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A CASE STUDY OF PROJECT-BASED LEARNING IN AN ELEMENTARY SCHOOL SETTING

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A CASE STUDY OF PROJECT-BASED LEARNING IN AN

ELEMENTARY SCHOOL SETTING

BY

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ABSTRACT

Project-based learning (PBL), a form of learning that has its roots in medical schools, has been frequently studied at the secondary and undergraduate/graduate levels. Few studies of this learning approach have been conducted at the elementary level. This study addressed the question of what project-based learning looks like and how it is implemented in the elementary years, as it exists within the context of a whole school. A qualitative case study design was used for the study. A purposeful sample of K through 6 elementary staff was interviewed over a period of 8 months. Analysis of the data showed that teacher mastery of content; scaffolding to developmental levels; and flexibility in planning were key elements in implementing and managing the project process. A defined set of learning lenses and an agreed upon philosophy at the whole-school level also emerged as significant factors in implementing the PBL approach.

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CHAPTER 1

INTRODUCTION

Experiential learning is not a new concept; problem-based learning (PBL), an approach included in the experiential learning family, has been used as a design methodology for over 40 years in the areas of science, engineering, medicine, and economics (Barneveld & Strobel, 2009). Other experiential-based learning features, which have their roots in the traditions of Kilpatrick (1918, 1921) and Dewey (1938), were embodied in the trend of "discovery learning" that occurred in the late 1960's and early 1970's (Thomas, 2000). In the last two decades, researchers have reviewed evidence, reflected upon, and made hypotheses as to why some of these past learning models failed to gain wide acceptance in educational practice.

One theory is that these models did not base their programs on a comprehensive understanding of what drives learner motivation nor gave enough attention to the foundations of knowledge that are necessary to participate in projects or problems that can be more cognitively challenging (Blumenfeld et al., 1991). Other authors and researchers have noted the gaps between past models that utilized 'projects' and the modern conception of PBL, which places specific emphasis on authenticity, constructivism, and the necessity of basic learning skills in order to fully participate in the learning process (Thomas, 2000).

While wider use of such models of learning appears to vary with national priorities and ideologies (Chard & Katz, 2000), the recent rising interest in the PBL

model is accompanied by emerging research that looks to define the criteria and factors associated with successful project-based learning models and to address the various misconceptions that are adversely associated with failed models.

Defining Criteria of Project-Based Learning

Dr. John W. Thomas performed a meta-analysis, supported by the Autodesk Foundation, of existing research on the project-based learning method (2000). Based on the recognition that multiple forms of experiential learning exist and have been implemented in various ways and under various conditions, Thomas first analyzed existing research pertaining to the different classified forms and selected those that, based on existing practice and theory, appear to have an overlapping set of core components. His final analysis included research that assumed the labels of "Project-based Learning", "Project-based Instruction", "Problem-based Learning", and "Expeditionary Learning".

Thomas (2000) identifies themes within each of the above models to define *Project-Based Learning* as the overarching approach. Though there still does not exist one exclusive set of characteristics, Thomas (2000) defines the following five criteria as being present in a PBL curriculum: *Centrality*, where the project is the center of the curriculum; *Driving Question* and/or ill-defined problem; *Constructive Investigations* that utilize inquiry, knowledge building, and resolution; *Autonomy*, or a shift from teacher-directed to student-directed learning; and *Realism,* with a focus on authentic problems and questions in which solutions have the potential to be implemented.

Chard and Katz (2000) also made evidence-based distinctions between more traditional, systematic instruction and authentic project-based work, with a focus on this process in early childhood education (defined as children ages three to eight). In a project-based environment, teachers not only help students to acquire skills but provide multiple opportunities for students to apply those skills; learning is primarily driven by intrinsic motivation, or interest and involvement in the project; children are offered a choice in how they learn from a variety of activities and help determine their own level of challenge; children take on the role of the expert in the classroom and capitalize on their proficiencies; and the teacher and children share accountability for learning, progress, and achievement.

Projects

There are two different strands of research in the area of implementation, management, and assessment research. The first strand – *"procedural facilitation"* – determines the features, materials, requirements, technologies, and assessment strategies associated with productive inquiry and maximum achievement on the part of students, and the effective combinations of those. The second strand focuses on collecting data on the nature and effectiveness of "grassroots" interventions, those projects that have been designed and implemented successfully by individual or groups of teachers in the classroom or within a subset of the school (Mergendoller & Thomas, 2000; Thomas, 2000). This study will investigate those components associated with the first strand, procedural facilitation.

Hmelo-Silver (2004) identified some of the barriers in implementing the PBL

model in a K–12 environment. In medical school, where much of the existing research has been done, learning revolves around an integrated, interdisciplinary curriculum organized around problems as opposed to subject domains. In K–12 education, teachers must assess students in specific subject areas and problems often do not map neatly onto subject-area divisions. Implementing this model requires careful planning in shorter classroom periods. As such, there is a great need for evidence-based instructional strategies that demonstrate which elements of PBL are important for particular kinds of outcomes, allowing educators to make informed choices in adapting PBL to particular contexts.

Kuhn and Pease (2010), in conducting an experimental study at the undergraduate level to identify effective components of problem-based learning versus lecture/discussion, found that a key component in driving the procedural process is student focus on engagement with the problem, whether experienced collaboratively or individually. Kuhn and Wirkala (2011), who conducted a similar controlled-experimental study of problem-based learning in a middle-school population, also found that engagement was key to activating the learning process and that collaborative versus individual work did not appear to act as an independent variable.

Both of the above studies address one of critics' most voiced assessments of the constructivist, discovery, problem-based, experiential, and inquiry-based learning methods – that such learning models are associated with "minimal guidance" on the part of the teacher, and that this lack of guidance fails to acknowledge structures that make up human cognitive architecture (Kirschner, Sweller, & Clark, 2006). In counter arguments, Chard and Katz (2000), Kuhn and Pease (2010), and Kuhn and

Wirkala (2011) address this critique as a misunderstanding and counter by describing scaffolding as a key element involved in the PBL process. Advocates state that activation of background knowledge and elaboration are essential components in the PBL process and that these elements are imperative because of the most recent research compatibility with human cognitive architecture (Chard & Katz, 2000; Kuhn & Pease, 2010; Kuhn & Wirkala, 2011).

Researcher's Stance

My interest in project-based learning seems to have happened incidentally, while I was working as a Graduate Assistant in the Office of Teacher Education at University of Rhode Island. Part of my duties included arranging practicum placements for students in the education program, which entailed familiarizing myself with various public schools in the districts of Rhode Island with which we had a working relationship. At times, I was asked to pull up former student placement information to be used on forms for program verification or for student teaching placements. It was during such an occurrence that I came across The School A. When I saw its location in South Kingstown, right down the road from the university, I became curious and wondered why I had never seen or heard of the school.

After a visit to the school's website, I found that the school was a public charter school. Their mission statement reads as follows: "This charter school is a multi-age learning community which fosters a passion for learning in all students so they can reach their full potential. The school utilizes a project-based curriculum integrating academic disciplines, emphasizing social responsibility and environmental

sustainability, in small classroom settings to prepare each graduate to be a responsible citizen in the global community." I had never formally heard of a project-based curriculum, and so did some informal research on the topic. I instantly became interested in the concept. The idea of teaching content in an "authentic" way, put into a connected and real-life context, was inspiring. In the current literature, there was a great emphasis on completing a project as the summative representation of everything that students have learned over the course of the project process. This approach made, and still makes, much sense to me. I had, and have seen elements, bits and pieces of the idea, in more traditional public school classrooms (including my own), but I knew that existing structures and expectations, both in the context of learning-level and at an institutional level, made this a more challenging and less common approach for public school teachers. I wanted to witness first-hand and develop an understanding of how this approach could, and has worked, in a public elementary school setting.

The following spring semester, I enrolled in the Field Study course required for my Master's Degree; it is this course, which requires a research field study, along with successful completion of the Comprehensive Exam, the usual course for earning a Master's Degree in the Elementary Education program. I knew walking in that I was interested in observing and figuring out how project-based learning could work at the elementary level; I immediately thought of School A (for confidentiality purposes I will use the name School A), and how I could turn my interests into a workable field study. When I turned in my proposed study to my professor, I was told that what I wanted to do - a critical observation and analysis of project-based learning at the elementary-level - would take longer than the 3 months allotted, and sounded more

like a Master's Thesis. My professor advised that I discuss my interests with my advisor, which I did soon after. With my advisor's approval, I decided to pursue the Master's Thesis course, which would satisfy the completion of both the Field Study course and the Comprehensive Exams.

Later in March of that same semester, I reached out to and arranged a meeting with Mr. Brady, the current director at School A. I had previously sent him an initial proposal for a study via e-mail and explained my interests and ideas for cooperating with School A. When we met in mid-March, Mr. Brady seemed amenable to the idea of my coming in to do research in the role of a participant-observer, pending on my completion of a more streamlined research proposal. My proposal was finalized toward the end of May, with a proposal date set for the end of September. After successfully defending my proposal on September 25, 2012, I then only had to wait for my proposal to receive IRB approval (as my research involved human participants) before I could begin my field research. After receiving approval in early November 2012, I began my research at School A later that month.

I completed my field research, which concluded with participant checks, in June 2013, seven months later. From February to May, I also completed my student teaching in Grade 1 at a public elementary school in Rhode Island. I had finished translating all interviews before the spring semester, and began analysis of the interview data that summer. In August 2013, I received an offer to teach third grade in the East Providence school district, which I accepted. The first year of teaching is a veritable journey of navigating a slew of responsibilities and tasks that I can only characterize as being where the real teacher education begins. I contemplated whether

to continue working on my thesis during that first year. When I sought the advice of one of my committee members, she advised against my pursuing both at the same time.

After further reflection, I decided that attempting to complete my thesis and serve as a first-year teacher would distribute my attention between the two, and I felt each deserved as much of my full attention as possible. As such, the fall semester of 2013 I was granted a leave of absence until the summer of 2014. While I did take time away from analysis of the data, completing my study was never too far from my mind, and I had no intention of not picking up my data again until the following summer.

In February 2014, during public school's winter vacation, I decided I had enough immersion in that first year to continue working on my data analysis, from where I had previously left off in August. I began committing some weekend hours to further coding the data and archiving literature for review. At the end of May 2014, about a month before the end of the school year, I met with my advisor to discuss my progress and next steps. I left feeling that I was on the right track and knowing the steps that I needed to take in order to move forward.

Justification for Study

Thomas (2000) identified a gap in research on the institutionalization of PBL and on PBL-based whole school change. Specifically, Thomas stated the need to describe factors that influence conditions under which PBL thrives and spreads in a school setting and becomes a viable part of the district and community, and the "ingredients by which PBL becomes a spearhead for whole-school change".

My own literature review turned out few studies on PBL at the whole-school level, particularly at the elementary level. Furthermore, I was not able to find any existing studies on PBL at the elementary level in a charter school. This study investigates how various contextual elements interact with and influence the function of PBL in a charter school.

The Approach

Case studies have been criticized for lacking the use of random assignment in order to select populations to be studied, and for not controlling environmental variables in order to determine specific causal outcomes. In response, case studies - when conducted according to an established protocol - are extremely valuable in investigating complex social units consisting of multiple variables that are of potential importance in the understanding of a particular embedded phenomenon and providing a more holistic account (Merriam, 2009; Yin, 2003).

I do not make any claims that the results of this study will be objectively transferrable to other environments. Rather, the role of the case study is to provide a rich and thick description of findings in a detailed and logical manner, so that the reader has the choice to contextualize elements of the study to his or her own situation if determined to be valid (Guba & Lincoln, 1981).

The research questions were investigated through a qualitative case study design. This design was an ideal fit for the study, due to the nature of the research subject – an innovative program (project-based learning) within an individual charter school that serves a K – 8 population, an example of a "bounded system". In addition,

the research questions lend themselves to more in-depth qualitative inquiry due to the potential range of factors/elements that exist and the various interactions and relationships therein (Merriam, 2009).

The specific case study type is Intrinsic and Instrumental. In other words, the purpose is not to come to understand abstract construct or generic phenomenon nor to theory build, but to provide insight into a particular issue or to provide a different perspective on a particular generalization (Merriam, 2009). Though drawing from other qualitative research sources, I primarily use the case study methodology and design as described by Merriam.

Research Questions

The following overarching question was proposed, along with four sub-questions or topical ideas. The research process led to the development of two additional sub-questions that provided more in-depth analysis of the data. As noted by Ely et al. (1991), "because qualitative researchers depend on the field to help them ask questions, it is not a good idea to enter the field with questions that are too specific, or too tight, or too slanted" (p.56). These questions provided a broad lens through which to examine the subject of study, and a grounded foundation on which to build an inductive analysis.

Overarching question: *What does project-based learning look like and how is it implemented in the elementary years, as it exists within the context of a whole school?*

Sub-questions:

1. What are the identified common criteria by which current PBL is defined?

2. What practices are being used for implementing, planning and managing projects, and what are the challenges present therein?

3. How does the PBL process change according to learners' developmental level?

4. What are the contextual factors that underlie the PBL model at an institution-wide level?

- What makes this approach successful in this school?

- What type of teaching environment does the PBL approach make possible?

CHAPTER 2

REVIEW OF LITERATURE

Theoretical Frames

The study that I present here attempts to address how PBL functions at the elementary level within a whole-school context. As with any area of study, there are multiple dimensions and perspectives that frame this subject. This study was informed by three primary theories, each falling within a distinct paradigm – learning theory, socio-cultural theory, and organizational theory.

Constructivism (Learning Theory)

The first, constructivism, is a learning theory that is most widely known by the work of Jean Piaget (1953) and Lev Vygotsky (1962). Constructivism, in both individual and social contexts, supports the scientific and philosophical underpinnings of the project-based approach. A related theory is constructionism, which is distinct in its definition by the manipulation of objects.

Constructivism, proposed by Jean Piaget, proposes that knowledge is not transmitted from teachers to students, but constructed by students themselves when interacting with the environment. The two primary types of constructivism - cognitive or individual (Piaget, 1953) and social (Vygotsky, 1962) - are both inherent in project-based learning as defined by Thomas (2000). Similarities between individual and social include inquiry teaching methods and students creating concepts

built on existing knowledge (Powell et al, 2009, p. 241).

Disequilibrium - the state of being uncomfortable when one has to adjust his/her thinking (schema) to resolve conflict (Powell et al.,, 2009, pp. 26-27) - is the catalyst for constructivist learning. When disequilibrium occurs, individuals either assimilate information (bring knowledge to own, existing schemas) or accommodate information (change schemas to accommodate new information) (Piaget, 1953). Scaffolding a unique type of internalization or "getting it" will occur when children are asked to perform a task that has some meaning and are granted assistance. This idea is called the zone of proximal development, proposed by Vygotsky (1962, p. 244). Language usage in the classroom is the most important process in a social constructivist setting (p. 245). Inquiry must be carefully planned and organized, especially for the less prepared students who may lack background knowledge and problem-solving skills (Wolk, 1994, p. 332). Real or meaningful knowledge based on one's ability to accept, reason or acquire information, implies that the individual has constructed personal meaning in the process of learning (p. 248).

Socio-cultural Lens (Cultural Theory)

The socio-cultural perspective was a significant lens through which the data collected was analyzed. Jerome Bruner's psycho-cultural approach to viewing education greatly influenced the direction of my analysis. Bruner (1996) identifies nine tenets as the bedrock of the culture of education. Though not all need to be addressed, there are six that I found to be particularly useful in helping to interpret the meaning behind my findings.

The first is the perspectival tenet, reflecting an awareness of the varying meanings that can be interpreted through a particular component or finding. For example, School A's emphasis on environmental and social responsibility can be seen as philosophical underpinnings of the staff; as a foundation for School A's curriculum structure; or as a means, from a leadership perspective, to unite staff purpose and motivation around a set of ideas and practices. It is the interaction between individuals and a culture that give this tenet meaning. This tenet can also be observed to an extent through the words and actions of the staff, in terms of how they cope with varying view points (Bruner, 1996, p.13).

Bruner's (1996) constructivism tenet speaks to the pedagogical underpinnings that underlie the project-based learning approach and the views of staff at School A. In Bruner's view, reality is constructed by many individuals, shaped by traditions and symbols of a particular culture. Bruner offers a definition of the purpose of education as "helping young people to better use these tools of construction, and helping them to better adapt to the world and help change its processes as necessary" (p. 20).

The interactional tenet speaks to a sub community that is necessary for passing on a knowledge or skill. Bruner (1996) makes the distinction of such interactions promoting "real learning", which he believes does not occur under the historically institutionalized one-way transmission model. As noted by Bruner, a sub-community fills several learning needs: models ways of doing or knowing; provides opportunities for emulation; offers running commentary; provides scaffolding for novices; and provides a context for teaching deliberately (p. 21). The School A's staff and students appeared to function as such a sub-community for individual learners.

The externalization tenet focuses on the main function of collective culture being the production of external works, or "oeuvres", which he attributes back to the French Cultural Psychologist Ignace Meyerson. These works produce and maintain a sense of group solidarity; provide a record of mental efforts; and promote a sense of the division of labor that goes into a product. The latter encourages metacognition on a group's overall progress to encourage discussion (Bruner, 1996, p. 22). The greenhouse; the garden; and the chicken coop are examples of physical 'works' that provide a sense of unified purpose for the members of School A; these artifacts also reflect the 'division of labor' - students first thought of and then worked with staff to create these products. Both staff and students have roles in maintaining these external works that are an inherent part of School A's culture of social responsibility and environmental sustainability.

The institutional tenet recognizes that cultures are composed of institutions that specify roles, status and respect. Cultures are exchange systems, and goals are achieved through a mix of volunteerism and coercion (Bruner, 1996, p. 25). As became apparent in the creation of the learning environment, teachers at School A are granted certain responsibilities and experience motivators that give them the sense of freedom to shape the goals of School A.

