cheng et al., 2008).

The results of this study showed that there was an interaction effect between the quality of group processes, student achievement, and collective and self efficacy. That is to say, that when high and low achievers perceived that the group processes were of high quality, then they reported higher collective efficacy versus self efficacy. The results also supported their hypothesis that the quality of group processes was a positive predictor of efficacy. The results indicated that when comparing high and low achieving students, the high achievers tended to perceive lower collective efficacy, while low achievers tended to perceive higher efficacy (Cheng et al., 2008). Overall, the researchers found that when group processes were of high quality, then both high and low achieving students reported higher collective efficacy, and that this was an important factor in the academic achievement of students in project based learning environments. An important outcome of this study was in the reiteration of the importance of building individual accountability, participation, social skill development, metacognitive skills and positive interdependence into project based learning classrooms as the foundation for high quality group processes.

A significant limitation of this study observed by Thomas (2000) was the reliance on student self reports to measure the variables of efficacy and group processes. The authors indicated that future studies could utilize surveys as well as outside observers to increase the validity of the responses and more deeply analyze the dynamics of group processes (Cheng et al., 2008). However, it should be noted that the participants in this study were taking project based learning throughout the year; therefore, these results may have relevance in generalizing to other project learning classrooms of similar structure. Another limitation of this study was that the survey questions were not included for review and analysis by readers to gauge the validity of the survey instrument and any possible bias.

An important outcome of this study related to the current action research project is that group heterogeneity; specifically relating to academic ability, does not negatively impact students' motivation, thus providing an ethical rationale for continuing research in project based learning. Further, this action research project aimed to analyze student motivation toward learning in a group context and to determine what linkages may exist between group dynamics and learning environments in a project based learning classroom. Also, the Likert scale used in this study was adopted for use in this action research project as a means of quantifying student responses, and to provide a consistent range of responses to determine changes in group means for each question.

Taken collectively, the six studies discussed in this section shed considerable light on issues of student achievement, learning, motivation, use of learning strategies, agency, efficacy, engagement, and the role of group heterogeneity in project based learning environments. These studies also indicate that future research should be undertaken in analyzing how students' attitudes and motivation towards learning may be influenced by participating in project based

learning. Further, the review of motivation and the studies included in this literature review contributed to the development of the rationale for the research design, survey instrumentation, survey administration, and data analysis undertaken in Chapter Three. As well, these studies brought up issues around teacher intrinsic motivation, group dynamics, student engagement, and project based learning, specific issues that have been explored and incorporated in the current study's research design. Chapter Three includes a description of the research design, sample, instrumentation, procedures, and a discussion on the validity of the research, and a description and justification of the data analysis.

Chapter 3: Procedures and Methods

Description of the Research Design

The problem the current study sought to address was how student motivation developed in a project based learning environment, and what specific motivational factors could help guide teaching practice to transform that motivation into meaningful cognitive engagement in a project based learning classroom (Blumenfeld et al., 2006). The purpose of the current study was to determine whether participation in ADSS's project based learning program has had an impact on student motivation towards learning, to analyze what that impact was; if possible determine why, and add to the existing body of knowledge on issues of student motivation in project based learning classrooms.

The research design of the current study was a mixed method, explanatory design using a static group pre-test and post-test (Fraenkel & Wallen, 2009). This design was selected based on the work of Liu, Wang, Tan, Koh, and Ee (2009), who called for a mixed methods design in researching student motivation in project based learning classrooms to elicit more insights into students' motivational perceptions and how those perceptions change over time for different motivational constructs. The participants completed a pre-test, and a post-test in the form of a survey of student self reports on constructs of motivation towards learning as well as individual and group motivational orientation. The means of the individual scales were examined to determine if there were any changes in participants' motivational orientation at the construct level during their involvement in the project based learning program. Student responses to open-ended questions were used to explore change in individual and group motivational orientation as a result of the project based learning environment. Open-ended responses were coded for imposed and emergent themes by the researcher and grouped in appropriate categories.

Description of the Sample

The current study took place in a Grade 8-12 high school located on central Vancouver Island in British Columbia, with a population of approximately 1200 students in Grades 9 -12. There were 70 professional staff and 32 support staff working together to promote student achievement. Approximately, 23% of the student body was of Nuu-Chah-Nulth First Nations ancestry. Socio-economic indices (B.C. Stats, 2010) show that the school served a student population (Alberni-Clayoquot Regional District) challenged by economic and social hardship. The school had five school based counsellors, four and a half Youth Care Workers, two Nuu-Chah-Nulth Education workers, the services of Family Guidance, Alberni Drug and Alcohol Prevention Service, and a Youth Health Center to provide information and counselling to students. As well, the Parent Advisory Council ran a daily breakfast club and provided food bags and hygiene packs to students in need.

The sample selected for study was all 14 of the Grade 9 students enrolled in the project based learning program at Alberni District Secondary School (ADSS). Of these students 11 were male and three were female, four were of First Nations ancestry, and two were on independent education plans. Students selected for ADSS's project based learning program undergo an application process where they self-identify their interest to pursue project based learning as an academic component of their Grade 9 experience and have parental permission to enroll in the program. This sample was chosen for study as it was the only project based learning class at ADSS, and was therefore, a purposive sample of convenience. The teacher for this class was the researcher who was in his 5th year of professional teaching, and the 4th year of teaching the Project Based Learning Program. At ADSS, project based learning was a one year, Grade 9 program that utilizes a project based learning pedagogy. The students in the program completed their Math, English, Science, Social Studies, and Physical Education courses as part of this

program. Through student and teacher initiated projects, extensive field trips, and targeted course

work, the students worked through the Grade 9 academic curriculum. During the period of the

research study students were involved in designing and building a large storage shed, silviculture

projects on the ADSS Christmas tree farm, student developed projects at a local woodlot, and

fisheries activities at the McLean Mill National Historic site hatchery. These activities were

integral components of the ADSS Project Based Learning Program and were linked to the Grade

9 academic curriculum through student projects.

Description of the Instruments Used

To ensure that the results of the current study were meaningful, an in-depth theoretical

review of the relevant research was undertaken to determine which constructs of motivation to

examine. This theoretical review is detailed in Chapter Two. The survey instrument for the

present study was a modified version of the Patterns of Adaptive Learning Scales (Koskey,

Karabenick, Woolley, Bonney, & Dever, 2010), which were chosen because they had high

reliability coefficients for older school children (Midgley et al., 2000). Midgley et al. (1998) as

well as Koskey et al. (2010) established and documented the validity of the PALS scales for high

school aged children.

This study utilized an anonymous, paper-based survey (see appendix A) that was

administered twice during the study. The survey consisted of two parts. Part 1 asked students to

respond to 10 statements (one per motivational construct) relating to their motivational

orientation towards learning in the formal school environment, and sought to quantify students'

self perceptions around self efficacy (Question #1), intrinsic motivation (Question #2), extrinsic

motivation (Question #3), academic self-concept (Question #4), academic interest (Question #5),

academic value (Question #6), situational motivation (Question #7), academic agency (Question

#8), adaptive attribution (Question #9), and school-prompted interest (Question #10). The PALS instrument served as the foundation for the choice of constructs and structure of the survey.The PALS instrument was not designed with all of the motivational constructs included in the current study. The current researcher modified and expanded the scope of the document to include the range of motivational constructs outlined in the current study.

The statements for questions one (self efficacy), two (intrinsic motivation), and three (extrinsic motivation) were adopted verbatim from the PALS survey (Midgley et al., 1998). Question four (academic self concept) was re-worded from "I'm certain I can figure out how to do the most difficult classwork" (p. 20) to read "I believe that I can succeed in academic situations". This was done to shift the focus of the statement from the difficulty of classwork to students' perceptions of their ability to succeed in academic situations (Guay, Ratelle, Roy, & Litalien, 2010). Question five (academic interest) was re-worded from "I don't like to learn a lot of new concepts in class" (p. 24) to the positive "I am interested in learning new skills and concepts" and to capture the skill development component of PBL. Question six (academic value) was re-worded from "My chances of succeeding later in life don't depend on doing well in school" (p. 28) to the positive "I believe that learning will be valuable for me" to determine the personal value of academic work (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). Question seven (situational motivation) did not have a correlate in the PALS survey that was deemed by the researcher to fit the construct of situational motivation. The statement "I believe that the classroom environment impacts on my motivation to learn" was designed to parse out participant responses to environmental features of the PBL learning context (Hidi & Harackiewicz, 2000). Question eight (academic agency) was re-worded from "I do my classwork because I'm interested in it" (p. 7) to "I like to have choice in my schoolwork". This change was

made to more accurately reflect the purpose of the construct and separate participant agency

beliefs from goal orientations (Pintrich, 2000). Question nine (adaptive attribution) did not have

a correlate in the PALS survey that was deemed by the researcher to fit the construct of adaptive

attribution. The statement "I believe that I determine my success in school" was designed to

capture students' locus of control perceptions (Ames, 1990; Bandura, 1989) and whether success

in school was related to internal or external factors. Question ten (school-prompted interest) also

did not have a correlate in the PALS survey. The statement "I pursue learning classroom material

outside of school" was included to attempt to capture participant perceptions towards learning in

out-of-school contexts and life-long learning (Pugh & Bergin, 2005).