A final relevant tenet is that of identity and self-esteem, which identifies education as a crucial contributor to the shared phenomenon of self, a concept dependent on cultural context. Bruner (1996) identifies the two components of self as agency and evaluation. Agency consists of William James' notion of an "extended self", composed of things, activities, and places, along with a privately-constructed

self. Through the extended self, cultural influences determine a sense of responsibility and skill sets. Evaluation, or self-efficacy, is affected by available supports. Bruner posits that the question needing to be asked by schools is, what contributions do they make to the person in terms of agency and self-esteem? He cautions of an overshadowed emphasis on performance and bureaucratic demands. Student investment in the learning process and reflection arose as two prominent themes in the research, affecting students' and teachers' sense of self (p. 35).

Organizational Learning/"Learning School" (Institutional/Organizational Theory)

While the fact that School A is a charter school was not a primary consideration in my choosing as to where to conduct the study, this fact became ever more significant throughout the data analysis process. There clearly existed factors in the culture and inner-workings of this institution that were effects of, and also helped to shape, School A's charter school status. The holistic analysis painted an image of a young institution (about 10 years old) that had experienced, and was still experiencing, an evolution in its approaches and its identity, exemplified through an emphasis on community learning and reflection. Towards "the end" of my analysis and reviewing relevant literature, I came across the idea of organizational learning, proposed by Peter M. Senge, director of the Center for Organizational Learning at MIT's Sloan School of Management.

Organizational learning is not a new concept; Gregory Bateson, who was a biologist and systems theorist, provided a seminal foundation in the 1960's. Chris Argyris, a professor of education and organizational behavior at Harvard, became

interested in the concept beginning in the 1970's, emerging with a definition two decades later that comprised two key features: individuals must be problem-solvers with the ability to detect and correct errors "in the external environment", and those individuals must be able to reflect critically on their own behavior and self-correct any identified discrepant behaviors that could negatively influence the organization Organizational learning is a continuous process through which individuals "develop new perspectives, create new ways of working together, and devise practices and structures…a strategy for long-term success" (Reed et al.,, 2001, p73).

Peter Senge, who was a student of Argyris, provides a framework for creating a learning organization, identifying five disciplines by which these organizations operate: 1.Systems Thinking, which integrates the other four disciplines, and involves seeing the self as part of the whole. Systems thinking allows detection of patterns and interrelationships within a complex whole (Kofman & Senge, 1993); 2. Personal Mastery, which requires continual development and interpretation of personal vision; 3. Mental Models**,** a deeply ingrained concept of the self, are usually only detected when a discrepancy exists between action and words. Awareness of mental models provides an opportunity for an individual to investigate how long-held perceptions affect one's behavior and decisions; 4. Shared Vision is a reflection on goals, values, and missions that are shared throughout an organization, in which individuals are committed and show motivation to act on this vision; and 5. Team Learning, which speaks to teams of individuals who are all, to a great degree, committed to personal mastery and eliminating mental barriers, and who show a high degree of collaboration and maximize collective ability (Senge, 1994).

Schools and educators showed great interest in Senge's framework, which led him to also eventually utilize the term "learning school". Most schools struggle to fulfill this role; the doctrine is difficult to put into practice for any organization (Reed et al.,, 2001, p.2). A true learning school attempts to answer the key question: "How can we guarantee that every child has access to the most effective teaching?" As identified by Senge, there are several components that must be incorporated in order to effectively answer this question. Most important, the school must represent all involved parties - teachers, students, parents, support staff, and the business community. In addition, staff teams must be empowered to make site-based decisions, such as setting critical goals, allocating resources, and organizing solutions (Reed et al.,, 2001). Senge makes the point that all disciplines within a given institution exist on a spectrum. The analysis of participants' experiences and views presents evidence of each discipline as it exists within the school.

CHAPTER 3

METHODOLOGY

This study employed purposeful sampling of a unique case, i.e., defined by its rare attributes of occurrence in the specified phenomenon of interest - project-based learning at the elementary level, within a charter school. The unit of analysis was the teacher and other school members in the bounded systems of the classroom and the charter school, School A, located in Rhode Island. At the time of the field study, the school was host to 172 students in grades K – 8 with classrooms grouped by mixed age - grades K and 1; grade 2; grades 3 and 4; grades 5 and 6; and grades 7 and 8. The study focused on teachers of the elementary levels i.e., grades K through 6. The school population also consists of one director; six teacher's assistants; and a maximum nine-member school council, composed of three staff, three parents, and up to three community members, which determines the overall direction of the school. The school was specifically chosen because of its project-based curriculum approach, as stated in the school's mission statement.

Participant Consent

In order to fulfill ethical responsibilities, I took all steps to develop a trusted researcher-participant relationship, providing all participants with a clear description of the purpose of study, description of procedures, duration, etc., as well as offering voluntary participation and the option to withdraw from the study at any time without

consequence (Merriam, 2009). During a staff meeting in which I was not present, Mr. Brady, the director of the school, had briefly mentioned and described my study. Teachers were made aware that they would be receiving consent forms, which they could sign and provide upon our first meeting, if they chose to participate. As mutually agreed during a preliminary phone conversation, I met first with Mr. Brady and provided him the consent forms, which we had agreed I would collect the following week. That same day and with Mr. Brady's permission, I began communicating with teachers via e-mail regarding scheduling days and times for first observations and interviews. Again, I made clear that teachers needed to respond only if they wished to participate.

During the study, I received consent from six of the nine teachers in the school. I observed and interviewed 5 teachers (excluding the sixth teacher, who teaches the 7/8 step-level; initially, I provided a consent form to the 7/8 teachers, in the event that I wanted to interview and observe the transition from upper-elementary to middle school). With the exception of the 3/4 step-level, in which case both teachers consented to the study, I interviewed and observed 1 teacher from each "step level" (combined grade level, with the exception of 2nd grade, which stands alone). I also received consent to interview Mr. Brady, as well as Rachel Phipps, the founder of School A.

Data Sources and Collection

Observations

I had previously identified areas of inquiry for observation, using the

aforementioned research questions as a guide and continual reference. Observations were conducted from the perspective of a participant-observer. Teachers at School A were informed as to the purpose of the study and were aware of my presence, though I did not actively engage or participate in classroom activities during school hours. Observations lasted between thirty minutes to one hour. During the span of December 2013 to the end of January 2013, I was able to make a total of eleven separate classroom observations; three project shares (one at the K/1 step level; one at the 3/4 step level; and 1 at the 5/6 step level); and one school council meeting.

The researcher's notebook was used to take notes on classroom observations and a school council meeting that I attended. I used a livescribe notebook and pen, which also allowed me to record some audio during observations, as well as the school council meeting. When observing the project shares, I recorded using my cell-phone video camera to document the event. All planned activities for the day, along with additional reflection notes, were kept in a fieldwork journal. As Bogdan and Taylor (1984) emphasized, I made best effort to record any additional details *as soon after* the observation as possible. On a couple of occasions after leaving an observation, I recorded my thoughts and reactions, while driving, on an audio recorder. The researcher's notebook includes my reflections during the course of observations and interviews, as suggested by Merriam (2009), in which I recorded in parentheses any observer commentary (marked OC).

Semi-structured Interviews

I conducted one in-person, semi-structured interview with each teacher

participant, the director, and the founder of School A; all except one of these interviews took place over the three-month on-site study period (November 2012 through January 2013). I conducted an interview with the founder of School A in August 2013; this interview was not in my original proposal, but became of interest after completing the participant checks in May and June 2013.

The number of interviews per participant was reduced from three each (the number proposed) to one each, due to schedule and time constraints. Participant checks for these interviews were conducted with all but one of the participants, from May to June 2013. The gap in time between interviews and the participant checks was again due to schedules and timing; I was completing my student teaching from February through May 2013, and was not able to meet with participants in-person before that time.

The only participant who did not complete a participant check was Beth, the K/1 teacher. We had scheduled a participant check, which was then cancelled due to other obligations per Beth's request. I reached out multiple times via phone and e-mail, and sent Beth an electronic file of the "pastiche" that was created for each participant check. She failed to respond to these requests.

The interviews for teachers, the director, and the founder each included four open-ended questions, to encourage the collection of more meaningful. All interviews included questions related to participants' thoughts on project-based learning as part of the curriculum; experience with the project-based approach; and background and experiences before coming to School A.

Data Analysis & Document Examination

I transcribed all interviews and participant checks within a week or two after completing, and archived them within the digital archive (Evernote database), which is password-protected. Interviews and participant checks were organized by their respective titles and name of each participant (Merriam, 2009). All tasks were recorded by date in a field log, along with any notes – additional thoughts and preliminary analysis – that arose while transcribing the interviews.

All interviews and participant checks were then uploaded to SaturateApp, a free coding and analysis software available through the website. Using the constant comparative method (Glaser & Strauss, 1999), information was coded and then organized into categories and themes, which became broader through analysis (Corbin & Strauss, 2007; Creswell, 2003). Iterative rounds of data reduction, over a period of several months, began with open coding directly from the interviews and participant checks. A coding frame containing all codes and definitions, along with notes and questions, was kept updated throughout the entire data analysis process.

In the later stages of data analysis, a set of reduced codes was transferred to an online visual thinking tool called Webspiration; codes were then organized by preliminary categories through concept mapping. Returning to the coding frame, codes were then examined based on level of analysis i.e., descriptive versus topic. Codes that were too descriptive were assigned to a topic code (or category), and topic codes that were lacking in specificity were also given a "descriptor code" to allow for more in-depth and uniform analysis. This approach mirrors the use of In Vivo coding, which calls for a mix of finding word patterns/using words used by participants as a

way of coding, and interpreting by topic (Corbin & Strauss, 2007). Topic codes, or categories, were then assigned to themed bins, which reflected the initial research questions, and additional sub-questions that arose during the course of data analysis (Merriam, 2009).

In addition, profiles were created for each participant. These profiles were created based on autobiographical descriptions published on the School A website, as well as a careful reading through interviews. The profiles provide a general description and professional and educational background in order to place each participant's thoughts and ideas into context.

Classroom and project share observations were scheduled with teachers in advance. Observation notes were collected and recorded in the researcher's notebook using a livescribe pen and notebook. These notes were then uploaded and archived in the digital archive. The documents collected from teachers were classified and organized according to content (e.g. graphic organizer; unit overview; etc.) and compared to interview content reflecting design of PBL lessons or activities; implementation methods; assessment methods; or as examples of a project product. The collected documents and classroom observations varied in the type and extent of information offered; however, they provided valuable insight in substantiating data collected from the interviews.

Reviewing Literature

Before and during data analysis, various literatures were collected and examined for relevant information pertaining to the aforementioned research

questions. The literature provided a foundation on which to build my analysis, as well as an illumination of the data findings, which in turn provided further direction for data analysis. The focus of the literature review invariably moved from being more descriptive, in terms of the project-based learning processes, to more analytical as it relates to the inner-workings of the institution and the cultural and organizational processes at work. Documents included a mix of peer-reviewed research articles, media articles, and research-based texts (LeCompte & Preissle, 1993). Public records – school data available from the Rhode Island Department of Education website - were also examined.

Document authentication was performed through identification of the author, place, and date of writing (McCulloch, 2004). All archived articles were given an identifying summary, and organized according to topic in the digital database in Evernote. All notes taken from written documents were scanned and uploaded to the digital database, and artifacts were also photographed and uploaded (Merriam, 2009).

Trustworthiness

Three strategies were used to ensure the trustworthiness of this study.

Triangulation

Methods triangulation is one strategy for increasing credibility of case study results (Guba & Lincoln, 1981). Three sources of data collection were used in order to ensure triangulation: The semi-structured interviews; the documents collected from the field; and classroom observations. The documents and observations were studied for

substantiation of the content of the interviews.

Participant Checks

Each interview was initially analyzed, and similar ideas were grouped together by theme or category, forming a "pastiche" (see Appendix A). In-person participant checks were scheduled with participants, during which they had an opportunity to clarify any comments, elaborate upon ideas or ask questions. Two participants, Rachel and Beth, were sent the "pastiches" through e-mail, with an opportunity to review and comment. Rachel responded with no additional comments or clarifications. Beth did not respond to the e-mail.

Audit Trail

The researcher kept a field log on the coding and research process, along with copies of revised coding frames, in the development of categories and themes. After each interview, the researcher documented any reflections or further notes in the field log. These reflections and notes helped guide the direction of research and next actions.

Limitations

This study has several limitations. First, only one interview took place with each participant. An additional interview after more in-depth data analysis would have helped to further validate the conclusions drawn. Furthermore, not all participants took part in the in-person participant check, which may render these

participants' thoughts and ideas less valid. Additionally, the documents collected varied in nature among teachers, which may have weakened triangulation of the data. Documents were usually offered by the teacher, or asked for by the researcher if being discussed during the interview; a pre-established list of documents to be requested from each participant was not provided, mostly due to the researcher's desire to create an environment of open rapport with minimal demands on the part of the participants. The number of observations per classroom also varied, based on availability and scheduling conflicts, which may also weaken triangulation of the data.

Participant Profiles

The resulting sample of participants included teachers who teach grades K through 6 at School A; School A's Director; and School A's Founder. For the purposes of defining profiles, middle-aged is defined as age 40 and older, while young is defined as age 39 or younger. Following is a description of each participant. All participant names have been changed to respect confidentiality.

Beth

Beth is a middle-aged, white teacher who teaches one of the two K/1 step-level classes at the School A. She received her undergraduate and master's degrees in Human Development and Family Studies from University of Rhode Island with a concentration in Early Childhood Education. She has been teaching for 23 years, and joined the School A in 2004 after teaching pre-school and kindergarten. Prior to teaching, she worked with children and adolescents through an anti-bullying and

personal safe educational program.

Susan

Susan is a young, white teacher who teaches the sole 2nd step-level class at The School A. She received her undergraduate degree in Human Development and Family Studies from University of Rhode Island with an Early Childhood certification. She has been teaching for 9 years, and joined the School A in 2006. Prior to working at School A, she worked and volunteered as a staff member and teacher at a Mental Health Center, and also taught as a substitute in Rhode Island.

Sam

Sam is a young, white teacher who teaches one of the 3/4 looped classes at The School A. He received his undergraduate degree in Elementary Education from Wheelock College with a focus on math and science. He has been teaching for 9 years, and joined the School A in 2005.

Mel

Mel is a middle-aged, white teacher who teaches one of the 3/4 looped classes at The School A. She received her undergraduate degree in Elementary Education and Sociology from Stonehill College, and her graduate degree in School Counseling from the University of Hartford. She has been teaching for 15 years, and joined The School A in 2004. Prior to teaching at School A, she taught at an independent school in Massachusetts.

Tina

Tina is a young, white teacher who teaches one of the 5/6 looped classes at The School A. She received her undergraduate degree in Elementary Education and English from the University of Rhode Island. She has been teaching for 7 years, and joined The School A in 2006.

Mr. Brady

Mr. Brady is a middle-aged, white school director. He received his undergraduate degree from Amherst College, along with a graduate degree from Central Connecticut State College and a CAGS degree from Boston University. Mr. Brady joined The School A in 2006, after serving as a school director in New Hampshire and starting and working at a K-12 charter school in Delaware. He taught middle-school science in Connecticut and Massachusetts prior to becoming an administrator.

Rachel

Rachel is a middle-aged, white interior architect and founder of an online organization meant to "build bridges between people, the divine, and each other". She founded The School A, in collaboration with a group of parents, from 1999 to 2002. She received her undergraduate degrees in Fine Arts and Interior Architecture from the Rhode Island School of Design and her graduate degree in Divinity from Andover Newton Theological School. In addition to her current roles, she has served as a pastor and a college chaplain.

School A

School A was opened in 2002 as a charter school that utilizes a project-based curriculum. Integrated academic disciplines and an emphasis on social responsibility and environmental sustainability are at the core of the school's mission. The main building, situated on twenty acres of land, contains five classrooms (step-levels 2, 5/6, and 7/8) and administrative offices, and a second perpendicular building contains four classrooms (step-levels K/1 and 3/4). The school continues to expand and renovate its property for educational purposes. The school groups students into step-levels, similar to the concept of looping (students spend two grade levels with the same teacher or teacher(s) in a multiage setting). The step-levels at School A are grouped and named accordingly: Grades K and 1 Explorers; Grade 2 Adventurers; Grades 3 and 4 Discoverers; Grades 5 and 6 Investigators; Grades 7 and 8 Navigators.

CHAPTER 4

FINDINGS

Figure 1.1 Themes and Categories
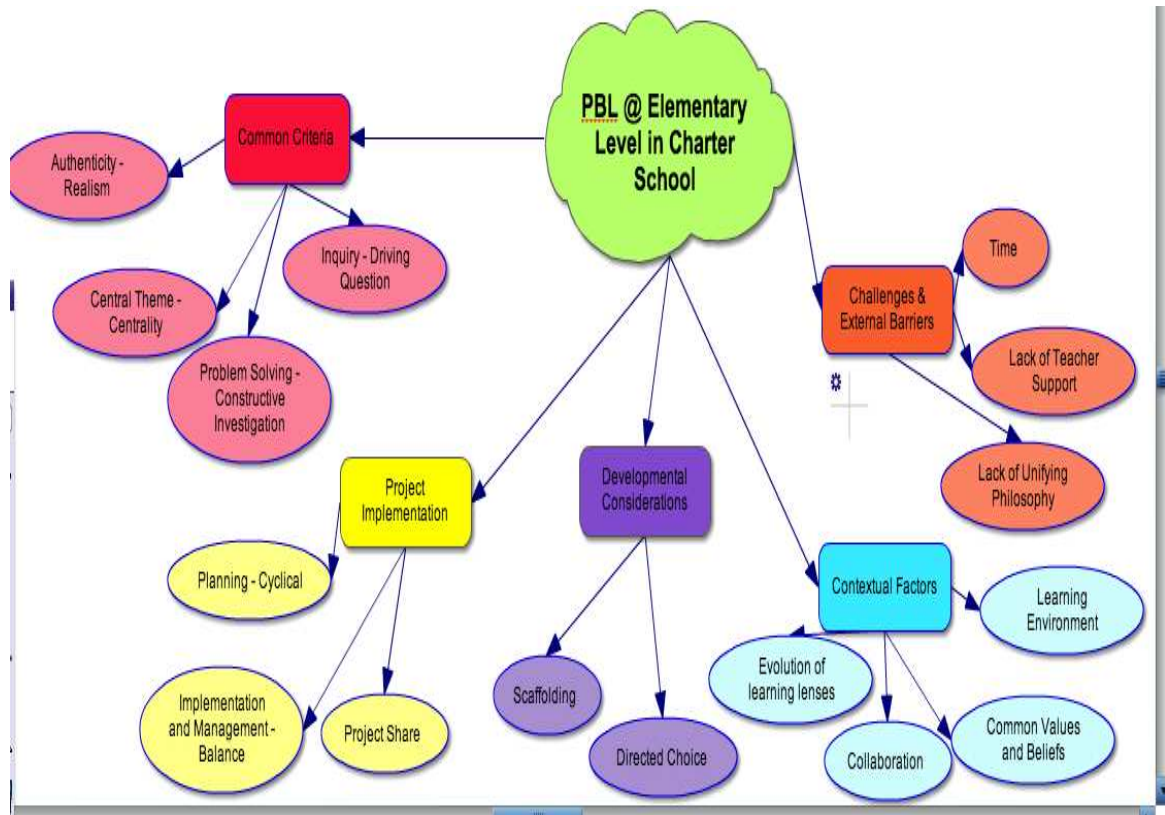
Question 1: Which of the common criteria, by which current PBL is defined, is identified at the School A?

Thomas (2000) defines the following five criteria as being present in a PBL curriculum: *Centrality*, where the project is the center of the curriculum; *Driving Question* and/or ill-defined problem; *Constructive Investigations* that utilize inquiry, knowledge building, and resolution; *Autonomy*, or a shift from teacher-directed to student-directed learning; and *Realism*, with a focus on authentic problems and questions

in which solutions have the potential to be implemented. The analysis of data collected from participant interviews, as well as observations, unearthed several components of the PBL approach at School A that could be categorized under the criteria identified by Thomas as essential.

Authenticity - Realism

"Authentic: Conforming to an original so as to reproduce essential features; worthy of acceptance or belief as conforming to or based on facts" (http://www.merriam-webster.com/).

The idea that project-based learning provides an authentic, real-world, and "more meaningful" learning experience for students and teachers is one that was voiced across participants. Its relevance became particularly evident when participants discussed addressing or interacting with current real-world issues and those directly related to students' lives. Tina, the 5/6 teacher, recalled a project that was created to directly appeal to an issue that was an integral part of her students' lives; an issue that the students, up until the project, had not had much of an opportunity to consider at a higher level of thinking.

> Tina: ...and it started off as, because at this age, kids are so funny about their food; they eat all day long, and they complain about the food that they're packed, and you know they end up wasting a lot…and they want to trade, but we can't share food and all this stuff, and you know they bring these little snack packs and that drives us crazy, so we wanted to get to this idea of having as little waste in our lunch as possible; and so the kids, for the first few days, we had them sorting their trash like okay, how much of what you eat is going into the trash, the compost, the recycling, are you not eating, so they could sort of see everyday… how much waste they were generating, and so we did that for a while and collected data, and then, I mean it was gross, we dumped the garbage (*Observer's Comment: Lauren laughs*) out in front of them, and they were like, you're kidding me right. (*Observer's Comment: Tina laughs*)

The students' reaction to the task is especially important - it sounds like it could be one of disgust or surprise. Both often stem from the unexpected, a characteristic of life outside the classroom. Because the project is so closely related to their every-day lives, it becomes a more authentic task, albeit a component that up until that point in time had remained unexamined by the students. Other teachers have had the experience of the unexpected learning opportunity or "teachable moment". Real life is often unpredictable and chaotic; relevant learning, focusing on performance and long-term retention, can also embody these qualities (Barneveld & Strobel, 2009; Grant & Tamim, 2013). Beth recounted an incident in her K/1 classroom that illustrates this point.

> Beth: ...I mean we have a filter to clean it because it's not a vernal pool it's an aquarium…but um so that's something that we do every time, but it turns out differently…sometimes, like one year we had, we didn't realize we had toads and frogs... and one year we had a very interesting little creature in there...and - with the tadpoles - and one of the children said something about, it was one child knew that it was a um dragonfly larvae, I didn't know that, I was like, "are you sure?", and so we came back after a weekend, and all the um tadpoles were gone, and all that was left was that little creature, and we looked it up...we looked it up, it was very sad for the children...I think there were like maybe five left, which ya know did develop and everything....but it was also a good lesson…about what happens in nature... ya know the this, and we looked it up on the Internet and they call the dragonfly larvae the sharks of the vernal pool cause they eat everything in sight…so, so it always turns out a little bit different.

Several participants referenced this authentic or "reality-based" learning experience when reflecting on and describing their views about project-based learning at School A. Sam and Mel, the 3/4 co-teachers, voiced this view several times, reflecting on the objectives of such an approach.

> Sam: …um we also, everything that we teach we kind of make it more of a larger picture mentality or how does it apply to you…and others around you, and I think that makes it more meaningful for the kids and that makes them more enthusiastic to do everything….I was gonna say almost like a reality-based

learning… Mel:…create, yeah, reality-based learning or ya know being able to sort of take out what's in your...and just to learn from it...and that could be from, it doesn't have to necessarily be a social change or environmental it could be just like learning how something is designed.

The acknowledgement of a reality-based learning process was often explicitly linked to students' environments, both in and outside of School A.

Mel: "And so, again tying into the social responsibility and having them having the kids sort of think outside of themselves and their own interests and combine their ideas and then think of the larger ya know picture"…(Sam: "…yeah I think...there's that and then also just not just the things you need to know but why you need to know it...and how it applies to you as you move forward, I think that especially with some of the certain projects makes it, like I said more meaningful…")

This connection to students' environments outside of the classroom aligns with Newman's exploration of authentic learning, which consist of three criteria: a) construction of knowledge; b) disciplined inquiry; and c) value beyond school (Newman, 1996). Newman (1996) expressed the view that authentic accomplishments build on prior knowledge accumulated in the field, and authentic achievements have aesthetic, utilitarian or personal value apart from documenting competence.

Central Theme – Centrality

Thomas (2000) defines centrality as the project being central to the curriculum. The projects that students complete are helped in their centrality through the use of themed frames or learning lenses i.e., social responsibility and environmental sustainability.

Learning Lenses

This notion of connections to the world "outside of themselves" (the students) is an idea not limited to the notion of authenticity. Such authentic connections overlap with the specific learning lenses through which School A shapes its entire image, those of social responsibility and environmental sustainability. The effects of these lenses are evident in some degree in almost every aspect of School A's functions, including its curriculum and project contexts; mission; physical structures; and in the voiced values of the teachers and staff at School A. Mel and Sam provided the following overview of an almost entire year's worth of connected content for social studies and science at the 3/4 step-level.

> Mel: …so, for example um this year we're talking about the age of exploration in social studies but at the same time we, before that we talked about oceans um and the ecosystems and sort of human impact on the oceans and natural resources, so at the beginning of the year they did natural resources and um oceans and then sailing and navigation and then um from there, and then they talked about natural resources in the ocean and what we turn those into...and then we also talked about how native Americans in their culture used natural resources to survive...and then that sort of led us into how the exploitation of natural resources and why there was a need to travel and explore and go across the ocean um which then went into food chains and how the food chains got disrupted...as a result of beaver fur trade and cutting down trees and so forth and then the age of exploration, and then their navigation, where we'll do space and then we'll go into, for social studies we'll do um the beaver fur trade and um sort of colonization, we'll go up to the revolutionary war this year and then also with that is ya know the basic species which sort of ya know high traffic from one place to another, so um we sort of develop a year that's kind of centered on a couple themes... like exploration and exploitation and natural resources and then kind of fit…our social studies and science in to it.

The themes of exploration and exploitation of natural resources, as examples of both social responsibility and environmental sustainability, provide a contextual window through which students learn and shape their views of world history and its connection to

the human decisions on the environment. Such authentic connections span grade levels.

 In K/1, Beth recounts such a connection that is in the present and physically contextual

i.e., the backyard of the school.

> Beth: …but we are interfering in nature and we realize that...ya know, that ya know a lot of these tadpoles are not gonna survive...in that pond...they're gonna be food for somebody...but um so we're interfering in that way, but it's minimal...interference…

These contextual learning lenses are very much a conscious consideration in the

development of authentic curriculum, as voiced by Tina in reference to the "No Waste

Lunch Project".

> Tina: Um, one project we did that we really enjoyed, we were trying to think about, it was the first project of the year...and we were trying to think about how to get the kids to connect a little bit more to our mission here, which is the environmental sustainability and social responsibility, and we decided to do this unit called No Waste Lunch…

Further cementing the relationship between the ideas of authentic curriculum is

the emphasis that students become active members of society and work to create change.

 The idea of activism was especially prevalent at the 3/4 step-level, as seen through the

narratives of Mel and Sam.

> Mel: ...next year's rotation is about sort of creating change um through sort of systems and um they do, they study government and so we do how government creates change and then we have how citizens can create change and so the kids uh, there's a process in which they sort of know how government does it, we do, we have a set of books about service learning and community service, they go to an art museum and look about how artists take sort of a social, environmental problem...and share it with the world and so forth…oh and then they write a persuasive letter to their, their senator or representative advocating for hunger, usually there's some sort of bill on the floor regarding it...so um and one of them was, there's like um there was a consolidation of um benefits on the floor, I forget what the proposal was (Sam: they were trying to cut SNAP last year) yeah, I mean

they, there um, the entitlements were gonna be combined, I don't even know if that totally went through, but SNAP would be totally devastated…and they do a community service project on their own…so they might so a lot of kids volunteered at a pet shelter, and so they go on the process, they do a home component that is a process on their own, where they go and they either volunteer or they raise money and then they document their process...of doing community service.

Students as active members of a society, working to make a change, appears to correlate with levels of high student engagement and an "authentic" commitment to learning (Blumenfeld, 1991; Baker & White, 2003; English et al., 2013). Mel, who previously worked at a montessori-style school, noted School A's themed approach provides an opportunity for higher levels of thinking.

Mel: I think that the big difference between this school and what I did previously is the sort of the connection to the community...and that um the higher level of thinking involved and the sort of, that environmental and social responsibility pieces to it that no matter what we do, like if it's invasive species it's sort of like they're always sort of analyzing their role and their choices...and how that impacts other people...

School A's approach to project curriculum is an integration of real-world issues that seeks to engage children and make a connection between their daily lives and that of a much broader world shaped by human history and present actions. Dewey (1916; 1938) proposed a project-based approach for science, one in which students solve problems; develop skills of thinking; problem solving; creativity; accessing information; questioning; making conclusions; and negotiation. The level of higher-order thinking that accompanies all of these skills seems to be more easily accessible through the integration of real and connected problems that affect humans on a global scale.

Inquiry - Driving Question

One of the most critical criteria that is consistently mentioned across the research is the importance of the driving question or inquiry to launch and sustain a project's momentum (Blumenfeld et al.,1991; Chard & Katz, 2000; Thomas, 2000; Akinoglu et al.,, 2008; Kuhn & Pease, 2010; Kuhn & Wirkala, 2011). Mr. Brady described the questioning process that is used at the beginning of the project, which sometimes involves students brainstorming questions about a particular topic.

> Mr. Brady: ...they list questions too, you know…what are your questions if you were asked to, at the end of the project, hopefully kids have answered these questions...so it's a way of organizing.

Mr. Brady also described witnessing students generate questions after returning from an experience, such as a field trip. Generating questions based on personal experience is important, because young children tend to still be in the "egocentric" stage, and allowing them to freely explore helps build connections between themselves and the world around them (Piaget, 1953). Beth gives an anecdotal example of what inquiry based on experience looks like in at the K/1 step level. The K/1 step-level studies the butterfly life cycle every year, a departure from the usual alternating content every other year, which is done within the Social Studies and Science curriculum at School A.

> Beth: ...it gives us an opportunity to talk about well ya know what does a butterfly need?...ya know what do you need?...would you be happy if you were in a little netted cage ya know without your family and you couldn't go anywhere and what do these butterflies wanna do, they want to go to Mexico.

Children are able to directly experience the cyclical phenomenon, which begins in the field behind the School A. The K/1 students learn about how to locate and find monarch cocoons, which are then brought back to the classroom for question-building

and observation. Tina more clearly articulated the driving question component. In the 5/6

step-level's exploration of consumption of energy, she describes the question that drove

the at-home and in-class projects.

> Tina:...and then the kids did two things, they had an at-home project and an in-class project, they looked at the classroom and said what are ways we can reduce l ike our sort of ecological footprint...how we consume energy, cause that's sort of what it all comes down to…

The process of teaching kids how to generate their own, higher-order questions is

a different type of inquiry, and one that Tina finds to be a challenging component of the

project process. Student questions are used as a formative assessment, as well as an entry

point in creating a "what we need to know" list, with the goal being to answer most or all

student inquiries by the time the project is concluded. One thing that was noticed by the

researcher amongst participants was the minimal reference to additional or new questions

being generated as a result of projects. The idea, however, that children continually

question and research through the project is inherent in interviews with the teacher

participants.

Problem Solving - Constructive Investigation

Critical explorations are experiences in teaching and learning that a teacher

utilizes in order to engage learners in subject matter that is real and may be physically

present in the classroom; the idea of "crucial explorations" is attributed to the early

childhood educator Eleanor Duckworth (Cavicchi et al., 2009, p.191). Critical

exploration has its roots in constructive investigation, which leads to students solving the

real-world problems that exist in their school, homes, and local community (Powell et al.,

2006). Tina reflects on her 5/6 students' investment in finding ways to help reduce energy waste in other places besides the classroom.

> Tina:...and at home, they came up with the plan of ways they could conserve energy, electricity, or create less waste at home...and it was so awesome, cause they did some, like, they looked into like laptops versus desktops and energy consumption and like made an argument for that, ya know the pencil sharpener plugged in, even though it's not being used, is it consuming energy...ya know they really looked at the minutiae of things…the parents like remember like, how come my daughter is making me line-dry my clothes in December instead of using the, the dryer? So to me it was just, ya know they really went deep into figuring out what their role is in conserving and uh it was just, it was awesome…

This type of involved problem-solving is not something solely done at the individual level, but also encouraged in collaborative groups. Sam reflects on how the problem-solving of social problems is an inherent part of the project process at School A.

> Sam: I would say the project um, there's like ya know especially for that one, what is the problem, and we talk about all the time how to solve problems, so they just know how to do it a lot on their own and then especially when we put them all together they do really wonderful things so, I would say just the social responsibility curriculum part of it...helps not only um, just I think that helps out a lot with the projects at this school, to be honest.

There is a recognition by the teachers that the theme of social responsibility integrated throughout the curriculum also provides a natural foundation on which to introduce and grow the cognitive skills involved in solving problems. Sam described this curriculum in more detail.

> Sam:...we have this ABCDE, so like what's the problem about, brainstorm a solution, choose one, is it safe, is it fair, will it work, do it, evaluate, and then friends again, so when we read these books like about City Green...we read a story and it says ya know, and the kids identify what is the community problem...what are the things that they try to do to solve the problem, what um solution did they choose, did it work, and so we actually when we read those books, we have those conversations, we sort of chart out...the ABCDE, all of that community problem within the book.

Teaching conflict resolution as part of the curriculum creates a related scaffold through which higher-order problem solving can be transferred and built upon throughout the project curriculum. In addition to learning how to identify problems and to form questions about their environment, students must have the collaborative skills needed to solve problems and construct solutions in a group, an approach supported at every step-level**.**

Question 2: What are the identified practices for implementing, planning and managing projects, and what are the major challenges present therein?

The Importance of Planning (A Cyclical Starting Point)

Teachers portrayed the planning process as the fulcrum upon which the project-based process rests. Without proactive planning, the project-based approach cannot be successful.

Structured in an Unstructured Way

In one respect, planning provides a structural support. When asked about the critical view that project-based learning is too open-ended and doesn't provide enough structure (Kirschner et al., 2006), Tina conveyed that planning is strongly correlated with structured guidance, an important component of the project process.

> Tina:...um, yeah I mean I think it's the most challenging part is maybe people that think that they're doing PBL, like, let that fall to the wayside...and see it as just this open-ended, kids doing whatever they want to be doing, but...no…"

Mr. Brady also voiced his perspective on clarifying the assumption that because projects are reality-based and influenced by student interests, projects are unstructured and left open to chance.

> Mr. Brady:…but the hope, I mean I think what you'll find is that the project learning is, that the misconception sometimes is that I think it's actually, it takes, it's very structured, but in an unstructured way...it almost takes more planning and I think on teachers to create a project-based approach as opposed to take a text book and teach a structured lesson.

Mel also reinforced this idea when she discussed the work of anticipating the problems that can arise from an approach in which there seems to be more potential opportunities for question and error.

Flexibility

However counterintuitive, it is precisely for their dynamic and often unpredictable nature that there is a need to thoroughly plan the project steps and process well before implementing the unit. Both Mel and Tina provided a similar perspective on this process.

> Mel:...you have to be incredibly organized and well planned out...and very often you will get into a project that you do for the first time and you will realize it's not like it's not as organized or as it could have been done differently and so it's um ya know do you decide in the midst of a project do you need to adjust and how can you adjust or do you just redo it for next time because you have to be, you have kids going off in different areas and getting kids to that pace at different ways and getting them what they need you have to be really really organized...and really well prepared, um and sometimes that's really hard to do when you're doing ya know everything else.

> Tina: I mean that's like my major focus when I'm approaching every lesson, and ends up being like I can never plan enough - you have to plan for it but, you have to plan for it but it changes moment to moment.

The idea that a project changes from moment to moment alludes to some sacrifice of control by teachers. The loosening of this control lends itself to a more flexible and ongoing planning process. This was a perspective voiced across step levels. At the K/1 level, Beth discussed how a planned project idea could change because none of the children show interest in the idea of doing a diorama, for example. She notes the importance of keeping flexible plans "so that the project really can emerge to be what this group of children wants it to be." This constant re-planning is emphasized multiples times by Tina, one of the 5/6 teachers, who states that one is planning throughout the whole project and changing or tweaking project components throughout the entire process.

While it's apparent that planning well in advance is a crucial aspect of the project process, the element of flexibility once the project is implemented is essential, much like building a tall building that is still able to give and bend according to changing weather elements.

The Big Picture

As noted earlier under the sub-topic *Learning Lenses*, School A curriculum is planned out in a themed fashion, with social studies and science serving as the primary subject foundation for project-based content. Mel discussed this approach in planning curriculum.