The responses to the statements were quantified on a Likert scale. Students responded to

each statement by indicating their level of agreement on a horizontal line scaled from one to five.

The participants were asked to rate their responses to each statement on a continuum from

strongly disagree (1) to strongly agree (5).

The last two questions (#11 and #12) were open-ended, and qualitative in nature. The

questions asked students to respond to the following prompts: (a) Question 11: What motivates

you to learn, and (b) Question 12: Does working on school projects in small groups motivate

you? Question 11 was designed to elicit responses that could aid in determining students'

individual motivational orientation and to see if this changed during students' participation in

ADSS's project based learning program. Question 12 was designed to elicit responses on

whether group motivational orientation changed over time, and to determine if those changes

may be related to design elements of ADSS's project based learning program

Explanation of the Procedures Followed

At the beginning of this research project, the researcher sought ethics approval through the VIU Research Ethics Board which was granted in June of 2011. Approval from School District #70 and the Principal of Alberni District Secondary School to conduct research was also pursued by providing an electronic copy of the Master's thesis proposal to the Superintendent of Schools SD#70, and the Principal of Alberni District Secondary School. Approval was given by both parties. Parental consent was sought by the researcher through conducting a parent meeting in June 2011 prior to which parents were contacted by telephone and e-mail to attend an information session on the upcoming project based program and the inclusion of this research study during the 2011 - 2012 school year. During that parent meeting the researcher outlined the program expectations, areas of study, and went over the timelines and expectations of the research project. Parents were given a parent/guardian consent Letter (Appendix B) and a self-addressed, postage paid envelope to return the consent letter to the researcher. Those parents who were unable to attend the meeting were sent by mail a parent/guardian consent letter and a self-addressed, postage paid envelope. Parent/Guardian consent letters returned to the researcher were left unopened. These unopened parent/guardian consent letters were given to the survey administrator immediately prior to the first survey period on September 6, 2011.

Participating students were surveyed twice during this study. On the first day of school; September 6, 2011, participants were informed that they would have the opportunity to complete a survey (Appendix A) on motivation and attitudes toward learning. A teacher independent of the program entered the class and the researcher left. At this time the survey administrator opened the parent/guardian consent letters and distributed the survey packages to those students whose parents had returned completed consent letters. The survey administrator also distributed survey

packages to those students whose parents had not returned consent letters, but informed these students not to open their packages, and to return them uncompleted into the survey drop box. Those students whose parents did not return completed consent letters were asked to begin silent reading at the start of the survey period. This methodology was developed to ensure the anonymity of the participants. All parent/guardian consent letters were sealed in an envelope and labeled with a 'destroy on May 2014' date and were placed in an administrator's locked safe. Following the survey administration script (Appendix C), the teacher administering the survey outlined free and informed consent, read aloud the participant research cover letter (Appendix D), read aloud the sample survey question, went over how to complete a sample Likert scale on the whiteboard, and showed students where to deposit the surveys at the conclusion of the survey period in a drop box. Students were informed that all surveys were anonymous; students were given the choice to not participate in the survey by sitting silently at their table, and handing in the survey uncompleted. At this point students were informed again that participation in the survey is voluntary; that they were not obligated to complete all the questions, and that there would be no consequences for not completing the survey.

The surveys were administered by a teacher independent of the program who had not taught, or was not currently teaching any of the students completing the survey. The survey administrator remained in the room during the survey period. Students were given 30 minutes to complete the survey. The survey administrator was given discretion to extend this time if needed. At the conclusion of 30 minutes the teacher administering the survey collected the surveys from the drop box and sealed them in a separate envelope, then transported them to the school administrator's safe, where they were locked and stored through the research period. This research period was titled T_1, and this was written on the front of the sealed envelope.

On December 6, 2011 the students were surveyed again using exactly the same procedure as outlined above, using the same independent teacher, and the same survey instrument. Prior to administering the second survey, the survey administrator collected the envelope of parent/guardian consent letters from the administrator's safe to ensure that only those students whose parents had returned consent forms completed the survey. At the conclusion of this research period, the teacher administering the survey collected the surveys from the drop box, then sealed the surveys in a separate envelope and transported them to the school administrator's safe, where they were locked and stored pending data analysis. This research period was titled T_2, and this was written on the front of the sealed envelope.

Discussion of Validity

Threats to internal validity were carefully considered by the researcher when planning the study on students' motivation towards learning in ADSS's project based learning program. Those threats most prevalent in action research, and mixed methods studies were examined and attempts were made by the researcher to address the threats to internal validity and minimize those threats where possible. The nature of action research makes the external validity of the present study weak, and does not afford the opportunity to generalize results to the larger project based learning population without replication of the study (Fraenkel & Wallen, 2009).

Content related validity of the survey instrument was considered to be high for questions one, two, and three since Midgley et al. (1998) established and documented the validity of the PALS scales used in the survey instrument for older school children. It is important to note that statements one, two, and three were adopted verbatim from the PALS instrument. Questions four, five, six, and eight were modified from the original PALS statements, and questions seven, nine, and ten were independently developed by the current researcher. Therefore, the reliability

of the modified and researcher developed statements have not been tested. However, the survey

prompts were carefully composed based on a comprehensive literature review of educational

theory and research into student motivation into how well they aligned with academic self

concept, academic interest, academic value, situational motivation, academic agency, adaptive

attribution, and school-prompted interest. A limitation of the survey itself was that there was

only one question for each motivational construct; therefore, construct-related evidence may be

limited by the design of the survey.

Threats to the validity of the survey instrument and survey administration procedure were

minimized by ensuring the anonymity of survey respondents through having the researcher leave

the room during the survey period, having a teacher independent of the program and who had not

previously taught any of the participants administer the survey, and by not having the surveys

returned directly to the researcher. The completed surveys were locked in an administrator's safe

until the end of the research period.

In order to minimize the possibility of instrument decay during the survey period,

participants were given 30 minutes to complete the survey with the survey administrator having

discretion to extend the time if needed. Location threats were analyzed; as the survey period was

conducted in the students' regular classroom, but were not considered as meaningful threats to

internal validity by the researcher. Further, the location of the survey period in the students'

regular classroom was thought to add situational context. Loss of subject threats was identified

as being a potential issue. In past programs, several students have been removed from the school

due to behaviour issues and this would impact the survey results; however, no loss of subjects

occurred during the current study. Subject characteristics were considered in the design of the

survey instrument, specifically around language levels and reading. The language chosen for the

survey prompts was discussed with Grade 9 English teachers and was deemed to be at an

appropriate level. Concerns around reading the participant assent letter were minimized by

having the survey administrator read aloud the letter and go over free and informed consent

verbally. Academically, the participant sample in the current study was believed to be

representative of the Grade 9 school population at ADSS by the current researcher.

Maturation was considered as a potential threat to internal validity; however, given the

three month timeline of the research period it was not considered to be a major factor related to

validity. Data collector bias was minimized by standardizing the survey administration

procedure, training the survey administrator in the procedures, and by not having the researcher

present in the room during the survey administration periods. Testing threat was also analyzed as

a potential threat to internal validity as both the pre-test and post-test involved the use of the

same survey instrument; however, the three month time period between the pre-test and the post-

test was considered to be long enough for student awareness of the survey prompts to fade.

Possible interaction effects were considered as well but were not considered to be significant, as

students were well informed about the project based learning program aims and objectives prior

to applying. A history threat was identified; however, the survey administrator was aware of the

potential for an interruption during the survey periods, and was asked to re-schedule the survey

for the next school day, had an interruption occurred. During the research period, B.C. teachers

were on job action; however, this action did not disrupt the academic experience of the

participants and was considered by the present researcher to have no meaningful effect on

participants or the results of the current study. Subject attitude was also identified as a potential

threat to internal validity as student attitudes towards school in general can vary significantly.

However, as this is one of the primary research sub-themes, it was deemed as an important

outcome of the survey.

As this sample was considered to be academically representative of the Grade 9 student

population at ADSS, regression was not identified as a significant threat to internal validity in

this study. Implementation threats to internal validity were considered, and the standardization of

the survey administration and the impartial nature of the survey administrator minimized this

threat. Finally, the researcher considered the ecological validity of the present study to be high

when generalizing the results to PBL environments of similar design, as the project based

learning program follows generally accepted principles of project based learning instructional

methodology (Blumenfeld et al., 2006; Thomas, 2000). Ecological generalizability of the present

study's findings may be appropriate for other project based learning classrooms; however, the

small sample size may make this problematic.

Data Analysis

At the conclusion of the research period the two sealed envelopes labeled T_1, and T_2 were

collected from the administrator's locked safe and were analyzed in the administrator's office. T_1

represented the pre-test surveys, and T_2 represented the post-test surveys. The pre-test and post-

test surveys were analyzed on a separate item basis, where each response was recorded for

Questions 1 – 10 (see appendix A), summed for each item, and tabulated in a data table with

separate headings for each item (i.e., each motivational construct). These items were analyzed

individually, based on the work of Pintrich (2000) who called for the study of motivational

constructs in an independent and interdependent manner to better understand how students are

motivated. Student responses ranged from 1-5; where student responses fell between numbers on

the Likert scale a half value between the two numbers was assigned. Data were then analyzed for

each item using EXCEL software to determine the mean and standard deviation for each survey scale item (see Table 1), and a two-tailed dependent t-test was conducted to determine statistical significance. Data were analyzed to determine the numerical and percentage difference between the pre-test and post-test means for each construct and were presented in Table 2. Student responses to the two open-ended questions in the pre-test and post-test were analyzed and coded for imposed themes related to the motivational constructs of self efficacy, intrinsic motivation, extrinsic motivation, academic self concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, and school-prompted interest. Emergent themes were identified by the present researcher as they arose. Frequency of responses within each theme was recorded and numerical change was calculated. Data were presented in Table 3.

These descriptive statistics were chosen because item mean and variability were seen by the researcher as useful measures of change in participant motivation towards learning. The relatively small sample size of 14 also played a role in choosing this method of data analysis. Upon completion of the item analysis for the two survey periods, the item means and standard deviations were compared for Questions 1-10 to look for change. To interpret the results of the research, the author utilized two measures of significance. The first was statistical, two-tailed dependent t-tests, which were conducted on the data to determine if statistically significant change had occurred. However, in the case where no significant difference was found with a t-test due to the small sample size, the researcher developed a second measure of significance. The second was researcher-based, where meaningful change was considered to be a 5% increase or decrease in item mean during the course of the study. A 10% increase or decrease in an item mean indicated a very meaningful change had occurred. A threshold of five percent for meaningful change and ten percent for very meaningful change were selected as the general

trend in secondary education is for motivational levels to fall in the Grade 9 year (Gottfried, Fleming, & Gottfried, 2001; Otis, Grouzet, & Pelletier, 2005). Therefore, any increase in participant self-reported motivation would be counter to the trend and would inform the practice of the current researcher.

For the qualitative data, the pre-test and post-test frequencies of participant response themes to Questions 11 and 12 were recorded in Table 3, and were visually represented as a bar graph for Question 11 in Figure 2, and Question 12 in Figure 3. The frequency of participant response themes was compared separately for Questions 11 and 12. An increase or decrease of two in the frequency of participant response themes was considered by the current researcher as meaningful change. Participant responses were coded for imposed themes related to the motivational constructs of self efficacy, intrinsic motivation, extrinsic motivation, academic self concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, and school-prompted interest. Emergent themes were also identified and coded by the present researcher during data analysis. Collectively, the responses to these questions were used to seek potential explanations for changes in means of the 10 Likert statements observed in the post-test survey and further explain changes in students' motivational orientations at the construct, individual, and group level. Chapter Four presents the findings of the current study.

Chapter 4: Findings and Results

The purpose of the current study was to determine if participation in Alberni District

Secondary School's Project Based Learning Program has had an impact on student motivation

towards learning. The participating students were those enrolled in the project based learning 9

cohort at Alberni District Secondary School. Participants completed a survey (Appendix A) on

motivation toward learning on September 6th (time period T_1) and December 6th (time period T_2),

2011. All 14 participants completed the pre- and post-test survey instrument. In Table 2, the

researcher summed the participant responses to Likert style Questions 1 – 10 and calculated the

item means for each question for the time periods T_1 and T_2. These questions had a 1 (strongly

disagree) – 5 (strongly agree) scale.

Table 2: Summary of responses to Likert scale questions (n=14).

Question Number	Motivational construct	Total T_1	Mean T_1	Standard Deviation T_1	Total T_2	Standard Deviation T_2	Mean T_2
1	Self efficacy	54	3.86	0.77	60	0.72	4.29
2	Intrinsic motivation	48	**3.43***	0.94	59	0.57	**4.21***
3	Extrinsic motivation	45	3.21	0.89	44	1.23	3.14
4	Academic self concept	57	4.07	0.73	60	0.61	4.29
5	Academic interest	61	4.36	0.50	64	0.51	4.57
6	Academic value	61	4.36	0.74	64	0.51	4.57
7	Situational motivation	53	3.79	1.12	56	1.17	4.00
8	Academic agency	63	4.50	0.65	60	0.83	4.29
9	Adaptive attribution	56	4.00	0.68	55	1.07	3.93
10	School-prompted interest	47	3.36	0.93	49	1.02	3.50

*A significant difference (p<0.05) was found

Table 2 was a summary of the participants' responses from the pre-test (T_1) and post-test (T_2) surveys. Questions 1, 2, 4-7, and 10 showed an increase in participants' responses. Questions 4, 8, and 9 showed a slight decrease in participants' responses. The most significant item mean increase (+0.78 between T_1 and T_2) was in Question 2 which sought to identify participants' intrinsic motivational orientation.

The data was run through EXCEL software and a two-tailed dependent t-test was conducted. The results $t(13) = 2.621$, $p < 0.05$, indicated that there was a statistically significant difference in the means at a 95% confidence interval, thus the null hypothesis was rejected for Question 2. The remaining questions were also run through a dependent t-test; however, a statistically significant difference was not found at the 0.05 confidence level. The largest item mean decrease (-0.21 between T_1 and T_2) was in Question 8 which sought to identify students' academic agency beliefs.

Figure 1 is a visual representation of the changes in participant response means to individual constructs (Questions 1-10).

Figure 1: Representation of the changes in participant response means for Questions 1 – 10.
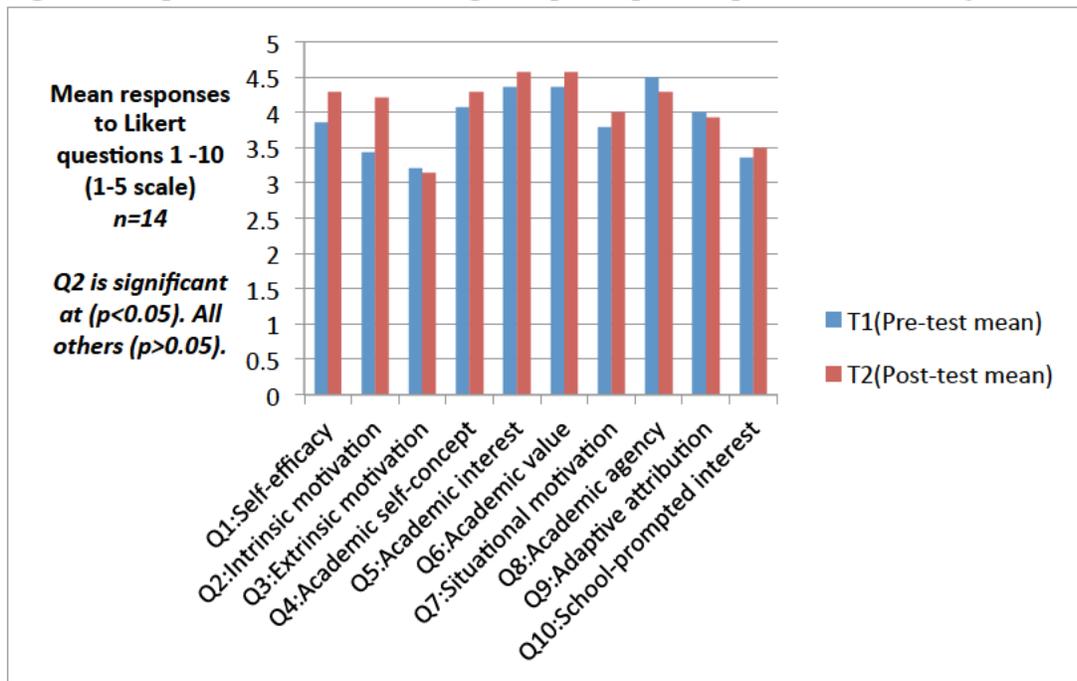
In Table 3, the changes in participants' responses to Questions 1-10 were documented as numeric increase or decrease and as a percentage increase or decrease. The numeric changes in means were calculated by subtracting the mean of T_1 from the mean of T_2 for each question. The percentage changes in means were calculated by subtracting the mean of T_1 from the mean of T_2 and dividing by the maximum value of five for each question.