> Mel:...and then we develop, I guess you'd say I almost connect the theme…through the year and then we sort of map it out and web it out so they kind of intertwine, especially social studies and science.

Working backwards from an overarching theme or topic in planning curriculum was voiced by participants across step levels.

> Susan:...so they may be represented in different ways, or a variety of ways each year, but they may be different but it's still the over, same overarching theme or topic, still trying to - hit those focus points...the topic questions.

Susan mentions the focus points and topic question. A driving question is one of the essential, if not the most essential, criterion mentioned by Thomas (2000) in the criteria of the project approach. As previously noted in the topic of Inquiry, teachers did not highlight the idea of the driving question. This does not mean it's not in use, but that it did not arise in the data as the defining feature of the project-based approach at School A.

The planning of curriculum is collaborative and done whole-staff, while the specific project planning seems to mostly exist amongst individual or co-teachers at the same step-level. Tina voices the approach to planning the curriculum as a whole school.

> Tina:...so as a school, we came up with this K through eight continuum of what topics we'd be covering...the big ideas...that's really where we started is with the big ideas, and then with the big ideas we think about sort of like you know what they need to know previously and what they'll need to be introduced to and what sort of skills.

After identifying major objectives, teachers find ways to connect these across content. The content is connected within a step level. Mel speaks to having a content structure that embodies the standards and the knowledge that the teachers want them to have as learners move forward within a particular step-level. A similar concept is

voiced by Beth at the K/1 level, who gave another example of how the curriculum content transitions from one topic, or unit, to the next.

> Beth:...and um it sort of comes to fruition and, we talk about, ya know the things that we've learned and, this, so this, like the project words...um, luckily, I mean, I'm really glad that we do fairy tales and farms because they're so closely related...there's a lot of fairy tales that take place on a farm.

To maintain a focus on the big picture, the School A staff uses the elements of backwards design and actively searches for opportunities to connect content across subjects for a more holistic learning experience.

Changing/Range of Resources

The availability and collection or gathering of resources - texts, experiences, and people - is just one element of the planning process, but an imperative one in terms of preparedness and planning for projects. This becomes a more complex process when one considers the depth of content and the nature of "changing resources" within School A's curriculum. Tina and Beth discussed how project resources are gathered, and then often changed, according to availability and the students' interests.

> Tina:…I mean the resources are what we gather throughout the years...and the support is what we can find in the community...so it, and that changes every year...so it's not like this, like I go to this little kit that's ready for me…every year; um, ya know we'll buy some books and have them, but um - and because you're trying to make it relevant, you know those, you want not just books, you want people…and places and things, and those change throughout the years.

> Beth:...and the other reason that we want to do that, not just because of the children that ya know and they're interests, but also because we seem to come up with new...resources...every year, like oh this is an excellent book...or this would be a great field trip...or ya know you just find things, and um, so, things change a little bit because of that...but it's all in the planning.

In-flux resources also present an ongoing challenge in the planning process, an idea expressed across step-levels. Susan commented on the absence of a school library. She noted that while she is fortunate to have her classroom library, there seems a constant need for more resources, and that "you're always bound to collect one less book than you need". Tina provides an additional perspective, remarking on her tendency to be "a little bit of a control freak, so I try to gather them all, cause when the kids come in and "I did this, and I, and I couldn't get this and I couldn't get that", it's like a whole day wasted if they don't come in with the materials they need".

The absence of a school-wide library requires that teachers take initiative to find their own resources on an ongoing basis. Additionally, there was no classroom observed in the K/1 through the 5/6 levels that had computers or other technological resources available to more than two students at a time. During observations, there were no computers or other technological devices observed in the K/1 and two rooms. Two laptops were observed in the 3/4 classrooms, and a desktop computer and two laptops were observed in the 5/6 classroom. While it's possible that resources are brought in as needed or shared across grade levels, this point was not mentioned. A follow-up inquiry would further reveal evidence of the value placed on the use of technology as a resource, as well as availability of funds and sources for such tools at School A.

In the absence of one-to-one instant-access technology, gathering resources can also present a challenge in the context of time needed to source the diverse skill level of materials needed; this is magnified due to the structure of the looped grades, or multiage step-levels, at School A.

Sam**:** …and I would agree that with one of the biggest ones, like you said, the reading abilities for a multiage class that's one of the tougher things, because you just - it's not hard to do, but it's just that's an extra thing that you end up spending more time on is gathering resources that applies to everybody."

In a study that examined the perspectives of teachers and students utilizing an inquiry-based approach in science, accessing informative resources was reported by students as one of the most problematic aspects in a project (Akinoglu et al., 2008, p. 210). Similarly, this aspect also seems to pose an ongoing challenge for students and teachers at School A.

Implementation and Management (Finding a Balance)

Though some proponents of the project-based approach, including the Buck Institute for Education (2014), would argue for no front-loading or pre-teaching of content associated with the project, School A's staff has come to slightly different conclusions based on their own experiences. Mr. Brady was the first to draw the distinction between the learning of basic skills prior to or distinctly separate from the project, citing that the project is part of the curriculum but not the entirety of the day.

The need for "pre-teaching" both content and skills seems to be a sentiment shared most strongly amongst the upper grade teachers, as expressed by Sam and Tina.

Sam: You have to really do the content and the skills first altogether, because you can't just start a unit and say we're, go pick a topic and do a project, cause what ends up happening is that they move on, there's no common knowledge that comes out of here to the next grade level.

Tina: I mean at this school we, we do a lot of pre-teaching...ya know we're not just saying go research...you're seeing actually the first real in-depth research report that they're giving.

Sam's and Tina's perspectives seem to echo the idea that projects can't be left too open-ended or unstructured; however, leading modern proponents of the project-based approach, including The Buck Institute for Education, believe that planning and structuring a project and teaching the necessary content throughout the project process is the ideal approach. This may be an "easier" design at the secondary level, where most basic skills - reading, writing, research, etc. - have been mastered and instead are being extended to more advanced concepts. Finding a balance is dependent on teachers' skills and experience, as well as on meeting student needs in terms of the learning of the basic skills necessary to complete a project.

Teacher Experts

The most commonly voiced challenge, and acknowledged necessity, was the teacher as an expert of the content. While the need to be an expert is important at all step levels, the depth of study and concepts typically becomes more detailed and abstract as children advance through the elementary years. This increasing depth and need to be informed is reflected in the data, as the notion of being a teacher expert was discussed primarily by the upper-grade teachers.

> Tina:...you have to know your curriculum, you have to go beyond knowing your curriculum, you have to become an expert in things you would have never imagined you would have to be an expert on…

Teacher expertise in a content area is an essential criterion before implementation, during which the mode of didactic teaching transitions into more of a facilitative role

Mr. Brady:...well it's a different way to teach, I mean obviously the teacher facilitates more than, it's not just direct teaching, it's not out of a text book, um, so the teacher, as I said, does - the kids all get the ya know certain knowledge, but after that it's more the teacher is a facilitator and having a wide knowledge of the topic so that they can facilitate them, and not...always be in front of the class being the instructor.

Mel gave additional perspective on why being an expert is so important in the role of a facilitator, remarking that "if you don't go into a project really knowing your content, it's really hard to support the kids into doing something...that's meaningful." The idea of "meaningful" learning is associated with an authentic curriculum, and is connected to School A's overarching learner objectives; this is addressed under the upcoming sub-topic *Learning Objectives*.

Differentiation

Expertise is not limited to knowledge of content. A teacher's commitment to becoming an expert in the knowledge of his or her students learning needs also emerged as an imperative component of the management process. Bruner (1996) describes four models of mind - imitative learners; didactic teaching/learning; thinkers; and knowledgeable teaching/learning. He offers a multi-dimensional spectrum for viewing the four models of teaching and learning, with the y-axis represented as the intersubjective-objectivist spectrum and the x-axis as the internalist-externalist spectrum.

Figure 1.2 Bruner's Spectrum
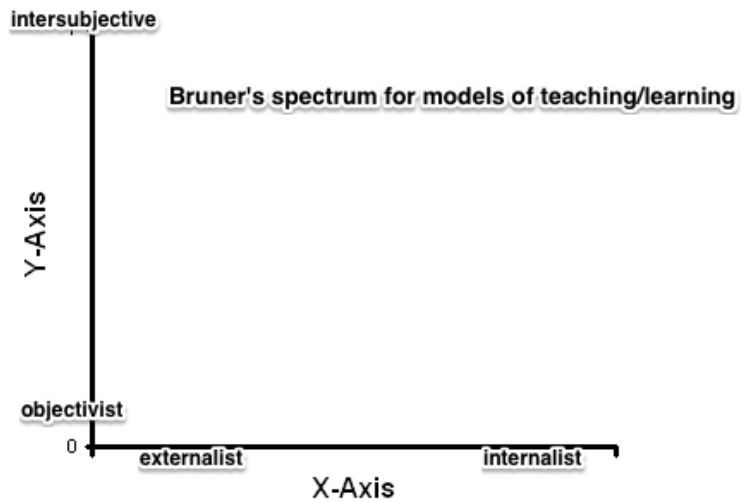
Put simply, objectivist theorists view their subject – the child – from an outsider's perspective, similar to an entomologist staying a colony of ants, while an intersubjectvist applies the same theories to themselves as they do to their subjects. Internalist theories focus on what the child can do, or think he/she can do, while externalist theories emphasize what adults can do for children from outside; both theories lend to the creation of how learning should take place.

Internalist theories are often intersubjective in nature. Modern pedagogy has been increasingly moving toward this area of the spectrum i.e., the idea that the child should be aware of his/her own though processes, and that the role of the teacher is to help children become increasingly metacognitive (pp. 63-64). Bruner, however, emphasizes that "real schooling" is never confined to one model of teaching. Teachers must have a deep understanding of content, as well as of students' learning styles and needs, in order to gauge which model of teaching is best used for a

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particular topic or lesson and set of students. Susan provided a simple metaphor for this cycle of assessment and delivery of instruction.

> Susan:...ya know there's no two snowflakes are alike, just like children no two students are alike, so - because no two children are alike, ya know you're continually having to change things or fit to ya know to meet their needs as learners um - and be able to adapt your teaching styles."

The importance of providing varying levels of scaffolding in terms of clarifying goals and expectations, facilitating, and providing guidance has been voiced by K-12 teachers using the project-based method in one form or another (Tamim & Grant, 2013, p.89). Tina discusses how these levels change according to student needs.

> Tina:...uh you know, this round, I've had to be super - I have to scaffold every thing for this group of learners, whereas last year I had to really, you know this group of students had been at School A for a while, they had sort of gotten the whole gist of how it works, with this one it's just like I feel like I'm reinventing the wheel a bit so...sometimes project-based learning can feel really open-ended and sometimes you have to, give them more skills first.

> This ability to be an expert in learners' styles and needs and to differentiate

accordingly seems in some ways to be helped by the multiage approach and the small size of School A, as indicated by Tina.

> Tina:...and that's why I think it works better with the multiage approach, and we're a small community cause you know that kid really well...so I can go around and support that learner as best as I can moment to moment.

At School A, the increased time spent together by teachers and students appears to increase the comfort level and better inform teachers in what is needed to meet individual student's needs, potentially increasing students' success in learning specified content and skills.

Facilitating the Learning Process

Teacher expertise and use of differentiation both inform the teacher's role as facilitator, which is evident across step levels from the beginning of the project process. The role of a coach and guide serves as a catalyst in peaking students' initial interest and in prompting student-generated ideas about a posed project or problem. Beth discussed ways that she initially launches a project to encourage students to think about a subject from differing perspectives, based on her knowledge of the content and of young children's learning needs.

> Beth: The first thing that - well, it can be different, um sometimes it would be that, um, I would read a book that would peak their interest…or several books...like at the fairy tales, ya know I start off reading *Goldilocks and the Three Bears*...and then I read *Somebody and the Three Blairs*...and then I read ya know another…ya know *Into the Forest* or whatever, so I read like a few versions and that gets them thinking, because they know a lot of fairy tales, ya know, there's more than one way.

In the intermediate grades, Sam and Mel discussed the first meetings in which the entire class meets in order to brainstorm solutions. The teachers' role as coach, guiding students' thought processes and encouraging creative compromise, is evident in their discussion of the process. Keeping the meeting open and not immediately limiting students' ideas is a key facet of the process.

> Sam: So we do, like Mel was saying the first original meeting is really open, I mean we know that we can squash any ideas that we know are not possible but I mean...they realize that some things aren't, so we had a, I mean we had a list of maybe like 12, 13 possible things...(Mel: yeah)...and then the next meeting we narrowed it down and out of all of them we tried to, cause we do want their opinion and their open ideas in there, so we combined a lot of them.

The teacher continues this role as facilitator as he or she helps students build

the skills needed to construct an end product. Susan speaks to providing "open-ended" direction as students begin their research project at the 2nd step level.

> Susan:...and then there's certain things that on the graphic organizer um I may, I wrote those particular pieces because I wanted them to look for that information...to kind of direct them...but I also leave it open-ended in that um interesting facts that they find beyond what I have...

At the younger step levels, both Beth spoke about the facilitative process of encouraging and prompting multiple ideas for the project representation, which is a relatively new concept for younger learners. Susan also voiced the idea of helping students to discover how to showcase their learning, so as to avoid them getting "too far off the beaten path."

Teachers using PBL in the classroom have cited the element of support and facilitation in the process as a definitive element of this type of learning (Tanim & Grant, 2013, pp.81-83). In his description of authentic learning, Newmann (1996) states "teachers must become a coach, mentor or facilitator in a "cognitive apprenticeship". Teachers need to be aware of prior knowledge; emphasize opportunities for higher-order thinking; and offer many opportunities for students to use varied forms of expression in order to process information (p.7).

Philosopher David Hawkins (2002) proposed a model of this type of learning, where teacher, learner, and subject matter make up a triangular relationship of continual interaction and shared trust. Practitioners of critical exploration (e.g., Duckworth) find Hawkins' analysis relevant to their efforts to create classrooms in which learners actively extend what they notice, do, and come to know. Using a

triangular form to describe these educational relationships, Hawkins used the pronouns "I," "Thou," and "It" (http://www.hawkinscenters.org/i-thou-and-it.html).

Figure 1.3 Hawkins' I, Thou, and It
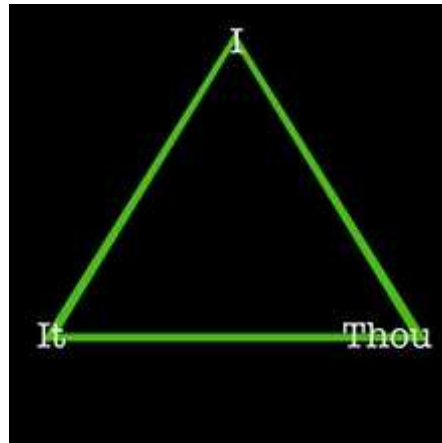
Hawkins associated the personal pronouns "I" and "Thou" with teacher and learner (in either order). The "It," the subject matter, can be known in various ways and depths, of which the learner is mostly unaware. While the teacher knows "It" more fully, in this triangular relationship, the teacher is not there to pass that knowledge to the student. Instead, the teacher seeks to bring about a relationship between the learner and the "It," by which the learner develops both in understanding "It," and in capacity to carry on in relationship with it after the teacher's participation with that learner ends (Cavicchi et al., 2009, p.198). Hawkins' ideas seem to align with Newmann's description of a cognitive apprenticeship, a relationship that is evident in the participants' descriptions of their roles in the classroom.

Integrated Content

Though the structure and application may differ, the integration of subject content is an element of the project-based process that is shared across step levels. While the core curriculum for the projects remains social studies and science, teachers routinely look for ways to access various subject content and skills in order to deliver project content. At the K/1 level, this integration of content is leveraged through various learning structures of the classroom, including the morning meeting; read-aloud time; and centers.

> Beth:...and then as we, to go forward with the project, we just integrate pieces of it throughout the day...so, like I said we might read a poem...at a planning meeting, we might sing a song a morning meeting or at an afternoon meeting, we might um - I mean math is really hard, but we do sometimes include math, it's just very difficult...because it's so specific...and they're, ya know we're, we've got to take them from one skill to the next in math...so...math is hard to integrate...but sometimes it's um, it's in there a little bit...but um; but through the rest of the day when we have center times...maybe gonna be one, two of the centers are going to relate to the project...um, when we're reading, we're reading books to them...at read-alouds...and then some of the books that we have, the leveled readers...um we have a lot of those but there are some that relate to the...to the topic...that we're discussing, and, ya know, they it kind of gains momentum and we do more and more.

There may be less integration in the earlier grades, due to the necessity to teach foundational skills more directly. In the intermediate and upper-grades, integration is more clearly seen to yield learning products, across subjects, which cohesively tie back into the project topic or problem.

> Mel:…it actually incorporates all subject areas cause they do a lot of math with this cause there's money involved, there's data collection, they actually they have to read large numbers...we're working on place value at the same time…

> Sam: And then our class did a math representation, cause we were selling those bracelets that ya know like the live strong ones...and we had different colors available, so we made bar graphs based on what colors people ordered and then how much money each class made and we made a bar graph out of it and

things like that so um, we did and then we also from there they actually helped us tally all the orders cause the orders went home with parents and we worked on ya know community building and working together but also tally marks and data collection...and things like that.

At the 5/6 step-level, Tina discusses the process of planning for integrating project work into the various content areas.

> Tina:...so then we just start planning our activities in all the different subject areas, so we're thinking about what kind of math activities can they be engaged in to learn more information, what kind of ya know reading activities in books and literatures can we have out for them to learn from.

Content integration is not limited to subject matter primarily taught by the classroom teachers; collaboration with the art teacher was also evident. Susan discusses the insect models that her students made with the help of School A's art teacher.

> Susan:...and then from there they went on to talk about their interesting facts...on a separate piece of paper so that's where um often times it depends on what they decided... to look at um, from there um, or simultaneously I should say they were building their insect, some out of the sculpting...some of out of the papier mache as I said, um and that was nice because that can ya know incorporated um art lessons...as well…um because Mr. Mac is big a big advocate on um ya know including all of those aspects…and always wants to be involved, um so he started the process, we used some class time on that as well.