Table 3: Numerical and Percent change in means

Question number	Motivational construct	Numeric change in means during the study.	Percent change in means during the study.
1	Self efficacy	3.86 to 4.29	Increase by 8.6%
2	Intrinsic motivation	3.43 to 4.21	Increase by 15.6%
3	Extrinsic motivation	3.21 to 3.14	Decrease by 1.4%
4	Academic self concept	4.07 to 4.29	Increase by 4.4%
5	Academic interest	4.36 to 4.57	Increase by 4.2%
6	Academic value	4.36 to 4.57	Increase by 4.2%
7	Situational motivation	3.79 to 4.00	Increase by 4.2%
8	Academic agency	4.50 to 4.29	Decrease by 4.2%
9	Adaptive attribution	4.00 to 3.93	Decrease by 1.4%
10	School-prompted interest	3.36 to 3.50	Increase by 2.8%

In the current study, change was deemed to be meaningful if there was a 5% increase or decrease in an item mean during the course of the study. A 10% increase or decrease in an item mean indicated a very meaningful change had occurred. Based on these criteria, meaningful change was deemed to occur in participants' self-reports of self efficacy beliefs (+ 8.6%) and very meaningful change occurred in students' self-reports of intrinsic motivation (+ 15.6%). Questions four (academic self concept), five (academic interest), six (academic value), seven (situational motivation), and eight (academic agency) were within one percent of the threshold for meaningful change.

In Table 4, participant responses to the 10 Likert questions were collapsed and divided by the maximum possible score of 700 to calculate the general motivational score of the cohort.

Data were compared for the time periods T_1 and T_2 to look for overall change in motivational

orientation.

Table 4: General motivational score summary

T_1 Participant collapsed score	Participant collapsed score as a percent of the maximum for T_1	T_2 Participant collapsed score	Participant collapsed score as a percent of the maximum for T_2	Total percent change in participants general motivation
545	77.9 %	571	81.2 %	3.3 %

Table 5 recorded the frequency of participants' responses to two qualitative questions for

the pre-test (T_1) and the post-test (T_2). Question 11 was "What motivates you to learn?" Question

12 was "Does working in small groups motivate you?" Participant responses were coded for

imposed themes related to the motivational constructs of self efficacy, intrinsic motivation,

extrinsic motivation, academic self concept, academic interest, academic value, situational

motivation, academic agency, adaptive attribution, and school-prompted interest examined by

Questions 1-10 of the survey. See Table 1 in Chapter Two for a summary of each of the

constructs. The imposed themes of academic agency, adaptive attribution, and school-prompted

interest had a response frequency of zero.

Table 5: Frequency of qualitative responses (*n=14*)

Theme	T$_1$ Question 11 Motivation to learn (frequency)	T$_2$ Question 11 Motivation to learn (frequency)	Question 11 T$_1$ – T$_2$ Numerical change	T$_1$ Question 12 Group work (frequency)	T$_2$ Question 12 Group work (frequency)	Question 12 T$_1$ – T$_2$ Numerical change
Self efficacy	1	1	Unchanged	3	0	-3
Intrinsic Motivation	3	5	+2	2	3	+1
Extrinsic Motivation	4	1	-3	4	2	-2
Academic self concept	2	0	-2	4	2	-2
Academic interest	5	6	+1	1	1	Unchanged
Academic value	2	4	+2	0	1	+1
Situational motivation	1	1	Unchanged	4	2	-2
Learning is fun	3	2	-1	2	2	Unchanged
Hands-on learning	2	2	Unchanged	0	2	+2
Group work as a negative experience	0	0	Unchanged	0	2	+2
Group work as a positive experience	0	0	Unchanged	0	10	+10

Participant responses to the imposed themes of *self efficacy* were coded based on the

appearance of phrases that indicated a participant's belief in their ability to complete a given

academic task at a desired level. These included responses such as "I am confident that I can

complete my project work cause I get to work on something I know", and "I can do the project

work because I am good at math and like working with my hands". *Academic self concept* differs

from self efficacy in that this construct sought to determine participant perceptions of their

ability to succeed in a general academic sense, and can be viewed as a more global appreciation (self concept) of their abilities as a student. Participant responses that were coded for academic self concept included, "what motivates me to learn is that I'm always thinking what's next, how do I keep getting better", and "I like working in groups cause I am good at it".

Participant responses to the imposed theme of *intrinsic motivation* were coded based on the appearance of key words such as like to learn, enjoy learning, and challenge. Student responses that were coded for intrinsic motivation included "I like to learn new skills", "I like the challenge of learning new things in new ways", and "I enjoy learning new things". *Extrinsic motivation* responses were coded if participants' responses indicated an instrumental or external motivation towards learning. Examples of participant responses included. "What motivates me to learn is that I want a six figure paycheck, and to go to UBC and I am constantly thinking of how or what I need to get there" and "what motivates me to learn is I look forward to hopefully being successful when I get older and it will be much easier if I have a good education".

Academic interest responses were coded based on participants indicating a personal interest in a particular subject or manner of learning. Participant responses included, "what also motivates me to learn is learning about important things like history and important things", "things that motivate me to learn more is stuff that interest me and things I can follow in class", and "I'm motivated to learn when I am interested in the subject". Participant responses were coded for *academic value* when they indicated a present or future value associated with learning. While there is some overlap between the construct of academic value and extrinsic motivation, the responses were coded for academic value when participants indicated an internal benefit relating to learning or an outcome of learning. For example, "having it hands on and actually doing something that isn't just from the textbook helps me understand the ideas more and makes

school easier" speaks to the value of applying academic concepts in a real world setting. Another

example of metacognitive value is "I also find that group work is better because you can put all

your ideas together and that helps me learn", in this response the participant speaks to the value

of group work as a process and as an outcome.

Situational motivation was coded based on participant responses that indicated an

environmental factor that stimulated engagement in academic tasks. Participant responses around

this theme included the outdoor aspects of the ADSS Project Based Learning Program, "I like to

learn new skills and to go out of the classroom to do it" and "the reason why I am in Project

Based Learning is because I can't learn when I'm sitting down". As well as the group work

strategies utilized in the PBL pedagogy, for example, "I believe working in small groups

motivate me because I can share my idea and listen to others and how they explain it.

Emergent themes relating to student motivation were identified by the present researcher

based on student responses and are also presented in Table 5. These were learning is fun, hands-

on learning, negative aspects of group-work, and positive aspects of group-work. The emergent

theme of 'learning is fun' were reported by participants exclusively in the post-test. Participant

responses that were coded as 'learning is fun' included "fun and interest make me try to learn",

"fun work", "group work motivates me because it is fun", and "it is funner to do group work".

The emergent theme of 'negative aspects of group work' related primarily to student

perceptions of the group work process and outcomes. For example, one participant response to

"Does working on school projects in small groups motivate you?" was "no, because I have to

depend on others", the other negative response to this question was "you cannot rely on other

people". These responses seem to indicate a negative response to group work as a process, as

well as an outcome.

The theme of 'positive aspects of group work' were coded when participant responses indicated that group work was generally a positive experience and overlapped with several of the imposed themes. Participant responses such as, "group work motivates me because I like being able to explain to other(s) and get help from them if needed" and "working on school projects with small groups does motivate me it gives me the chance to see how other people think and learn I also find it is better because you can put all your ideas together" were examples of participant responses coded under this theme.