The project-based process provides a structure and frame through which teachers can brainstorm different ways to integrate subject matter, simultaneously offering opportunities to form relationships with other specialist teachers.

Expanded Classroom

Another common theme across steps levels is learning experiences that take place beyond the classroom walls. This starts in the field behind the School A, which is home to a vernal pool as well as a breeding ground for monarch butterflies. At the K/1 step level, Beth describes one way in which her students access this environment.

> Beth:…there's a vernal pool...in the back of the school...so we go over there and collect them (tadpoles), and we put them in an aquarium and um, and then um, when we're, when they become froglets...we take them back to the vernal pool...and release them."

All of the step levels participate in field trips, specifically aligned with that grade level's project topic. The trip can serve as an entry event to promote student interest and engagement, as Beth describes in relation to the K/1 unit on farms and fairy tales. Other times, the trips serve as a way to deepen and reinforce a topic that has already been introduced in the classroom. Susan describes the 2nd step level's field trip to Breakheart Brooke in Arcadia Park.

> Susan:…um we had learned prior to going about um insects...um about rivers um, parts of the river, we went, explored the children were up to their waists in water (*Observer's comment: Susan and Lauren laugh*) forget about the rain boots they went beyond that, um collecting specimens um and macro invertebrates, then they come back um we took a ton of pictures um to document everything.

The information gained can then be brought back into the classroom and incorporated into further research efforts, strengthening students' comprehension of content. Another purpose for field trips is as a bridge to experts in the field. In connection to the No Waste Lunch project, Tina describes the 5/6 field trip to the local landfill.

Tina:...and sometimes it goes a little bigger, and we have to go bigger, so then we'll start thinking about...field trips, experiences that they can have outside in the community...and they they, we went to the Johnston landfill, which is called the Resource Recovery Center and you know that was our way of getting out into the field and talking to some experts.

Experiences outside the classroom provide an avenue for the integration of students' independent projects. The independent component also appears to increase through the upper grades, and only in 3/4 did teachers begin to discuss an at-home component connected to the curriculum. In recalling the 3/4 step-level group project in which the combined classes raised money for solving hunger in Rhode Island, Mr. Brady gives an example of an independent project performed by a 3/4 step-level student.

Mr. Brady:...and I know like one of the kids, ya know who likes to draw, did actually did some drawings and held an art sale at her house, they raised money and distributed it to the community, so the kids did it, a number of individual projects that were also community.

During the interview with Mel and Sam, one of the 3/4 Teacher Assistants (TA), and also the art teacher at School A, became involved in the conversation about the hunger project. He had gone to get an example of a project product that one of the groups had created (a cereal-box titled "Hunger-O's" and designed to inform about the issue of hunger in Rhode Island). He appeared engaged as he listened to our discussion, and he enthusiastically recounted the individual project component.

TA:…but the at-home projects were all different, like they picked, one kid worked at an animal shelter, and they all picked an individual thing...(Mel: yeah that was important to them).

Newmann (1996) describes connections to the world beyond the classroom, and gaining a deep knowledge, as an essential part of authentic pedagogy (pp.10-11).

While the expanded classroom provides a real-world connection, this is also one of the elements that can serve as a challenge to teachers in the elementary level, as Mr. Brady noted, "…it's hard, it's hard to get out in the community, especially with this age kids, that's the problem."

The Project Share

Objectives

The project share is the culminating learning opportunity. Mr. Brady provided an explicit description: "...and then at the end they all do some sort of a share, we call it a project share but um ya know they often do it for their parents who come in during the day or the evening to - and the kids share what they learned."

The project share, not unlike the remainder of the project components, is an essential element of the learning process. Students are expected to share their learning results and reflections with an audience. During my participant check with Mr. Brady, I reiterated this point based on our conversation.

> Lauren: I think the idea there is that these individual students have a choice and then they get to really share it um with an audience, whether that be their parents or ya know some other portion of the community (Mr. Brady: right, they're just good public speakers in the end).

Becoming an effective public speaker is just one voiced objective of the project share. A related objective is a voiced understanding of what was learned by the student. Mr. Brady describes how this expectation has evolved since he came to School A.

> Mr. Brady:..um but I think there were times when I first came that they, I think some of the projects were, kids did a project but they didn't ya know, I

remember somebody built a copy of Fort Knox, I think that they were studying at the time...um but didn't know why they, they just built it because they liked it…but they didn't, there was no, what was the learning that behind it...ya know so I think we had those kind of discussions...ya know, yes you're doing a project, but the project should reflect what you've learned...and you should be able to, when I come up and ask you about your project, you should be able to explain, to explain it...or to talk about it, ya know, and I'm not sure that was true at the start.

The share serves as an official reversal of roles - the students become the teachers, the guides, the experts. This development of expertise and personal responsibility for one's own learning is the ultimate objective of the project share; however, it also presents an opportunity to actively learn from peers.

Mel: No, I think that the, um, the biggest thing that I've learned over the years is that um ya know doing projects is great and exciting and meaningful and relevant for children um but if you don't do our share, if you don't share the projects in a meaningful way that allows the kids to teach each other...you're missing a huge opportunity, so for example like tomorrow, like they became an expert in one explorer...but they want them to be knowledgeable about all six, so they're gonna be taking notes during the other kids' presentations and they're gonna ask questions and so forth so they can walk away with that knowledge.

The students' teaching "each other" is an objective that is mentioned by Mel as the "ideal" in shaping the learning culture at School A. Though the students take the lead, Mel and Sam describe the collective experience of the share itself, as well as the events that led up to and created the culminating experience in the 3/4 Hunger Awareness project share.

Mel:...but it's, yeah it's great, and like last year we did it the kids had on display, our class projects, their personal community service projects, their art projects, and they sang "We are the World"…this is last year, and we raised like over $6,000.00 collectively and we had um a third of the class volunteer, which is amazing because most people won't even take seven, eight and nine year olds.

The project share fosters meaningful learning through the development of three

important aspects: student responsibility for and ownership of learning; emotional investment in independent projects; and an end purpose, which is to share what has been learned with an audience.

The Eco Fair

In the prior sub-section Expanded Classroom, Mr. Brady recognized the challenge of getting out into the community with elementary-age children. One way that the School A has addressed this issue is through the creation of the annual Eco Fair, which takes place in May and is held at School A. The entire public community is invited to attend the event, during which the various step levels share their spring project work. Additionally, local vendors and organizations are often invited to provide services that keep with the school's central themes.

As noted on The School A's website, all members of the school collaborate and each step-level directs a different component of the environmentally themed fair. The Explorers (K/1) usually run a hands-on arts and crafts event. The school sells a variety of young vegetable plants and herbs grown in its greenhouse, as well as plants donated by the local community, an event usually run by the Navigators (7/8). A raffle is held for prize baskets, often donated by local businesses, with proceeds funding the school and its initiatives, an event usually led by the Discoverers (3/4). A bake sale is held to raise donations for the school's various initiatives, a project usually led by the Investigators (5/6). The Adventurers (2nd) usually run The School A Grill, which sells hot food and also raises donations for the school.

Though participants were not asked about the Eco Fair, I attended the fair held in May 2013. Each year, the school year usually receives local press coverage. They also keep the public informed through the school's public Facebook page. The Eco Fair serves as a way to bring the community to School A, to publicize its work and to garner support for its educational efforts.

Question 3: How does the PBL process change according to learners' developmental level?

Scaffolding

The consideration of the varying developmental levels in the elementary environment was an area of key interest when beginning my research. From an elementary educator's perspective, it seemed apparent that there would undoubtedly be components of the process that need to be deconstructed, then pieced back together and implemented in developmentally-appropriate ways before the project process can be accessible to children of elementary age. This idea was clearly evident in participants' responses, and the range of scaffolds needed across step levels was also communicated.

The cause for this high level of scaffolding in the project process is linked to cognitive development and the level of independent skill, or zone of proximal development, an idea that can be attributed to the work of the Russian psychologist Lev Vygotsky (1962). Vygotsky's theory of the presence and significance of the zones was even more evident at School A in its early years, as the school was

originally founded with step-levels that spanned the equivalent of three grades (i.e., K to 2, 3 to 5, and 6 to 8). Through experience, the participants voiced the School A staff's realization that the addition of a third step-level greatly affected the ease of delivering content, an issue independent of the project approach. Mel and Sam elaborated upon this realization.

> Sam:…which makes it hard because really when you're talking Kindergarten to 4 it's almost preschool to fifth or sixth grade...and you're talking about reading levels and stuff like and even though it's the year range, it can definitely much larger with the skills that they have ya know...so um having um sixth graders with eighth graders ya know having K with second graders, it was just too much of a developmental range…to really meet those students.

The level of scaffolding for basic skills is a clear component of the teaching day for the younger step levels, as voiced by Beth and Susan.

> Beth:...and it's tiring for young children to write...ya know because they have to think about so many things, ya know what is the letter form, where, where, what do I do with it, where does it go on the page, so the thought...the idea that they have, just goes away while they're trying to...do everything correctly...so, yeah...so scribing is good for them.

> Susan:...um again ya know maybe some of the younger grades more so, especially with this being just second grade...um ya know we'll help them through the writing process and incorporate other things that they're learning in terms of writing...or grammar and spelling and such of that nature.

While the scaffolding of basic skills in reading and writing is a greater consideration in the early childhood and intermediate elementary years, when children are just developing these skills, there are other developmental considerations that become apparent in the later elementary years. At the 5/6 step-level, Tina communicated a different type of consideration, related to integration of the project approach with subject content.

> Tina:...and to um - so we're integr - into our morning messages, into our morning work; it's not all day long, especially at our grade level, we did it

really really heavy, like you could see it in everything we did and the kids were like, okay we're over this, like your... it's too much...ya know so they're very aware at this age so you have to either do it subtle or make it fun.

To keep the content accessible and engaging, teachers across step-levels scaffold project content and structure according to the needs of their students' developmental levels.

Directed Choice

William Heard Kilpatrick, a former professor at Teachers College, gave life to the idea of student choice in the first quarter of the 20th century. He believed that a project being born from a child's own interests are critical to its having purpose. Kilpatrick saw this as the most valuable by-product of project-based learning. He stressed the critical importance of allowing children to choose (or plan) their own projects. In an imaginary exchange, he illustrated why he thought this was crucial: "Question: Don't you think that the teacher should often supply the plan? Take a boy planting corn, for example; think of the waste of land and fertilizer and effort. Science has worked out better plans than a boy can make...Kilpatrick: It depends on what you seek. If you wish corn, give the boy a plan. But if you wish boy rather than corn, that is, if you wish to educate the boy to think and plan for himself, then let him make his own plan" (Wolk, 1994, pp.42-45).

Though the element of choice exists at School A, the level of student "choice" in an elementary-based project appears to have an inverse relationship. The younger the child, the more content directions available but the less choice the child has over project representation. The opposite appears to be true with older children and the

upper elementary levels, which has a more directed content direction but more choice

of project representation.

Figure 1.4 Age group and project control
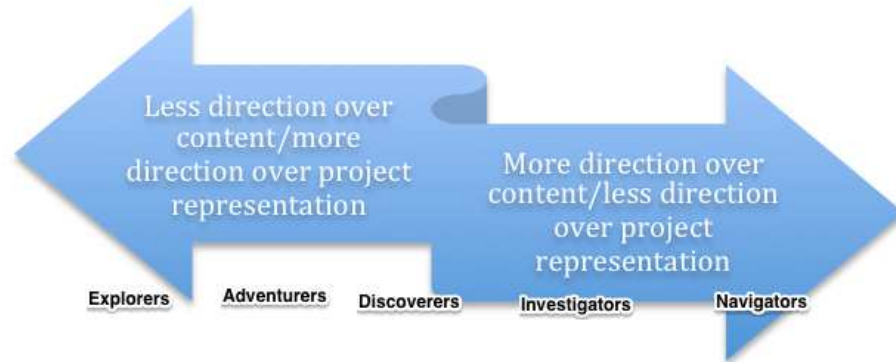
The first of these two views, applying to the younger grades, is voiced by both

Beth and Susan.

> Beth:...one of the differences is that when they get older, they're given more
> choices um about how they're going to present...the knowledge that they gather
> through the project…um so project shares are different, um, when, because
> they come in without having done any projects...you can't say to them well do
> you wanna do a poster, or a book or, they don't have any idea what you're
> talking about...so we try to touch on all of those things.

> Susan:...this particular project, especially at this grade, um and then being the
> first project of the year…they, it tends to be more um, ya know...(Lauren:
> structured)...structured, yes that's the word.

Clearly, there is a certain level of familiarity with, and level of experience,

with the project-based process that contributes to more teacher control over choice in

project representation. Mr. Brady expresses a similar view, in which children go from

more open-ended in terms of exploration of content to more directed in topic, as they

get older. Rachel, the founder of School A, further solidifies this philosophy, although

not explicitly suggesting that older grades (7/8) are limited in content choice.

> Rachel:...so at a very young age, kids literally explore, it's directed exploring…but the freedom to really just scratch the surface is there, then investigators dig a little more deeply…and then navigators chart their own course.

This transition from more open-ended content and less control over

representation, to more choice of representation and a narrowed (but deeper) topic

exploration seems to occur at the 3/4 step-level. Mel and Sam described the choice

that is given to students when deciding how to represent their learning.

> Mel:...and if you want kids to come away with ya know, yeah it's all really great if you want ya know kids to ya know study what they want to study, but then you can't possibly handle 19 different project topics...mentally; yeah, but particularly the project (*Observer's comment: staff interruption*) particularly the project representation and what they actually choose to do to show their learning...will definitely depend on the kids... and what they're and what works...and what they're interested in.

> There is a spectrum of choice at each step level, depending on the project and

its objectives. Beginning at the 3/4 step-level, teachers described an independent, at-

home project component, in which students have more choice over a topic of interest.

> Mel:...and then what happens is, so we decide the community problem, and then they get to go and they spend about a month at home and they decide a community problem that's important to them...and they do a community service project on their own...so they might, so a lot of kids volunteered at a pet shelter, and so they go on the process, they do a home component that is a process on their own, where they go and they either volunteer or they raise money and then they document their process...of doing community service.

Along with more open-ended exploration of content, both younger and older

students' understanding of the main objectives of a topic often requires teacher

scaffolding. Susan notes that with the younger groups, the scaffolding helps to ensure

that students understood the main points or learning objectives. Tina also speaks on this point, illuminating the idea of a "fine balance between what's the teacher learning, what's the learning you know you (the students) have to have...and where do we allow the flexibility and freedom of them exploring it more."

Ultimately, there appears to be some level of shared choice, in both content exploration and project representation, between students and teachers. While all of the teachers interviewed do provide structure for project content and direction, the students' interests often dictate the ultimate direction of a project. The act of teachers shifting project-outcome directions based on student interests is applicable across step levels, but was particularly evident in the early childhood years. Susan expresses this idea in reference to the study of living organisms completed in 2nd grade, specifically investigating the lives of crayfish.

> Susan:…but again there's certain points that you, that you want them to learn...then they went over the life cycle, they learned about complete and incomplete metamorphosis... which is something that I hadn't intended on doing which was the difference between complete and incomplete it's not a standard or something but it, that's where the project-based learning is always evolving because we happened to come across some information when a child was studying their um insect or crustacean I guess um being a crayfish, but again there's certain points that you, that you want them to learn...then they went over the life cycle, they learned about complete and incomplete metamorphosis...which is something that I hadn't intended on doing which was the difference between complete and incomplete it's not a standard or something but it, that's where the project-based learning is always evolving because we happened to come across some information when a child was studying their um insect or crustacean.

Beth voices a similar review in regards to the project direction taken as a whole group.

> Beth: Then they start to be interested and um - and the other part about the way we do projects is it's a little bit emergent...as it goes along because no two

projects ever turn out the same...ya know, one group of children is, well almost all children are interested in doing um plays...drama...presentation, but ya know one group might be more interested in writing a book, and another group might be more interested in making a diorama...or something...so it doesn't it's not always the same thing.

The idea of a "negotiated project approach" with younger children was evident in a case study done by Mitchell (2008) in a first-grade classroom. The teacher used the project-based approach only in her classroom. Regardless, the teacher was successful in using the Negotiated Project Approach by integrating the standards into the children's interests, rather than vice versa. This unexpected finding is unique to project-based research, given that previous studies have tended to find that teachers plan project content that will meet the standards before taking account of student interests (Chard & Katz, 2000). This finding suggests an approach for integrating a higher level of authenticity in the curriculum (p.345). Teachers at School A appear to do some of both -using backward design to plan projects according to standards, but allowing for opportunities to match student interests with standards as the project evolves.

Question 4: What are the contextual factors that underlie the PBL model at an institution-wide level - specifically, a public charter school grades K-8?

Evolution of Learning Lenses

The School A was founded based on the principles of social responsibility and environmental sustainability. While this reality has been realized and maintained,

Rachel's original vision of the general functions and operations of the school

environment were different from the current environment.

> Rachel: Oh my gosh, as I originally envisioned it, I had everything down to exactly how the physical environment was gonna be shaped, ya know, in my original charter, if you read it, it says that each of the steps will be housed in a separate building, each building will have alternative energy sources that are different from the other, so that, and then each, and I mean I had a whole funding structure built around this, um and, and each day it's, your classroom is your lab - is part of your education, it's part of your laboratory so kids would be actually studying different forms of alternative energy and the different ways that they interact with both the building and the environment and then they'll have opportunities to study all of them, cause they'll go through all the steps.

Regardless of changes to the original idea, the elements of social responsibility

and environmental sustainability weave through School A' physical and pedagogical

structures. At the entrance, one can walk to the left and just behind the main building

to observe the school garden; walk a bit closer, and one will also see a greenhouse and

chicken coop. These structures are utilized by the students and staff throughout the

year, interwoven into the curriculum and producing food that is harvested by the

students and eaten in an annual feast. Plants are grown in the greenhouse and sold to

the community at the annual Eco Fair in May. When I attended the Eco Fair in May

2012, I bought two tomato plants and two hot pepper plants - both flourished in my

backyard that summer.