As the purpose of the current study was to determine if participation in Alberni District Secondary School's Project Based Learning Program has had an impact on student motivation towards learning, the imposed and emergent themes in the qualitative responses were compared for the pre- and post-tests. This was undertaken by the current researcher to determine which themes were meaningfully impacted, or not impacted at all, after participation in ADSS's Project Based Learning Program and served to inform interpretations of the quantitative data.

Table 5 summarizes the frequencies of participants' responses to the questions 'what motivates you to learn', and 'does working in small groups motivate you' during the course of the study. The results show that for the question 'what motivates you to learn' participants' response to the themes of intrinsic motivation, academic interest, and academic value increased. The participants' response to the themes of extrinsic motivation, academic self concept, and learning is fun, decreased during the course of the study.

For the question 'does working on school projects in small groups motivate you', the participant responses to the themes of intrinsic motivation, academic value, hands-on learning, group work as a negative experience, and group work as a positive experience increased. Participant responses decreased for the themes of self efficacy, extrinsic motivation, academic

self-concept, and situational motivation. A more detailed discussion of these themes and the

relationship to the quantitative data can be found in Chapter Five.

Figure 2 is a visual representation of the changes in participants' responses over the

course of the study to Question 11. Meaningful change was deemed to occur in the present study

if an increase or decrease of two in the frequency of participant response themes occurred. The

total frequency of participant responses is also included as collapsed responses for T_1 and T_2.

Figure 2: Frequency of participant response themes to Question 11
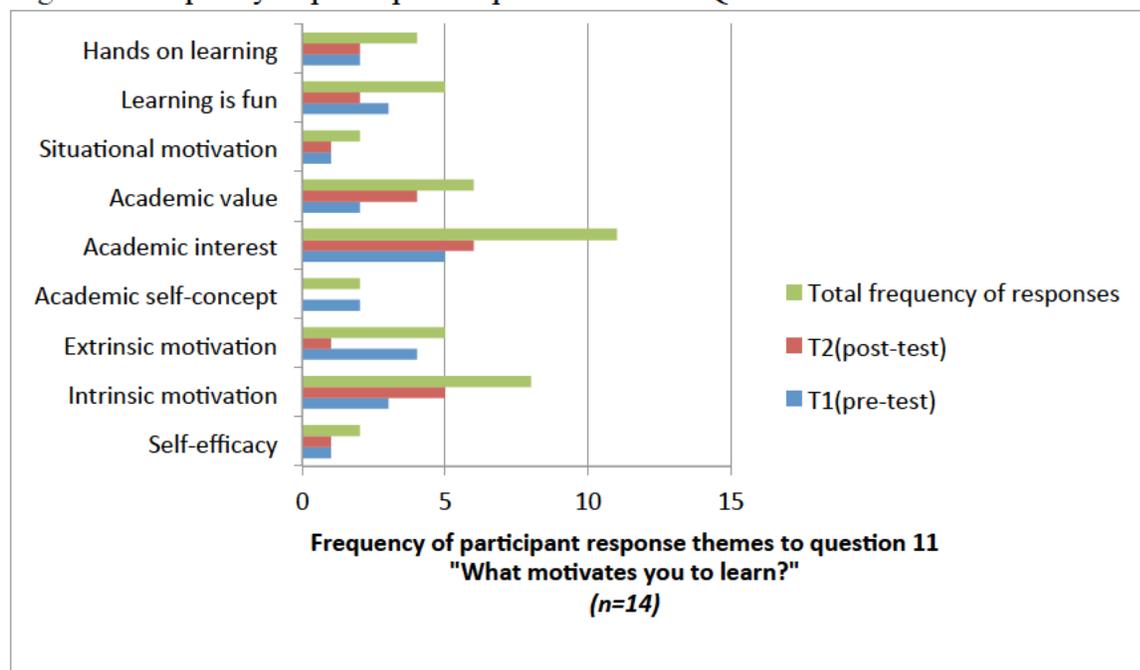
Figure 2 demonstrates that for Question 11, meaningful change occurred over the course

of the current study in the themes of intrinsic motivation (increased by two), extrinsic motivation

(decreased by three), academic self concept (decreased by two), and academic value (increased

by two). Academic interest and intrinsic motivation were the constructs that students mentioned

most frequently when results of pre and post-test surveys are combined.

Figure 3 is a visual representation of the changes in participants' responses over the

course of the current study to Question 12. Meaningful change was deemed to occur if an

increase or decrease of two in the frequency of participant response themes occurred. The total

frequency of participant responses is also included as collapsed responses for T_1 and T_2.

Figure 3: Frequency of participant response themes to Question 12.
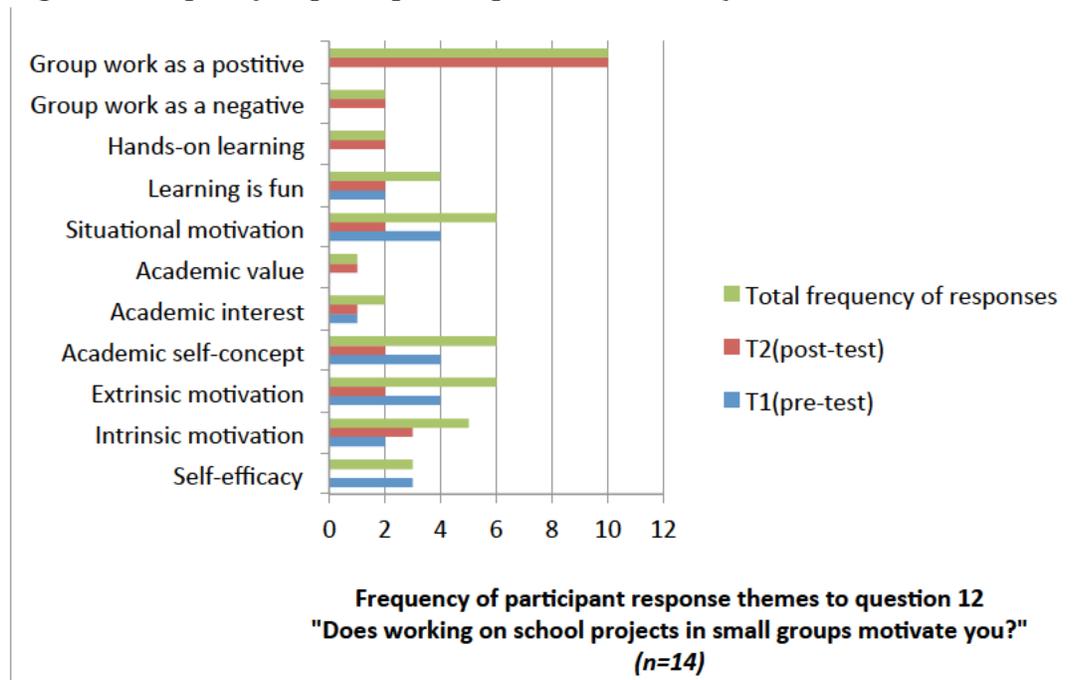
Figure 3 demonstrates that for Question 12, meaningful change occurred over the course

of the current study in the themes of self-efficacy (decreased by three), extrinsic motivation

(decreased by two), academic self-concept (decreased by two), situational motivation (decreased

by two), hands-on learning (increased by two), group work as a negative experience (increased

by two), and group work as a positive experience (increased by ten). Chapter Five presents a

summary of the research, discussion of the implications of the findings, limitations of the

research, and suggestions for further research.

Chapter 5: Summary and Conclusions

Research Summary

The purpose of the current study was to determine if participation in Alberni District Secondary School's Project Based Learning Program has had an impact on student motivation towards learning and to add to the existing body of knowledge on issues of student motivation in project based learning classrooms. Specific motivational constructs were explored in this study using a quantitative approach; self efficacy, intrinsic motivation, extrinsic motivation, academic self concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, school-prompted interest; and a qualitative approach exploring individual reported motivational orientations and group dynamics related to motivation. The current study utilized a mixed method, explanatory design using a static group pre-test and post-test (Fraenkel & Wallen, 2009), and was conducted over a three month time period (September 6 – December 6, 2011) during which time participants completed two identical surveys consisting of 10 Likert statements related to specific motivational constructs and two open-ended questions related to individual motivational orientation and group dynamics related to motivation (Appendix A). The participants were 14 students enrolled in the ADSS Project Based Learning program during the 2011-2012 school year.

The participant responses obtained from the Likert statements (Questions 1 – 10) were summed for the pre-test and post-test and item means (scale 1 -5) and standard deviations were calculated. Pre-test and post-test items were compared for statistical significance using a two-tailed dependent t-test, and intrinsic motivation was found to be the only construct that had a statistically significant; $t(13) = 2.621$, $p < 0.05$, positive increase. However, meaningful change was deemed to occur by the present researcher in the motivational constructs of self-efficacy beliefs (+ 8.6%) and very meaningful change occurred in students' self-reports of intrinsic

motivation (+ 15.6%). Questions Four (academic self-concept), Five (academic interest), Six (academic value), Seven (situational motivation), and Eight (academic agency) were within one percent of the threshold for meaningful change.

The participant responses obtained from the qualitative open-ended questions (11 and 12) were coded and recorded for imposed themes related to the motivational constructs of self-efficacy, intrinsic motivation, extrinsic motivation, academic self-concept, academic interest, academic value, situational motivation, academic agency, adaptive attribution, and school-prompted interest. Emergent themes of; learning is fun, hands-on learning, negative aspects of group-work, and positive aspects of group-work were also coded and recorded by the present researcher. For Question 11; individual motivational orientation (what motivates you to learn), meaningful change occurred over the course of the present study in the themes of intrinsic motivation (increased by two), extrinsic motivation (decreased by three), academic self-concept (decreased by two), and academic value (increased by two). For Question 12; group work motivational orientation (does working on school projects in small groups motivate you) meaningful change occurred over the course of the present study in the themes of self-efficacy (decreased by three), extrinsic motivation (decreased by two), academic self-concept (decreased by two), situational motivation (decreased by two), hands-on learning (increased by two), group work as a negative experience (increased by two), and group work as a positive experience (increased by ten).

Implications

The purpose of the current study was to determine if participation in Alberni District Secondary School's Project Based Learning Program has had an impact on student motivation towards learning and to add to the existing body of knowledge on issues of student motivation in

project based learning classrooms. Results indicated that the general motivational orientation of participants in the ADSS Project Based Learning Program was high to begin with (77.9 %) but still increased by 3.3% over the course of the study. The current study also examined particular motivational constructs and found that *self efficacy* and *intrinsic motivation* increased during the course of student participation in the ADSS Project Based Learning Program. Participants also developed clear views on group work, with a majority of participants reporting a positive view of group work at the end of the study.

The results of the present research indicated that participants in the ADSS Project Based Learning program have shown a meaningful increase (+8.6%) in their reported self-efficacy over the course of the study. These results seemed to support the assertion of Meyer et al. (1997) that self-efficacy and intrinsic motivation towards learning are characteristic of challenge seeking individuals. That the self-reported levels of participant self-efficacy and intrinsic motivation showed meaningful increases during the course of the study may indicate that elements of the ADSS Project Based Learning program offered a challenge seeking environment and fostered a challenge seeking orientation in participants. At a task specific level, participant responses around the theme of self-efficacy indicated that project work increased their belief in their ability to accomplish academic tasks (Schunk, 1991). The decrease in the qualitative participant response themes around academic self-efficacy may be related to the dynamics of group processes and an increase in collective versus self efficacy. As found by Cheng, Lam, and Chan's (2008) study, the findings of which showed that when high and low achieving students perceived that group processes were of high quality then they reported higher collective-efficacy versus self-efficacy. These findings also indicated that there is a more complex interaction effect at play in PBL designed classrooms between individual and group motivational orientations

relating to collective-efficacy versus self-efficacy. This finding suggests that PBL teachers should carefully consider the development and facilitation of group processes of high quality to ensure that heterogeneous groups experience collective-efficacy, and consider increasing (or modifying) projects to increase academic self-efficacy.

The statistically significant increase (+15.6) in participant self-reported intrinsic motivation as well as the increases in qualitative responses relating to this theme indicated that aspects of the ADSS Project Based Learning Program positively impacted intrinsic motivation. Participant responses such as, "I like the challenge of learning new things in new ways" may speak to the design elements of the program that connect with students at a motivational level. The participants were exposed to a number of informal learning environments (e.g., woodlot, wood-working shop, Christmas tree farm), as well as a significant focus on group work and project work during their participation in this program. These elements are the key differences between the PBL environment and the 'traditional' classroom (Blumenfeld et al., 1991; Thomas, 2000; Ravitz, 2010). It may be that the personal pleasure and satisfaction that they derived from their performance in these authentic activities (Deci, Vallerand, Pelletier, & Ryan, 1991) lead to the increase in intrinsic motivation observed in the data (Lam et al., 2008). These results support anecdotal observations by the teacher researcher which suggested that students were highly engaged and excited about the PBL methodology, and that significant benefits to students were observed in the areas of problem solving, cooperative learning, critical and creative thinking, responsibility, increased motivation. Thus, overall student engagement in learning may lead to increased levels of intrinsic motivation as supported by the research of Wurdinger et al. (2007). Further, as intimated in Boaler's (1998) study, intrinsic motivation may be related to students' ability to utilize information in authentic activities. While the students in the ADSS Project

Based Learning Program may not know more content than their colleagues in the traditional system, their ability to make meaning from that content, interpret that meaning in an authentic activity, and foster a mastery goal orientation (Mouratidas & Michou, 2011) may lead to more intrinsic motivation towards learning in general.

The qualitative findings of the current study around group work indicated that students developed clear views of the experience of group work as a negative experience (increased by two), and group work as a positive experience (increased by ten). These results supported Wurdinger, Haar, Hugg, and Bezon's (2007) finding that group heterogeneity; specifically relating to academic ability, does not negatively impact students' motivation. Perhaps a more significant implication is that the group processes utilized in the ADSS Project Based Learning program contributed to a dramatic increase in students' positive experience relating to group work. The increase in statements about group work as a positive experience in combination with the increase in participant self-reported increases in self-efficacy and intrinsic motivation would seem to support Barron, Schwartz, Vye, Moore, Petrosino, Zech, Bransford, and the Cognition and Technology Group at Vanderbilt's (1998) concept of developing positive group processes and a sense of agency in PBL curricula. However, the results of the current study indicated that participant self-reported academic agency declined by 4.2% over the course of the study. Therefore, individual agency beliefs, self-efficacy, and intrinsic motivation may be more attributable to group processes in a PBL environment than previously believed.

While the participant self-reported increases in the quantitative motivational constructs of academic self-concept, academic interest, academic value, situational motivation, and school-prompted interest were not considered as meaningful change, the fact that there was an overall increase in these constructs; as evidenced by the increase of 3.3% in the participants' general

motivational score, may indicate that participation in the ADSS Project Based Learning Program

at least sustains participant motivational orientation for these constructs. In parsing out the

results for academic interest and academic value, the qualitative results indicated that for

individual motivational orientations these constructs increased over the course of the study, as

did the participant response themes for hands-on learning in both the individual and group

motivational orientation questions. For group motivational orientations academic interest was

unchanged and academic value increased. These results support the findings of Boaler's (1998)

study which found that in PBL environments students developed a conceptual understanding of

mathematics, and a stronger ability to use and apply mathematics to interpret different situations,

develop meaning, apply procedural understanding, and increase mathematical confidence. These

findings, in combination with the results of the current study, would indicate that PBL

environments create authentic experiences in which students can manipulate and interpret

curricula in ways that create and sustain engagement in the subject matter and foster motivational

benefits. Therefore, teachers of PBL should carefully consider the authenticity of project work

and ensure that students have opportunities to apply curricula to real-world situations.

Perhaps the most meaningful implication of the present study is in the broad range of

motivational constructs explored. Prior educational researchers have observed an overall decline

in students' motivation as they move into middle school (Lepper, Iyengar, & Corpus, 2005) and

high school (Gottfried, Fleming, & Gottfried, 2001; Otis, Grouzet, & Pelletier, 2005). This

decline in motivational orientation is not supported by the results of the current study. Participant

self-reported motivation increased for the constructs of self-efficacy, intrinsic motivation,

academic self-concept, academic interest, academic value, situational motivation, and school-

prompted interest. Participant self-reported motivation decreased for extrinsic motivation,

academic agency, and adaptive attribution. These results suggested that student motivation in a

PBL classroom is a complex, multi-dimensional process that is mediated by both individual and

group orientations and experiences. Therefore, teachers of PBL should critically examine the

design of PBL environments relating to specific motivation constructs and with individual and

group motivational orientations in mind to make student motivation an explicit design element.