While these structural elements are a model representation of School A's

values, the principles of both social responsibility and environmental sustainability

shape the direction and the content of the curriculum within (and outside) of school

walls. As discussed above in response to Question 1, Central Theme, these two

learning lenses are often both integrated into one project or unit. Tina explicitly refers to these two ideas when describing the No Waste Lunch project.

> Tina: Um, one project we did that we really enjoyed, we were trying to think about, it was the first project of the year...and we were trying to think about how to get the kids to connect a little bit more to our mission here, which is the environmental sustainability and social responsibility, and we decided to do this unit called No Waste Lunch.

The lenses provide an element of local-directedness to the curriculum. They shape the culture and in turn the learning, and both are clearly expressed in the school's mission. Because School A is a charter school, in which prospective students are entered into a lottery, families are made aware of these lenses before children attend the school. In his review of the existing literature on charter schools, Welch (2011) notes that Merseth and colleagues (2009) found that several successful charter schools were marked by an emphasis on mission and culture, and clear communication of this point to prospective teachers and parents.

Community Focus

Strike (2008) suggests that one might define community as something that people share in common - shared values, identity, shared goals, etc. In education, Strike (2008) argues that such a community has 4 components - 1. Shared notion of basic non-instrumental goods e.g. worth of core values (in catholic education as opposed to Catholicism, for example); 2. Shared notions must be expressed through cooperative activities that realize aims; 3. Shared language, amongst all members (i.e., staff, students, parents, etc.) to justify, understand, describe and argue shared practices; and 4. Shared activities that allow people to succeed together. In simplified

language, Strike (2008) notes that such "shared educational projects are cooperative learning writ large" (pp.179-180). It would seem that a naturally inherent part of social responsibility would be community focus and a strong sense of cooperation.

Whatever the cause, there an evident emphasis on community at School A, an idea that harkens back to the founders' vision of the values that School A embodies. Mel and Sam spoke on this point.

> Mel:...and so those are kind of just I think the community, the culture of the school um makes it work to a larger degree and then yeah what our school is about um and about connecting with the greater community in a meaningful way, and I know, like one of the founders talked about the fact that like, he almost wished he didn't call it project-based learning or whatever in the charter cause he ya know anyone can do a poster on anything...it's more about like that involvement in the community.

Clearly, there has been some retrospective reflection on the definition of the curriculum approach; the image of community involvement is almost as, if not more, pertinent than the idea of project-based learning, though there exists a symbiotic relationship between the two. The involvement with the community takes place on multiple levels, from the operation of the school to the participation in project shares. Rachel and I spoke about the idea of levels of community and how that operational involvement is realized at School A.

> Lauren: And so, that's interesting because that was something that um, that sort of that connection with the, with the outside comm - like the greater community (Rachel: right) outside of ya know (Rachel: right) because I think that there's different levels to the different types of (Rachel: yes, they're) how you would define community (Rachel: Yeah and that's intended, it's intended, that's why we have community representatives on our council.)

Community representatives provide a particular perspective and connection to the greater community seems to be an important point. School A is a small school and

community, and keeping these sorts of connections active provides a necessary avenue for resources, ideas, and a sense of identity. Parents and other community members are both offered three seats (for a total of six out of the nine members) on the School Committee. Strike (2008) contends that small schools have a unique opportunity to be democratic, and that there are good reasons why, in education, we should seek to locate significant decision making in the local school community. One reason is that local democratic deliberation is community building (p.185). Welch (2011) also notes that charters may be more democratic since they can be more directly responsive to immediate, local needs and demands, even if those demands are for conventional schooling and success on conventional measures like standardized tests (p.62).

In addition to operational perspective, there is an emphasis on engaging with and serving the community through projects, which Mel cites as the primary objective of the project-based learning model. When asked about memorable projects, Mr. Brady referenced the 3/4 step-level's Hunger Awareness project. Though he couldn't remember the exact details, he highlighted the involvement of community. When I asked Mel and Sam about the project during the interview, they were able to provide more focus.

> Sam:...and we focus on hunger and the kids decide okay, so this is the community problem of hunger, what can we do to solve it and they ya know come up with some sort of solution to that problem…

At the close of the participant checks, I presented a quote by Jerome Bruner (1996) to each participant - "Education is a complex pursuit of fitting a culture to the needs of its members and of fitting its members and their ways of knowing to the needs of the culture" (p.43). I did not give participants any other information or

prompting, just asked them to respond in whatever way they wanted. After thinking

for a few seconds, Mel provided a perspective on involvement with the greater

community.

Mel: "...and it's just when I see the word culture too I also just think of not only just our small classroom community, but the school community and ya know the local, we try to do as much as we can for Rhode Island and then also the just world wide culture, so and it does, I like how it does have the phrase complex because it definitely is not a very easy thing to do."

As the involvement with community is not new to School A, and has been

integrated into past projects retrospective reflection by the School A community

allows a refined focus on important aspects of consideration when working with a

particular sect of the community. Mel and Sam discussed their insights and such a

reflection the second time that they launched the Hunger Awareness project.

> Mel:…well I know they did it at home the last time though, but again it just expanded and we also knew like we knew um, we did, we timed it a little bit different, the timing, I think we had done it kind of during the holiday season…the previous time which was ya know in some ways there's so many community service projects in your face at that time of year…but it's also a really stressful time…so we decided, I think we decided, did we do it in January? Sam: I think we did it after the Mel: yeah like we did it after...which from a hunger point I think um usually like January and February...(Sam: they're the worst, yeah)...are considered like the desert months because people...like   they   give   sort   of   November   and   December...

Based on their experience, Mel and Sam completed a type of needs analysis in order to more effectively support a community need. This timing not only better benefitted the community, but because there was not a plethora of community service projects taking place after Christmas, the timing of the project implementation also made it easier for the younger students to find avenues through which to participate and serve in the community.

As part of the School A community, parents are also often involved with the project process. Mr. Brady spoke about parents as assisting and volunteering in projects and being the primary audience for project shares. The idea of local community members and parents engaging with the curriculum and offering their services and expertise was also voiced by Susan.

> Susan:...um so also it's nice to always incorporate the outside community as well so if there's a parent that's an expert in something we try to do that as often as possible...the outside community, um for example the eco fair we had - Henry Meyer from the Kingston water district came and had a discussion on water conservation which was our topic at that time...um so he would come um, we had another parent, well from another level, I should say, so not just the outside community but School A community.

There is a distinction made between the greater community and the School A community, by both Mr. Brady and Susan. There is a clear recognition of the role that both "types" of community play at School A. The small size of the school seems to be conducive to more close involvement with the School A community, which encompasses staff, students, parents, and council members, when it comes to daily and ongoing interactions. Strike (2008) argues that what should be focused upon in schools is creating community, not necessarily an emphasis on decreasing school size; the reason for this is to combat student alienation and disengagement (pp.170 and

176).

An emphasis on building community includes involving parents as part of the school community through multiple avenues. For example, Susan references the sharing of ideas in the construction of her classroom environment, specifically her choice of creating a website as a means of maintaining communication with the parent community.

> Susan: I always had it in my head...when I first started teaching that I wanted to have a classroom website. So a couple years ago I had mentioned that to a parent volunteer and she said oh I do for one for my son's lacrosse team...and I know that some you have to pay for um and I didn't know much about the website piece and um how technical it could or would be so, she introduced me to Shutterfly...and um, for some reason this is taking (*Observer's comment: Lauren laughs in reference to how long the website is taking to load*), and I love taking pictures that's a hobby...so I tend to snap photos of everything...um, and um, ya know so that parents can see...the pictures and feel like they're here...if they're not able to volunteer.

In addition to values; operational involvement; engagement through projects; and involvement in the school, an emphasis on students' role in the community is apparent as a fifth parameter. Reflection on students' place and role in the greater community - on a local and more global, interconnected level - is encouraged at School A.   This becomes a more formalized "assessment" when students graduate from School A. When asked about a memorable project, Rachel chose to instead speak about the connection that is emphasized between students and the greater community during graduation, a ceremony that she is still involved with annually.

> Rachel: Oh my gosh, um that's a really tough one mostly because the projects that I was involved in were so long ago, that I don't know if I could tell you exactly what crystallized in that; what I can share with you is our graduation because I do that every year, and every year I'm blown away; um so I wrote the graduation ceremony quote on quote, um a long time ago when we did our first graduation and, and there are elements in it that are always present so um we

try to have somebody come and speak to students from a position, not a position of authority but from a position of um sending you of sending out into a broader community.

This connection between the student and the greater community is further realized through the collaborative learning discussed in the following section.

Collaboration

Vision

Collaboration appears to yield a productive vision amongst staff at School A. That vision grew from the foundation laid down by the founders. Rachel presents the founders' own driving question at the start of the process.

> Rachel:...after it was accepted by the state, we went into the next stage of development, and that's when we called together the founders so there's, there founders that eventually worked together well, what does project-based learning mean?

This example of collaborative, purposeful vision provided a common starting place, an idea that has not been lost over the years. In my participant check with Mr. Brady, I read aloud his comments from the pastiche created from the content of his interview.

> Lauren: (As dictated by Mr. Brady) They're willing to spend the time cause they think it's a good way to teach. I think that was the teachers said yes they needed some training, that's why we had her (Sylvia Chard) in. We didn't fully buy into everything she said. She provided a logical approach and then teachers went out and actually did a project on their own. People have to be willing to see that it's, believe in that it's worth it enough to put in the time to do it. Spent a lot of time just as a staff talking about what it is, and ya know we did that the other day. I think everybody needs some, you need to be exposed - you need some sort of - I think it was helpful to have Sylvia Chard in, have somebody come in and do the training with you. I think I've got people who are willing to be open-minded.

To continue to find common starting places, or common ground, once an institution has already been set in motion is a necessary precursor to fostering collaborative vision. This vision in turn results in recognition of the need to progress in a direction fueled by established vision and actionable decisions. One might label this vision a philosophy. Mr. Brady echoes this idea in his comparison of charter schools to more traditional public schools.

> Mr. Brady:...I think, that's the thing about charters that's a little different, I think because you start with a philosophy...and the hard part of charters is keeping the philosophy, it's easy to start something because everyone's all excited...um, but at least you have a philosophy on paper and it says, if you're gonna work here yes your, this is what you're expected to do, and regular schools people are hired individually, and it's not really based on a philosophy…

Whether or not the reader agrees with Mr. Brady's comparison, his recognition of the importance of a set of beliefs and goals that unites and propels individuals forward as a group is a key is an imperative characteristic of a successful leader. A study of charters found that leadership provided by administrators and governing councils was critical to schools' success; this was consistent regardless of sample size (Fox, 2002, p.5; Malloy et al., 2003, p.235).

A related facet that supports whole-staff "buy-in" is the relatively equal level of idea-generating and decision-making autonomy granted to each staff member. Aikin (1942) argued that the most innovative schools in the Eight Year Study took two important steps: they took stock of local community wants and needs, and they involved their whole staffs in collaborative discussions around the school models. Successful schools in the age of accountability are characterized by "collaborative work and discussion among the school's professionals" (Welch, 2011, p.62). Rachel

clearly articulates this parameter as part of her original vision in regards to curriculum decisions.

> Rachel:...the original idea was that each teacher might have a favorite project that would be taught throughout the year but then everybody would have that curriculum to teach that project and just work it to their students, and what ended up happening was we deviated a little more from that than we thought, because teachers wanted to do, so as long as that was teacher- and administrator-driven, then that's fine.

Rachel emphasizes that the original vision evolving was "fine", because it rested on the collaborative visions and actions of the entire staff - teachers and administrator. Yet the willingness to abide by a particular vision, even amongst all members of an organization, is not enough to grow an organization or sustain its mission. Time is an element that must be invested. Mr. Brady echoes this idea in his thoughts on what makes an approach successful within an institution. Tina also references the idea of time spent together as a staff when she, as a side note, discussed her formal training in the project-based learning approach.

Unified vision; an investment of time; and reflective engagement with colleagues appear to create a supportive working environment at School A. This commitment to collaborate with colleagues and make collective decisions based on an agreed-upon vision is an important element in Senge's (1999) discipline of Team Learning. Beth gives a parallel view on why School A continues to be successful in its mission.

> Beth:...yeah, um, yeah I think that's the basic - it's the environment the, the um - attitude ya know that the school, that everybody seems to have…we're all, we're all good teachers, and what you need to teach, we can talk about what we're teaching with one another...and if something's missing, ya know we can figure that out but basically the idea that we're all supportive of each other doing their projects and um, and that we have the freedom to, to um, create those projects.

This is a similar idea expressed in Malloy et al. (2003) amongst charter schools teachers, who often used the word expert to describe fellow teachers. Teachers highlighted a culture of commitment and motivation among colleagues: "You can't help but work to your highest potential at all times" (p.233). In a review of the literature, teachers also chose to work in charter schools because they sought like-mind colleagues who shared their vision of teaching and learning (Yongmei, 2012). The idea of teacher autonomy is also embodied in Beth's statement about the "freedom to create" the project curriculum. Though usually taking place at the step level in terms of specific project collaboration, School A's staff always comes together to create the annual Eco Fair.

Learning

The collaboration at "the top" trickles down to the learning in the classroom. Collaborative learning is a natural effect of the problem-based project that is often utilized in a project-based learning approach. I use the word collaborative rather than cooperative purposefully. Though both terms have similar connotations in learning, there are some differences that can be drawn. Rockwood (1995) characterizes the primary difference as being one between knowledge and power. In communicating foundational knowledge, in which the teacher is still center of authority in the class, cooperative learning is likely to be the method used; this same method is also often used for teaching group roles and teamwork skills. Collaborative learning is closer in definition to the social constructionist view that knowledge is a social construct. Collaborative learning can still take place in small groups, but may have fewer

defined   roles   and   involve   more   open-ended,   complex   tasks

These types of interactions function both at the teacher-student level, as well as at the student-student level. Again, this comes back to purposive design that at least had its origins in the founder's vision. Rachel describes the type of reciprocal learning relationship that she envisioned for the teachers at School A.

> Rachel: It was really important when I interviewed teachers, that they understood themselves as learners that they saw themselves as learners in the classroom, that they thought they could learn from kids as much as kids were learning from them – if it was a top-down approach, it wasn't going to work, it really had to be a collaborative environment.

Within the student body, this type of learning is purposefully taught and encouraged. Sam communicates that skills in collaborative learning are necessary in order for a group-based project to be successful. The elements of compromise and creativity are also evident in the approach used in the 3/4 step-level. Sam describes the process of accommodating multiple project ideas for the Hunger Awareness project.

> Sam:…we wanted to do a food drive...slash get food from the Johnny Cake or donate food and then also do a fundraiser so we're like, well let's just do it all together in one night, so everyone got to have their idea fulfilled but not, within a reasonable way.

Aside from success via group discussions that lead to producing a product in a group, another stated value is children as collaborators with and teachers of each other. This emphasis on collaboration in the curriculum becomes particularly visible when students graduate from the 7/8 step-level. In a culminating act, students are asked to create and present, as a group, a "gift" to the community; the community could be

School A or the greater community outside of School A. Rachel describes this idea, giving examples of projects by past groups of students.

> Rachel:...and then last but (not) least, because they're Navigators, we ask them to give a gift, either to the community, meaning the School A community or the community-at-large meaning the world and it's a group effort, they have to decide what it is that they wanna give and they figure out what to do ya know how they're gonna do it; so the first year they come up here and they went to the steel yard and they built a weather vane for the school and it was intended to go on top of the building I think it sits in, it's either on top of the building now or it still sits in the garden…and it's all about what School A is so if you look at all the elements of it they really did an amazing sculpture, and then the second year they put in the garden ya know, and then the third year…so it tends to be (Lauren: so they're really building) they're building the school, and um and they're always present, and if you heard them share what their thoughts are behind their class gift, we call it a class gift, um they are thinking about how do we weave and stay, ya know how do we weave a presence, something that we can come back to, something we can see, something we can watch and grow, ya know it's really taking the values of School A and putting it in action and it's sort of their first - I don't wanna say their first foray, because they've been Navigators, but in terms of giving and contributing and completely leaving something on their own, it's a pretty big um endeavor.

The culture of collaborative learning, embraced by teachers and students, is evident not only in the words, but in the physical structure of the school itself. The school is continually shaped and built by teachers, students, parents and other community members. The Navigator's class gift especially serves as an authentic assessment of students' abilities to draw on project skills developed in previous step levels, to come together and create a product that leaves a lasting presence and impact on the school community.

Common Values and Beliefs

In a review of the charter school literature, Malloy et al. (2003) found that teachers were drawn to charter schools because they perceived increased freedom,

flexibility, and empowerment. Teachers also sought out charter schools because of their desire to work in schools that shared a similar educational philosophy to their own. In the case study research, teachers emphasized that the school mission was the glue: "Our mission unifies us. We're all on the same team." (p.234).

Through analysis of the data, patterns emerged that revealed the importance of unifying values and beliefs that shape and move the School A community towards short- and long-term goals. These values and beliefs include the previously mentioned central themes of social responsibility and environmental sustainability. As Mel elaborated upon multiple times, these central themes are the foundations that drive the project process, as opposed to the other way around.

> Mel:…I mean I, ya know what was true in project-based is kind of, people's opinion I think...but for us, the project process was ya know had to fit with the mission of the school...which is different then probably projects anywhere else or in a lot of places so it had to fit that social responsibility and environmental sustainability...which involves being with the community and thinking on a higher level…so from, it always comes back to like consumer choices that you make, ya know and why are you making those ya know it just comes back to sort of that greater goal of the school.

The concept of unification is not an easy facet in sustaining an organization, but having a clear mission and goals allows members to continually return to these concepts and reflect upon their decisions and actions. This idea is inherent in Senge's *Shared Vision* discipline (1999). Mr. Brady also spoke about the importance of a school having an embedded philosophy.

> Mr. Brady:...so um how do you, so it's a whole culture thing, not just what it is, but within the thing, how do you get a school all on the same philosophy...ya know you can get individual teachers...that happens all the time...in a school, but you, that's how I said the difference here is it's the whole school it's embedded in the school...rather than this teacher here, this teacher here…

This philosophy is not an idea that was put down on paper and then handled as an abstraction. Rather, this is an idea that is discussed in context, on a regular basis, by members who have a stake in the operation and success of School A.

> Rachel:...well basically the question that we (school council) asked last night, ya know what makes School A School A, if we took School A and put it in the middle of an urban environment could it exist if we took School A and put it in the middle of another country could it exist if ya know what I mean so those were questions that we asked ourselves just to say, to get to the sort of nut of the meat of what makes School A School A um and we definitely decided that those three tenants (social responsibility; environmental sustainability; and community) make School A School A, and then we decided the culture make School A School A and the values make School A School A and that we could be School A just about anywhere if we were true to those things that we, ya know, the parameters that needed to be in place.

Reflection

Reflection on professional practice and the learning approach is clearly evident at School A, though participants did not directly speak it on as a subject. Recognition of explicit mental models by individuals is an important indicator of an organization that promotes ongoing learning and improvement in its processes (Senge, 1999). An intricate part of exploring mental models is an individual's reflection on how his/her values and ideas affect his/her behaviors and decisions within an organization. Rachel was the only participant to specifically mention the idea of reflection. In later data analysis, her verification of reflection as an intricate component of the School A culture became increasingly relevant.

> Rachel:...so I think that the thing that I'm always blown away by is the School A is the reflectivity that's invited and encouraged and supported...if you reflect, reflection is a huge part of School A I don't know if you got that but to look back and to look at what we did and how it, ya know what happened ya know the learning can be right there um even if on the outside someone would say, oh my god that was such a failure ya know, if you don't, if you don't accept the consequent failure, it's not failure it's learning.

This appreciation of "failure" as an opportunity for learning seems to be a necessary catalyst for the successful growth of School A. Rachel spoke on this further during the course of our interview.

> Rachel:...and I think that's another thing that School A does, it really fosters risk um and doesn't penalize ya know you don't, we don't see - I don't believe in failure doesn't believe in failure everything is a learning experience and a learning opportunity and even if it doesn't look like a success when it's finished.

As the founder, Rachel's attitude for encouraging the taking of risks without fear of retribution seems to have laid a strong foundation for authentic investment by staff in implementing and experimenting with a learning approach that is outside of the mainstream of more traditional public schools. The teachers across grade levels showed evidence of reflective practice many times throughout the interviews, though the focus of that reflection varied. This drive to interpret and improve practice is parallel to Senge's *Personal Mastery* discipline (1999). For example, Tina reflected often on the need to differentiate her teaching.

> Tina:...but my views of how I've changed is it's a lot of work (*Observer's comment: Tina laughs*)...ya know before I knew about it, ya know everybody does projects, but to do the true project approach it's a lot of work, you really have to know your learners...and, um, ya know I'm realizing all of the things I have to do differently and that I assume they know and that they really don't.

In another instance, Tina reflected on her implementation of the project approach.

> Tina:...ya know I think a challenging part is just sort of when you sit back and reflecting, I'm always wondering is this - you're always is this, am I truly doing PBL, is this what it's supposed to look, is this right for this group of learners…is this the best way that I've put together for them to learn; and I do think it is, because when you have the kids and they're older, they will always think back and reflect and remember a project that they chose themselves.

Though not directly referencing the project approach, both Beth and Susan reflected on their own experiences and practice as educators, though through different lenses. Beth reflected on best practices and pinpointing weaknesses in the teaching craft through guided reflection. She was also not hesitant to admit her bias towards teaching English language arts over math, and the challenge she finds therein in incorporating math into project work.

> Beth: Yeah - including math, so um, and maybe that's just because, ya know math isn't my thin*g*...ya know I'm much more into literacy and what happens ya know I think that happens a lot with elementary teachers...ya know...some of them are really into math and some of them aren't…so it might be easier for someone else but for me it's definitely a challenge…

On a different note, Susan reflected on how past experiences strengthen her present experience as a teacher.

> Susan:...but it's also nice because I don't regret having those experiences (*Observer's Comment: behavioral development center*)...because it's also enabled me to work with those children who might have some of those...difficulties here at this school...um and given me more confidence to deal with some of those things...because they're not anywhere near the population that I was working with before, however, ya know, in your experiences you develop and ya know gain...more skills and strategies.

In addition to reflection on individual practice, some teachers - and Mr. Brady - made reference to reflection from a whole-school perspective. Mr. Brady mentioned a staff meeting in which teachers reflected on best ways to individualize the project approach, an ongoing conversation. Tina and Sam also reflected on the effectiveness of the project approach.

> Tina: Yeah, and I was actually wondering what we'd be talking about because, even at the end of the year I'm like, what's she gonna ask me? I'm like, I'm still right now wondering if the way I'm doing PBL the best and right way...always, so I'm always changing it...but ya know, hopefully they always, they'll walk away with, I would think education in general is a very frustrating process,

because you're trying for this year, and for me its two years so that feels a little better...**.**and you're always wondering...are they getting anything out of this, is anything connecting and making meaning for them, and ya know you cross their path 4 years later and they tell you some little snippet, and you're like, they are like...part of this community.

Sam reflected on School A's approach to teaching content and skills prior to

launching the project.

Sam:...like I said even in here when we talked about it, it was literally like the day before we had just talked about how um we're getting better at doing it where it's more of the content first and then you get to go off and explore on your own um, and then now of course we have the newer standards coming in…so it's sort of we have to redo this all again, so um fine tuning and getting better is going to be another concept for the next couple of years as well.

Mel and Tina also reflected on the assessment piece of the project approach

and described it as one of the greatest areas for improvement as a whole school. Mel

discusses the performance assessment piece, and holding learners responsible for their

own, and other's, learning.

Mel:...so I think um, I think it's um project-based work is really um very exciting, it's relevant, it's fun um but there's that other component (assessment) that I think sometimes gets missed...um and we didn't do it as well, and I was, it took me a really long time to figure out how to do that well, because there's so much in the project share environment, there's so much balls and energy like bouncing off the walls…(*Observer's comment: Sam and Lauren laugh*) (Sam: yeah)...like to get them to actually concentrate on each other is very hard, so um it takes times to sort of figure out how to do that well.

Tina also reflected on the formative assessment process, which is also brought

up as a particular challenge further in the analysis.

Tina:...and um ya know it's probably the one area where we have to work on the most because we have all these rubrics for writing...and reading...**.**and math, but a lot of it is checklists, like doing, like just being able to follow a process...of creating a project, and then um a lot of it is a reflection from them as a learner…and a lot of it's just like anecdotal information, for us...we haven't gotten, but we are working as a school on becoming, on having more formative

assessments, but um, a lot of it is just based on observation and...and their reflections.

Tina notes that the students' reflections are used as a form of assessment. This is an important overlapping idea, one that shows that reflection is highly valued by teachers as a student-learning objective as well. Mel elaborated upon this idea, and described the development of a new idea for a summative reflective assessment that would help teachers and the community to gauge the longer-term learning, in regards to students developing individual ideas and opinions within the frame of the school's central themes.

> Mel:...and we just did this thing, we've been talking about, I don't, do your know on NPR they do this *This I Believe*?...and there's a kid portion of that, and one of the teachers, who's been very much like, you've gotta get these Navigators to do a *This I Believe*, and during a faculty meeting it came up that, we - it's very hard to say okay well how are we doing social responsibility and environmental sustainability, like how can we kind of document that we're doing that and the kids are moving forward, and one of the ideas we brainstormed is doing something like that, where they take the knowledge that um they're gaining through content areas, and then they're going to be forming opinions and beliefs about that and that, so we tried, we did our first attempt at it, but we had very little time to do it, where they would say okay this is what you leaned as a discoverer, what is one value or belief you have, and they wrote a *This I Believe*...so I think, um, at some, I wanted some more time but it was a very quick and dirty thing at the end of the year. We had talked about what if people could do that, as they left each step they did a *This I Believe*, from their experience at that step and then that would be a culmination at the end...but again that was like that 's very much in the brainstorm process...

This idea reflects the summative and reflective assessment that Rachel described as being part of the graduation ceremony at School A.

> Rachel:...and then we ask students to um share a written, usually it's written, reflection of their time at School A; and um the idea behind that, it wasn't originally a reflection of their time at School A, it was originally a reflection of their - and it may actually still be written as a reflection of, of what they've learned and what they are taking out with them out into the world."

Reflection by teachers and students is supported and encouraged at School A. This value fosters the voicing of new ideas, both at the individual and group level, in turn yielding organic change through personal and community growth, as defined by the students and teachers.

Student Investment

There is an evident belief amongst staff that project-based learning provides the opportunity for deeper student investment in the learning process. An investment implies that an individual has a valuable stake in the outcome of a situation. In a review of the literature that investigates teachers' perspectives of the inquiry-based approach, it is reasonable to think that students who have a greater investment in their learning value the outcome - deeper knowledge; mastery of a skill; increased self awareness; increased self confidence; etc. – and are willing to put forth the time and effort to realize a much deeper understanding of the content area (Akinoglu et al., 2008; Mitchell, 2008; Rust, 2005; Grant & Tamim, 2013).

Participants voiced several elements of the project approach that promote this sense of investment in one's learning, the most widely voiced being student voice and choice in the topic of study or the direction of the project. Tina and Susan both mentioned the fact that students get to choose an area of interest, within the context of a unit, for more in-depth study. Mr. Brady spoke on a "level of learning" that grows out of being able to take a self-directed approach. Mel expanded on the individual project component of community service that is emphasized at the 3/4 step-level.

> Mel:...so they decide what they're gonna do and then they have to decide okay um and then they decide what they're gonna, how they're gonna show it, so for

example do they make, did they show their learning through a poster or a scrapbook...I'm trying to think, I think my group made a scrapbook last year...and then what happens is, so we decide the community problem, and then they get to go and they spend about a month at home and they decide a community problem that's important to them…they do a community service project on their own...so they might, so a lot of kids volunteered at a pet shelter, and so they go on the process, they do a home component that is a process on their own, where they go and they either volunteer or they raise money and then they document their process...of doing community service.

The element of choice and self-directedness promotes ownership over learning, a sense of intrinsic self-motivation, an idea supported both by Kilpatrick (1925) and Dewey (1916; 1938). Both Susan and Rachel described the value in such ownership as "responsibility over learning" that leads to self-motivation.

Susan paints a poignant image, through word choice, of what choice and student-direction can look like in a primary elementary classroom. She recounts her class' experience after returning from the field trip to Breakheart Brooke.

> Susan:...whether it is that caddis fly or their crayfish and how cool it was and, ya know they want to show me the picture that they Sam or um ya know tell me all of the things that they learned in their small group...and um it kind of sets that focus for them, a small obsession (*Observer's comment: Lauren and Susan laugh*) kind of if you will, ya know everything's like do you have more information about this?

The phrase "small obsession" was one that jumped off the page and conveyed a sense of excitement and attachment to learning. Susan used the phrase more than once in the same interview.

> Susan:...they went, they explored, they came back, we discussed our experiences, they did some journaling...um they um, naturally just kind of ended up be - having a slight… but a slight obsession on whatever something that they really connected with there... whether they found a lot of this particular insect or they, they're the ones that found it at this place…they have this attachment um and then they came back and ya know started stu - ya know there, where I said you could choose one that you like.

During the participant check, Susan seemed to want to change her choice of words, though the message remained consistent.

> Lauren:…and it is actually when I chunked it together, it's still chronological...(Susan: mmhmm)...there's a whole rhyme and a reason to the design of the extraction, but yeah I was basically trying to group together similar ideas; so if there's one that you disagree with...(Susan: yeah, the obsession, the obsession)... a slight obsession…(Susan: yeah, meaning, that wasn't, I don't like that word choice) (*Observer's comment: Lauren laughs*) yeah, you used that twice, I thought it was really interesting kind of (Susan: Yeah I wonder how much coffee I had that morning…(*Observer's comment: Lauren laughs*)…(Susan: yeah a topic of choice or interest area, could we - change that to? Because I think obsession is a little bit like over) right, well no, I can definitely make that note, but I thought it was interesting because I think it - ya know obviously you're seeing how excited that they get over particular topics, their idea; but I think that's maybe what you were trying to convey (Susan: right; and I believe that one was an early morning conversation with you.) (*Observer's comment: Susan laughs*)

This sense of excitement resulting from hands-on experience is also referenced by Beth. She reflects on the experience of the K/1 students in finding monarch caterpillars behind the school in a field, bringing those caterpillars into the classroom to observe and discussing the changes that take place.

> Beth:...ya know, and they it's exciting to them...ya know one group has already seen this, the other half of the class hasn't already seen this, they find the caterpillars themselves... they bring them in, oh can we, ya know so it's an exciting thing.

At the older step levels, Tina also gives evidence of intrinsically-motivated student engagement in learning through a display of students' commitment to, and their thorough investigations of, a project unit that encouraged students to find ways to conserve energy at home and at school.

> Tina:...and at home, they came up with the plan of ways they could conserve energy, electricity, or create less waste at home...and it was so awesome, cause they did some, like, they looked into like laptops versus desktops and energy consumption and like made an argument for that, ya know the pencil sharpener

plugged in, even though it's not being used, is it consuming energy...ya know they really looked at the minutiae of things."

Tina further validates a student's investment through an anecdotal memory of a parent conversation.

> Tina:...the parents like remember like, how come my daughter is making me line-dry my clothes in December instead of using the, the dryer? So to me it was just, ya know they really went deep into figuring out what their role is in conserving and uh it was just, it was awesome...yeah, it was cool.

As founder and parent of a child who attended School A, Rachel remarks on what she sees as the long-term benefits of student ownership in learning - a deep sense of self-esteem and pride in the place that created those opportunities.

> Rachel:...so if there's anything that I'm, the thing that I'm probably most proud of, and I would describe to people when I tell them about School A, is that kids love being there um they love learning and they maintain their autonomy through it and they, the self esteem that they get from that is a deeper kind of self esteem than the good job ya know you did a great job on that it's something that they actually feel and believe about themselves as a value um and I'm, that I think I'm most proud of - I found out last night that my youngest daughter, I didn't know this, but there's a Facebook alumni group that has 50 kids in it and my daughter started it and I was like, "Em, I had no idea that you did", "oh yeah, I was just like, just something I did", so ya know, she's in college yeah, and I found out because Hilary (a 7/8 step level teacher) is ya know the co-administrator…

A student-initiated alumni group that connects them back to their peers from elementary and middle school years suggests that students valued both the relationships built at School A, as well as the project-based experiences that they experienced while students.

Embedded Philosophy

Acculturation: "…the process of cultural and psychological change that results following meeting between cultures" (Sam & Berry, 2010, p.472).

With a clear, existing set of values and beliefs, an institution also creates invisible and visible boundaries that must be crossed if an "outside member" is to become an accepted member from the inside. Strike (2008) notes that learning involves initiation into a community's practices - characteristic activities - under supervision of an accomplished member, a form of mastery/apprenticeship (p.183). Tina illustrated this point of initiation when she spoke about the, sometimes, stark process of acculturation that can occur when students, and families, enter School A in the later elementary years.

> Tina:...so, when you're new in the upper grades, it just feels different…it changes the dynamics a lot…because we kind of like it may sound weird, but you're sort of indoctrinated into this culture of School A…and that's over a long period of time too like, we have like ya know a sort of morals and values that we believe should be a part of education, and so when they haven't had that or they've maybe had that very traditional, straight-forward type of education, it's hard for them to...transfer over.

Tina further elaborated on the acculturation of both students and families, and the conflicts that can arise as a result of differing value sets.

> Tina:...yeah, like I've had kids before who um ya know in our charter it says we are we practice nonviolent strategies for solving problems, and ya know telling people that you can't talk to me, it's not a choice ya know in this school, I mean there's just been issues that have risen up with families where it's like, that's okay that that's your family's value system, but at school this is our value system...it's a non-negotiable, your child can't treat...another child this way, so it's hard.

In response to the Bruner quote during the participant check, Tina also discussed how student values change as they get older, and how differing values need to be addressed and met.

> Tina:...basically what this quote is saying, is that your culture has these needs, and the people in the culture have the needs, and they don't always necessarily match up, but they're both morals and values, so how do you...get everyone's needs met, right, I think; and I think that's interesting, especially being a fifth and sixth grade teacher because the needs of that culture, as in age group, is dynamic and changing from when I started teaching it eight years ago...so um, and maybe the needs that need to be addressed at this age level were more things that would be addressed or into in like seventh, eighth, and ninth grade...just them as they're little age culture is different, and they don't come in - I think this is an interesting quote to think about for our school, because as a school culture we have these values...and parents don't always pick this school for those values…so but they're also an important part of our culture, so I do think that's an interesting quote because even though they're not there, cause of our school culture...we still need to meet their needs as a family and as people.

Tina's reference to parents making (or not) a conscious choice is a significant one, and Welch (2011) mentions that survey and other data from Buckley and Schneider (2007) demonstrate parents' great interest in characteristics like location and heterogeneous composition. Parents, then, are looking perhaps more for "fit" than for innovative, unique designs (p.60). This might be attributed to the relative newness of charter schools, and conceptions about what charter schools can offer over traditional public schools.

The phenomenon of acculturation is not relegated to students and families. New teachers also feel or experience the presence of such morals and values, which is in many ways apparent in the surrounding routines, procedures, and physical environment of the school. Susan speaks to this idea and compares her experience at School A with that of her previous experience as a teacher at a mental health facility.

Susan:...so um it was interesting because um the whole ya know peace tables and such that you'll see in some of the other classroom, classrooms and…and we didn't ya know these children went from zero to sixty um ya know in a fraction of a second at that school...whereas this school ya know they're talking more about…and have more of those skills...so, um, ya know and composting and recycling and all of that.

There seems to exist a paradoxical, yet not wholly displaced relationship, between being "indoctrinated" into a culture that also values the unique contributions of its individuals; the keys seem to be buy-in to the culture, and autonomy. The idea of cultural transition also arose when Rachel and I discussed the subject of trying to implement the project-based learning approach within an existing institution, namely a traditional public school. Rachel gave a view that spoke to the necessity of a careful and strategic process.

Rachel:...so I think the only way that you could do that is if you very, very carefully took the culture you were going into had complete buy-in and um, and then took the parts that were really amazing about them and blended them.

She goes on to give the opinion that this type of cultural change, however, is most effective when it occurs from the "ground up", shifting the locus of control from the top to the bottom.