As school systems work towards implementing 21st Century learning designs, and the

role of teacher shifts to a more facilitation of learning model (Premier's Technology Council,

2010), then designing learning models that embrace the centrality of student motivation in the

teaching and learning process will be foundational to learners' achievement (Blumenfeld et al.,

2006). The experiences of the current researcher and data generated in the current study have led

the researcher to suggest a recommendation that four interdependent factors need to be part of

the conscious design of learning environments that reflect 21st century learning principles.

First, strategies for student motivation are included as part of the design of lessons, unit

plans, and instructional plans much like learning outcomes. It is critically important to design

learning environments in ways that meet the motivational needs of all learners to maximize

cognitive engagement. This factor is the foundation of designing learning environments that

foster student motivation. While each classroom may be different, and each group of learners'

motivational needs vary, making conscious and explicit the motivational strategies underlying

the teaching and learning process may help to develop student motivation and serve as a starting

point for sustaining cognitive engagement over the long term.

Second, the learning should be contextualized in the experience and process of learning

(Pintrich & De Groot, 1990). This factor can be explicitly stated and explored as part of the

lesson or combined as part of an experiential activity/project. The ability of students to make

meaning of the curricular content and grasp the real-world connections is crucial for sustaining

motivation in the 21st century learning environment. This factor speaks to the need for the

teacher to carefully plan and develop understandings around how curriculum connects to real-

world applications. Building these connections can help develop and perhaps more importantly,

sustain student motivation that has been created as part of a conscious design process.

Third, differentiation of instruction and demonstrations of learning can help to build

personalization of learning into the teaching and learning process for all students (Bell, 2010).

Providing opportunities for learning that are not bound by 'traditional' systems may have a

dramatic impact on student learning. As well, creating multiple opportunities for students to

demonstrate their learning may deepen and sustain student motivation. Therefore, developing an

increasing repertoire of instructional and assessment strategies may assist the teacher in creating

learning environments that engage and sustain learners by personalizing instruction and

assessment practices.

Fourth, collaboration in learning that focuses on students developing skills around group

work can be a powerful motivating force in 21st century learning environments (Cheng, Lam &

Chan, 2008). Building positive interdependence and individual accountability into the learning

process through high quality group processes can dramatically impact student motivation

towards learning as the responsibility for learning shifts away from the teacher to the learner

(Blumenfeld et al., 2006). However, creating an environment where group processes are of high

quality is no simple matter. To unleash the potential motivational benefits of collaborative group

work, as well as integrating these four factors in 21st century learning environments, teachers

must be supported in developing and enhancing their skills related to motivational strategies and

processes, application of curricula to the real-world, differentiated instruction and assessment, as well as group facilitation, assessment, accountability, and social skill development.

Limitations of the Study

There are certain limitations that need to be considered in the interpretation of the results of the present study. First, all of the results were based on participant self-reports. An underlying assumption of the self-report methodology of the present study was that participant motivational orientations are conscious, accessible to the participant, and can be communicated (Fulmer & Frijters, (2009) to others through participant surveys. While students' self-reports of motivational orientation are considered to be valid predictors of educational outcomes (Cheng et al., 2008) as well as motivational and cognitive engagement (Pintrich & De Groot, 1990), certain challenges with this methodology have been identified. For example, Fulmer and Frijters (2009) in their review of self-report and alternative approaches in student motivation indicated that there is a risk participants may interpret different meaning from survey questions relating to motivational construct than is intended by the researcher, and that self-report measures are too general to capture the complexities of motivation. Therefore, the results of the present study should be viewed with the assumptions and limitations of the self-report methodology in mind.

Second, the results of the current study represented changes in participants' motivational orientation during participation in the ADSS Project Based Learning program. It is important to note that PBL programs can vary widely in curricular content, pedagogy, and use of group work strategies (Thomas, 2000). Therefore, the ecological generalizability of the current study's findings may be appropriate for other project based learning classrooms but should only be considered for classrooms of similar design and pedagogy.

Third, the survey instrument asked students to respond to one Likert statement per

motivational construct. While qualitative responses (Questions 11 and 12) were used to attempt

to explain the quantitative responses (Questions 1-10), the results of the quantitative component

of the survey could be strengthened if the survey included more than one Likert statement per

motivational construct. A more extensive qualitative component (e.g., participant interviews)

would also have provided more information relating to changes in specific motivational

constructs and a deeper understanding of how specific aspects of the ADSS Project Based

Learning program may have influenced participant changes in motivational orientation.

Fourth, the sample size was relatively small (*n=14*). Statistical analysis of the pre-test

and post-test means indicated that a statistically significant change was only observed for

Question 2 (intrinsic motivation) at the 95% confidence level. Therefore, the changes in

motivational orientation related to specific motivational constructs (other than intrinsic

motivation) may be attributable to factors other than the ADSS Project Based Learning program.

Further Research Discussion

The purpose of this study was to determine if participation in Alberni District Secondary

School's Project Based Learning Program has had an impact on student motivation towards

learning and to add to the existing body of knowledge on issues of student motivation in project

based learning classrooms. The current study utilized a mixed-methods design relying on

participant self-reported motivational orientation and would have been strengthened with an

ethnographical or phenomenological component. Future researchers may consider using multiple

qualitative methods (e.g., participant interviews and observations) to provide rich descriptive

data to compare to measured changes in motivational orientation (Fulmer & Frijters, 2009). This

approach may also provide more information on antecedents of motivation, as well as the

complexity and multi-dimensionality of both individual and group orientations and experiences. Further, future research could look at a much larger sample across different PBL learning environments to determine those motivational constructs and orientations that are influenced by the pedagogy of PBL versus those that may be specific to the ADSS PBL program.

The present study did not include methodology to capture the relationship between participant motivational orientation and student achievement. While past research has shown positive correlations between increased motivational orientations towards learning and increased student achievement (Lepper, Iyengar, & Corpus, 2005), future research could focus on the roles of specific motivational constructs in fostering student achievement in PBL learning environments. Further research may also explore the role that these motivational constructs play in mediating individual and group motivational orientations towards student achievement. Making a strong link between PBL pedagogy and student achievement would be crucial in demonstrating the 'why' and the 'how', PBL approaches can positively impact students' motivation and achievement.

In looking towards broader, systemic change to address declining student motivation, future research could focus on the specific challenges faced in implementing a PBL learning environment. Identifying challenges and developing strategies for overcoming those challenges are crucial for long-term teacher acceptance of PBL pedagogy (Lam, Cheng, & Ma, 2009). Identifying common themes between 'traditional' and PBL pedagogies may help to facilitate the implementation of instructional practices that more effectively create, foster, and sustain students' motivational orientation and lead to increased academic achievement for all students.

Conclusion

In building on the work of past motivational and PBL research, the current ADSS study has demonstrated that participation in the ADSS PBL program increased participants' motivation towards learning. The present study found that participants reported significant increases in self-efficacy, intrinsic motivation, and group work as a positive experience. The results of the present study illustrated that for participants in the ADSS PBL program student motivation was a complex, multi-dimensional process that was mediated by both individual and group orientations and experiences. Therefore, teachers of PBL should critically examine the design of PBL environments relating to specific motivation constructs and with individual and group motivational orientations in mind to make student motivation an explicit design element. The current research has also added to the existing body of PBL research in terms of broad range of motivational constructs explored and the interactions of these constructs in individual and group motivational orientations through PBL environments.

The findings of the present study may hold relevance for teachers in 'traditional' classrooms. Since many of the design elements of a PBL learning environment are transferrable to a 'traditional' learning environment: student choice in project work, group work, problem-solving approaches to learning, and authentic activities (Thomas, 2000), then incorporating some of the key design elements of a PBL classroom in a 'traditional' classroom may reap some of the motivational benefits found in the results of the present study. Resolving the challenge of declining student motivation will require a shift in the understanding of, and acceptance of, the centrality that motivation holds in defining students' experiences in our educational system. If, as stated by Fullan (2001), "educational change depends on what teachers do and think", then taking into consideration the best of what works with our current system and developing what

works in emergent pedagogy (e.g., PBL) may be critical in developing teacher engagement in

creating challenging and motivationally supportive learning environments for benefit of all

students in the 21st century.

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Appendix A: Participant Survey

VANCOUVER ISLAND
U N I V E R S I T Y

The first statement is an example.

I like strawberry ice cream.

1	2	3	4	5
NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE

Instructions: Please respond to the following statements by circling the number that you believe best reflects your response to each question/statement. Please do not write your name on this sheet.

1. **I can do almost all the work in class if I don't give up.**

1	2	3	4	5
NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE

2. **An important reason why I do my class work is because I like to learn new things.**

1	2	3	4	5
NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE

3. **It's important to me that other students in my class think I am good at my class work.**

1	2	3	4	5
NOT AT ALL TRUE		SOMEWHAT TRUE		VERY TRUE

4. I believe that I can succeed in academic situations.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

5. I am interested in learning new skills and concepts.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

6. I believe that learning will be valuable for me.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

7. I believe that the classroom environment impacts on my motivation to learn.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

8. I like to have choice in my schoolwork.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

9. I believe that I determine my success in school.

1   2   3   4   5

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

10. I pursue learning more about classroom material outside of school.

1   **2**   **3**   **4**   **5**

NOT AT ALL TRUE   SOMEWHAT TRUE   VERY TRUE

The following questions are open answer. Please respond to each question as fully as you wish and in any format you wish.

11. What motivates you to learn? Please explain.

12. Does working on school projects in small groups motivate you? Please explain.

Thank you for your input.

The return of your completed survey indicates your consent to take part in this study and for the information you provide to be included in the study results.

Appendix B: Parent/Guardian Consent Letter

PARENT/GUARDIAN RESEARCH CONSENT LETTER
"Motivation toward learning: A study of Alberni District Secondary School's
project based learning 9 program

September, 2011

Ryan Dvorak   Rachel Moll, Ph.D., Supervisor
Master's of Education Student   Faculty of Education
Vancouver Island University   Vancouver Island University
                                                     (250) -753-3245 (ext:2161)

I am a student in a university-level Masters course that requires me to gain applied experience in designing and conducting research. As such, I have designed a research project to study the relationship between student motivation toward learning and participation in Alberni District Secondary School's project based learning 9 program.

During this study, your child will be asked to complete two surveys on specific dates. The surveys will contain 12 brief questions about their level of motivation with respect to school and learning. Your child's participation will require approximately 30 minutes of time.

There are no known harms associated with your child's participation in this research; however, counselors are available if, for any reason, you child should wish to see one.

All records of your child's participation will be kept strictly confidential, such that only I, and an administrator, will have access to the information. Data will be stored in a locked safe within the administrator's office. Data will be destroyed two years after the end of the project, approximately May 2014. Electronic files will also be deleted at that time. The results from this study will be reported in a written research report. Information that you provide will not be made public in any way that identifies you/them as an individual participant.

Your child's participation is completely voluntary. They may withdraw at any time for any reason without explanation and without penalty. Your child may choose not to answer any question for any reason.

If you have any concerns about your child's treatment as a research participant in this study, please contact the VIU Research Ethics Officer, by telephone at 250-753-3245 (ext. 2665) or by e-mail at reb@viu.ca.

If you have any questions about the research project, or would like more information, please feel free to contact me at the e-mail address below:

Ryan Dvorak

Master's of Education Student

Vancouver Island University

I have read the above form, understand the information read, and understand that my child can ask questions or withdraw at any time. I consent to having my child participate in this research study.

_____   _____

Parent/Guardian Signature   Date

_____

Child/Student name (Please print)

Appendix C: Survey Administration Script

VANCOUVER ISLAND
U N I V E R S I T Y

Survey Administrator Script

This survey administrator script outlines the process that will be followed in delivering the survey for this action research study. The survey administrator will be asked to read aloud the participant assent form. Instructions to the survey administrator are bolded, and components of the script that are to be read verbatim are italicized.

Distribute the envelopes with the survey packages containing the survey and the research consent cover letter to the students and have them open them. Please read this aloud to the students at the beginning of the survey administration period.

I am a student in a university-level Masters course that requires me to gain applied experience in designing and conducting research. As such, I have designed a research project to study the relationship between student motivation toward learning and participation in Alberni District Secondary School's project based learning 9 program.

During this study, you will be asked to complete two surveys on specific dates. The surveys will contain 12 brief questions about your level of motivation with respect to school and learning. Your participation will require approximately 30 minutes of time.

There are no known harms associated with your participation in this research; however, counselors are available if, for any reason, you wish to see one.

All records of your participation will be kept strictly confidential, such that only I, and an administrator, will have access to the information. Data will be stored in a locked safe within the administrator's office. Data will be destroyed at the end of the project, approximately May 2014. Electronic files will also be deleted at that time. The results from this study will be reported in a written research report. Information that you provide will not be made public in any way that identifies you as an individual participant.

Your participation is completely voluntary. You may withdraw at any time for any reason without explanation and without penalty. You may choose not to answer any question for any reason.

The return of your completed survey indicates your consent to take part in this study and for the information you provide to be included in the study results.

If you have any concerns about your treatment as a research participant in this study, please contact the
VIU Research Ethics Officer, by telephone at 250-753-3245 (ext. 2665) or by e-mail at
reb@viu.ca.

If you have any questions about the research project, or would like more information, please feel free to contact me at the e-mail address below:
Ryan Dvorak
Master's of Education Student
Vancouver Island University

I have read the above form, understand the information read, and understand that I can ask questions or withdraw at any time. I consent to participate in today's research study.

Please inform the students that the research consent cover letter should be kept for their records.

Please read this aloud. *The return of your completed survey indicates your consent to take part in this study and for the information you provide to be included in the study results.*

Please, also inform the students that counseling assistance is available should they wish to access it for any reason.

Read aloud the sample survey question; *"I like strawberry ice-cream",* **and go over on the whiteboard how to answer the question by circling the appropriate numeral. Indicate that if a student wishes to answer in between the numerals to please place their circle in between the numerals of their choice.**

At this point please inform students to begin completing the survey, and if they choose not to participate to please silent read or work on sustained silent writing at their table. Show the students the location of the drop box and tell them that this is where to put their surveys at the conclusion of the survey period.

At the conclusion of 30 minutes please walk around the room and determine if all of the participating students have completed the survey. Please do not ask verbally, just check and see if they are done writing. If not, please extend the survey period and do not open the door. If the students are completed, ask them to hand in their surveys completed or non-completed to the drop box and have them begin silent reading. At the conclusion of the survey period, please collect the surveys and place them in the envelope labelled T_1 for

survey period#1, and T_2 for survey period#2. Seal the envelope and leave the classroom after ensuring that I have arrived, and take them to the administrator to be locked in his office safe.

Thank you,

Ryan Dvorak

Appendix D: Participant Research Cover Letter

PARTICIPANT RESEARCH CONSENT COVER LETTER
"Motivation toward learning: A study of Alberni District Secondary School's
project based learning 9 program"

September, 2011

Ryan Dvorak   Rachel Moll, Ph.D., Supervisor
Master's of Education Student   Faculty of Education
Vancouver Island University   Vancouver Island University
                                               (250) -753-3245 (ext:2161)

I am a student in a university-level Masters course that requires me to gain applied experience in designing and conducting research. As such, I have designed a research project to study the relationship between student motivation toward learning and participation in Alberni District Secondary School's project based learning 9 program.

During this study, you will be asked to complete two surveys on specific dates. The surveys will contain 12 brief questions about your level of motivation with respect to school and the value that you place on learning. Your participation will require approximately 30 minutes of time.

There are no known harms associated with your participation in this research; however, counselors are available if, for any reason, you wish to see one.

All records of your participation will be kept strictly confidential, such that only I, and an administrator, will have access to the information. Data will be stored in a locked safe within the administrator's office. Data will be destroyed two years after the end of the project, approximately May 2014. Electronic files will also be deleted at that time. The results from this study will be reported in a written research report. Information that you provide will not be made public in any way that identifies you as an individual participant.

Your participation is completely voluntary. You may withdraw at any time for any reason without explanation and without penalty. You may choose not to answer any question for any reason.

The return of your completed survey indicates your consent to take part in this study and for the information you provide to be included in the study results.

If you have any concerns about your treatment as a research participant in this study, please contact the VIU Research Ethics Officer, by telephone at 250-753-3245 (ext. 2665) or by e-mail at reb@viu.ca.

If you have any questions about the research project, or would like more information, please feel free to contact me at the e-mail address below:
Ryan Dvorak
Master's of Education Student
Vancouver Island University

I have read the above form, understand the information read, and understand that I can ask questions or withdraw at any time. I consent to participate in today's research study.