Rachel:...and sometimes the environment will do that, ya know if a school is struggling and people are really at their wits' end I think that might be a ripe time to go in with something like this because this could bond and shape and encourage and support and create something new ya know sort of a phoenix rising kind of a situation, but I think that if someone just saw this as a quick fix and said, "oh let's just subscribe to this curriculum or concept or whatever", um I think you'd get a lot of resistance because if the community didn't ya know it's basically a whole issue of top-down versus ground-up."

In Rachel's view, acculturation, in terms of a new philosophical approach meeting an established set of values, cannot really occur unless there is a full and

long-term commitment to ultimate change; this dictates success of the organization. She states that it cannot work as a "bandaid approach." Welch (2011) notes that in order to gain acceptance as a capable organization that utilizes " best practices" in the field, new institutions often disregard internal concerns about efficacy and efficiency; this tendency toward field-wide conformity is what institutional theorists refer to as isomorphism (p.56).

Acculturation at School A can be equated with mindfulness – an awareness of values and principles that are woven throughout the physical design of the school, the daily operations, and its curriculum. The project-based approach seems almost secondary; School A's continued success appears to be rooted in the whole-school collaboration from the ground up, creating an optimal learning environment based on a ongoing, reflective needs assessment of its members.

Learning Environment

The environment of any institution is undoubtedly shaped by those in decision-making roles. At School A, this privilege is granted to all vested members - the director, the teachers, and the entire school council, though the first two undoubtedly hold more sway over the more immediate learning environment created day in and day out.

Role of Leadership

Senge (1999) emphasizes the role of the principal leader as a steward and leader, in which a horizontal approach to management is important. In reflecting on

his own role as a leader, Mr. Brady identifies the provision of teacher support as a primary action.

> Mr. Brady: I think you have to support teachers both, ya know, I mean we don't have a lot of money here, so some of it is monetarily…but ya know give them the freedom to purchase the items that they think they need...to produce the, to do their job…umm... and the others is uh ya know just, you have to buy into the philosophy in order to provide, whether it be the planning time or ya know, people come with various requests for things.

Mr. Brady aligns support with providing some freedom, whether that is capital resources or more intangible resources, such as planning time. As a school director, his philosophy was shaped by William Glasser's leadership management approach; Mr. Brady completed the Choice Theory/Reality Therapy Certification through the William Glasser Institute. Choice theory is a replacement for external control, operating on the theory that we can only control our own behavior (Glasser, 1998). Mr. Brady describes his own approach as a "kind of leadership in an indirect way rather than a top down…and kind of influencing or suggesting".

In a case study of teachers in a charter school, the principals who provided resources and other forms of job-related support yielded teachers who felt appreciated and valued as colleagues (Malloy et al., 2003, p.235). Tina validated Mr. Brady's ideas about his role when she communicated his willingness to provide this type of support, describing him as "very flexible" when it came to asking him for necessary time to plan curriculum. Not least is Mr. Brady's belief that a leader must completely buy-in to the school's philosophy.

> Mr. Brady: I think it's, first of all, as I said I think you have to buy in to the philosophy of the school, ya know, here, and I do, um buy into the philosophy of project-based.

The commitment and belief in the philosophy of the learning approach and in the school's value system ensures that leaders and teachers are speaking the same language, an important component of a shared educational venture (Strike, 2008).

Teacher Autonomy

With horizontal and indirect leadership comes a particular set of expectations for teachers. Without a top-down and directive approach, all members must assume greater responsibility for making decisions and implementing solutions. During the participant check and after summarizing Mr. Brady's leadership approach, Mr. Brady re-emphasized a particular point.

> Mr. Brady:...the other part of that is the people here are willing to accept that responsibility...ya know, I need this, I need that, okay so, it's be trusting I think of the teachers, that they're going to use it in the correct way, and give them the power to kind of do it.

This acceptance of responsibility and giving of power seems to be the gateway to increased teacher autonomy. The approach aligns with Rachel's original vision of responsibility for School A's teachers.

> Rachel:...but what we also found was that it was really crucial for teachers to have, if they were gonna do so much writing of their own curriculum it's critical that they're passionate about what they're teaching, and so selecting the faculty and then allowing them to follow the things they're passionate about became a really important piece of making that work.

The freedom to create and passion for teaching are forces that contribute to a teacher's sense of autonomy. Such ownership is evident in interviews with the participants. Beth speaks of the privilege and challenge inherent in this type of autonomy, specifically in writing curriculum.

Beth:…the basic thing is that teachers have um, the privilege and challenge of writing their own curriculum...you have to meet the standards, but you get to choose how you're gonna teach things, what you're gonna teach."

In a review of teacher perspectives in charter schools, one of the most reported areas of neglect was ongoing professional development of teachers. This does not appear to be an issue at School A (Fox, 2002, p.7). Staff seem to be provided with resources to better do their job, importantly in the form of training in the project-based approach. This training did not come right away; in fact, it took the teachers' collected voices to advocate for this training, which coincided with Mr. Brady's entrance as Director at School A.

Mr. Brady: I don't know, well I mean I came in 6 years ago...um, that's when we had Sylvia Chard in, so I think that was - the teachers said yes they needed some training, that's why we had her in...so they just felt they needed a common place, cause the teachers had been kind of…they felt they needed somebody, before I came, they organized it...and then teachers went out and actually did a project on their own, things like that, so they actually had training...in a way to do it.

Tina discusses this initiative from the teachers' point of view.

Tina:...and actually it was funny because I was the one who got her in here, I was on the learning committee at the time…we saw a need for us to sort of unify and sort of define more what project-based learning was.

Both Tina and Mr. Brady also speak about the training as providing a "starting place" or a model, from which teachers as a whole (and individually) were given the freedom to further modify the approach according to their needs. As Tina explains, there were other systemic elements that needed to be considered after the training with Sylvia Chard, before teachers could fully implement a modified approach based on her methods.

Tina:...and she was like, the guru, not the guru on it and you know we don't do her approach in its entirety, we figure out what that means in terms of our being a K through eight charter school...that has this focus, but in that we're a public school.

An important point is that the training stemmed directly from the teachers' voiced desire to have a better understanding and more uniform approach to this type of teaching and learning. Furthermore, unlike many program launches and trainings, in which all teachers are expected to follow the program uniformly, teachers at School A clearly had the power to modify. This may be easier done when teachers are being trained in a method of delivery, such as the project approach, and not a specific curriculum. Furthermore, size of School A's staff is far less than the average public school district. Regardless, it appears that teachers at School A are respected as decision-making colleagues and given the freedom, trust, and support to glean those components of an approach that work for their classroom and school, and to make modifications according to professional judgment.

Teacher Attitude

Every participant with whom I spoke displayed what could be categorized as general "positive" attitudes towards teaching and learning. Examples are wide-ranging, and focus on various factors. For example, Sam reflected on the benefit of our interview sessions and being able to talk through the overarching approach and vision of School A.

Sam:…I mean like I said I'm really glad that you're doing this because ya know the year gets going and you just get sort of like tunnel vision...and it's nice to just stop and do this because it's just nice to talk through things and that's what we've been trying to do...I'm sure it's good for everybody.

Beth displayed a sense of empowerment behind her practice, remarking upon her ability to create in an environment that supports such initiatives.

> Beth:...so we're not - you don't need to have somebody hand you the social studies curriculum...and say teach this book...you can - and for me ya know that's why I don't want to teach in a traditional school...is I don't want anybody telling me, I want to be creative, and part of the reason I want to teach, the biggest reason I think is the children but...part of it is it gives you a chance to be creative...and ya know and if I couldn't do that...and I think that School A, creativity is encouraged."

Tina conveyed her excitement at finding an environment that more closely fit with her ideas of what teaching could resemble.

> Tina: But, yeah, I sort of, when I was at URI, and I was doing my placements and you know, these public schools, I was always - and I didn't even know about charter schools then, I always knew I, I didn't see myself in a sort of traditional environment...and I was really excited when I had found this place."

Susan commented on the 'controlled chaos' that exists in the elementary classroom with a sense of optimism.

> Susan:...um this child may need paint...this child may need, ya know, pipe cleaners this child ya know wanting more clay or something breaking on this one and you're just running around like a chicken with your head cut off, but it's fun…and it keeps you young.

Interviews with teachers using similar inquiry-based approaches have shown that they too prefer the project approach to traditional methods and observe improvements in motivation and enthusiasm among their students, which may positively correlate with teachers' generally positive reflections (Rust, 2005, p.653). Specifically, charter-school teachers described themselves as having an "espirit de corps", different from teachers in more traditional schools; these positive relationships with constituents also correlated with small class size (Fox, 2002, p.6). While no direct cause has been investigated, there seem to be a dynamic set of variables at work

that promote a positive attitude amongst teachers; increased teacher autonomy, student engagement, and a relatively small community emerge through data analysis as possible reasons.

Other Teacher Motivators

In addition to teacher autonomy and student investment, Sam and Mel expressed another motivator that aligns with the project-based approach. Sam mentioned the "bigger picture" learning that goes along with teaching a set of skills.

> Sam: But the I mean the good thing is even though you do do all that and it really feels like you're doing the right thing for each of them, like when you get done with the unit you're like I we really, they got what they needed to get and like, more of the bigger picture which is really kinda nice instead of just the skills...so that's been, I mean it's very rewarding at the end of it so, which is nice.

During our participant check, we revisited the idea of project-based learning being a more authentic form of learning; Sam re-emphasized this idea, describing the approach as human-centered, an expansion from the oft-quoted student-centered approach.

> Sam:...but it's just, the, ya know but even getting back to your authentic part from the other one, is just that it does feel at the end that they're getting what they should as a human not just as a student ya know it makes a big difference.

Mel also commented on the rewarding aspect of a project coming together in its summative form, calling it a "rewarding thing" after dealing with the perceived "craziness" of the project process.

Internal Challenges

Time

Participants voiced some challenges that arise when using a project-based approach, some of which have been addressed in previous sections of the results. The most voiced challenge by teachers was the sense that there is not enough time to accomplish all that the project approach entails. In a study that surveyed middle-school teachers using the project-based approach in a science curriculum, time was also found to be one of the most problematic areas (Akinoglu et al., 2008, p.208). Tina and Beth both spoke about there not being enough time to do all of the planning required (which Beth mentions is "true of everything"), and that there is a need for continuous, uninterrupted time.

Part of the time-consuming challenge is the breadth of topics that one covers as an elementary school teacher, with the added depth that is involved in knowing a topic area in order to facilitate a project. Sam and Tina both spoke about this idea.

> Sam: I would say it's um the hardest part for me is each year you have to do is you just need to know your content really very deeply before you get into it um...not that that's hard I mean I end up doing it but it's, that's probably the most time-consuming thing...would just be knowing um because that just takes a lot of the work."

> Tina: A more challenging experience with projects; I mean, in general the most challenging part about a project is being an expert....on the topics, especially ya know at the 5th and 6th grade level, it's still technically the elementary school model, I teach all the subjects all day long, and it's very challenging to prepare quality curriculum in all the subject areas.

While the sensation that there's not enough time is a common theme amongst educators, this feeling seems to increase in charters schools where many decisions are made by consensus amongst all or most staff members. In a comprehensive survey of

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charter schools, teachers valued participation in the process but also admitted that consensus building was time consuming. Furthermore, many teachers noted that they served on several committees and managed responsibilities other than classroom instruction - although they enjoyed playing multiple roles, they knew they were at risk for burnout (Malloy et al., 2003, p.236). The time needed to create a true learning school is a repeating theme - time needed for creating a shared vision; for working together in teams; for reflecting on practice; and for thinking of school as part of a larger system (Reed, 2001, pp.11-12).

Standards and Assessment

Using a more innovative approach and still meeting all expectations as a public school can pose a challenge. Charter schools must prove accountability through 1. Academic scores; 2. The provision of a distinct service to the community served; 3. Compliance with bureaucratic rules and regulations; and 4. Financial compliance with use of public tax dollars (Paino et al., 2013, p.501). Each of these areas poses a potential challenge to a developing charter school. While none of these areas was mentioned in depth by participants, the subject of standards and the state assessment did surface. Beth and Tina gave two different portrayals of their opinions of the standardized assessment.

> Beth:...and as long as you're doing, meeting the standards, which we are, I mean I don't put a lot of, I'm not really into test scores and all that and those NECAP things I think in a lot of ways that's a waste of time, but, ya know it does show...those kinds of assessments...the state assessments...show that we are doing really well.

> Tina: I think you need to…(Lauren: right)...I think assessment is definitely important in that, and with science, ya know, with science it's sort of like we've

hit, it's almost like before they've done the project, we've, they've mastered or we've they've been exposed to all those GLE's.

Tina also spoke about the challenge of implementing the reality-based learning, at the 5/6 step-level, that is characteristic of the project-based approach.

Tina:...but it's also hard to make sure the learning is as real and relevant as possible while still meeting all these expectations that you have to meet...as a public school...so that's what I struggle with.

This experience is often attributed to the increased political pressure on teachers to incorporate standards-driven instruction and assessment into their curriculum, which can cause challenges for teachers who seek to understand the teaching processes that support their adoption of project-based learning (Mitchell, 2008, p.340).

There seems to be greater agreement on the complexity of assessing projects on an ongoing basis. Mr. Brady noted that the complexity of assessment increases in a project that doesn't primarily use paper tests that produce a concrete score. Tina further discussed this idea, conveying that "it's not like, you're not telling them to go from point a to point b, they're making the path...and how do you assess that path."

In order to assess the many components involved in a project, and taking into account different ability levels, Mr. Brady emphasized the need for teachers to have a solid idea of "what makes a good project" before implementation of the project process.

External Barriers

Rachel and Mr. Brady gave their views on what they perceive to be barriers to adopting and scaling the project-based approach.

Lack of Teacher Support

To start, Rachel believes teachers are often discouraged from caring, after trying new things that don't necessarily align with standardized measurement and failing to receive support from administration.

> Rachel: I could give you a cynical answer…and I could give you (Lauren: a little less cynical) yeah, what I hope is the answer um; my cynical answer is that it's cult - it's enculturally grained, it's enculturated and ingrained that going to work is work, not play, and that when you go to work, your job is to deliver something that's measurable and that's your only job um, my not cynical answer is that people have gotten burned by trying new things and discouraged from caring and in that model um they lose motivation to actually try the things that they think would work.

Rachel believes that a change or shift in cultural perspective relies on breaking down barriers of fear and control. Teachers may be resistant to a change that feels like a critique of their current teaching and a threat to their identity. As Chard and Katz (2000) have warned, we as educational researchers have a tendency to polarize different approaches to teaching, which may cause teachers to hesitate or resist making changes (Dresden et al., 2007). Rachel challenges this threat, discussing the conflictive motivations that can arise between being passionate and caring and fear of being penalized for working outside of dictates from district, state or federal administration.

> Rachel: Yeah, I think people go into teaching because they deeply care I believe that, everyone, I mean I'm a teacher, my dad, and professionally I'm

not quote-on-quote - I mean I am professionally a teacher but, but it's not my only profession um so when I'm outside and coming in and out of a uh culture I have a little more ability to stay myself when I'm in the culture, I think when you're in a culture um I think that deep caring, you can get hurt, you can get ya know it's hard to teach and then let go of ya know what you can't control, I think the pressures of teaching and measurable outcomes and all of that can be daunting because I don't think that the supports are there for teachers to have it not be daunting um and scary ya know and honestly I will tell you that anytime fear gets involved things get messed up so you just have to, you have to do what you believe and just sort of let go of the things that you can't control cause otherwise they'll make you scared.

Lack of Unifying Philosophy

More recent research has found that stronger, more successful schools are characterized not only by successful responses to external accountability, but internal cultural accountability as well (Welch, 2011, p.62). In building upon core ideas inherent in the research (Malloy et al., 2003; Senge, 1999; Strike, 2008; Welch, 2011), the "glue" for such internal cultural accountability can be sourced from an institution's unifying mission, vision, and/or philosophy. Mr. Brady provides support for this perspective, observing the "lack of unifying philosophy" that he has experienced in public schools.

> Mr. Brady:...public schools don't have a philosophy in the school which is interesting, when you think about it, they're just - they're supposed to produce good learners...and educate, but what does that mean in - there is no general overall approach or philosophy, matter of fact, people usually foster individuality in public schools...ya know, say as long as you're doing your thing and doing it well, but if you do more to it, just makes it a better, just a better - if you can pull everybody together...but most public schools, and that's why I got out of it are…are very, all the same, very traditional, and not necessarily traditional, but you don't have a whole culture of on, you're not always on the same page...it's hard on…in the discipline policy in a public school to get everybody on the same page...they just know they don't want kids to misbehave.

Mr. Brady also reflects on the idea that established institutions must often wait

for certain staff members to leave in order to create an environment where all members are aligned with a school's mission and philosophy.

> Mr. Brady: ...and I was involved in my own things, cause I probably wouldn't have been as far as I am in my thinking, but I wish I could go back now and see what we could do with that, boy it would be fascinating, I bet we could...at a regular public school; there's no reason you can't, it just takes a while to get there sometimes…and you gotta wait for certain teachers to leave and you change, and I was there 12 years so I had hired most of the teachers at that point.

CHAPTER 5

CONCLUSION

An array of connected themes emerged in the data; these can be summarized in

the following tables. Each of the research questions is termed a "driving question"

that guided the formation of the themes.

Table 1.1 Common Criteria

Driving Question/Macro Theme	Categories/Micro Theme	Evidence
Common Criteria	Authenticity - Realism	Connecting learning
		Context-based
		Meaningful learning
		Reality-based learning
	Central Theme - Centrality	Activism
		Environmental sustainability
		Social responsibility
	Inquiry – Driving Question	Experiences
		Asking to answer questions
		Role as consumer
	Problem Solving – Constructive Investigation	Problem-solving
		Investigating roles
		Conflict resolution

Table 1.2 Planning, Implementation, and Management

Driving Question/Macro Theme	Categories/Micro theme	Evidence
Planning, Implementation, and Management	The Importance of Planning - Cyclical	Backwards design
		Flexibility
		Big picture
		Resources
	Implementation and Management - Balance	Facilitation
		Teacher experts
		Differentiation
		Integration of content
		Expanded classroom
	The Project Share	Objectives: • Basic Skills • Engagement • Lifelong learner
		Audience • Parents • Eco Fair

Table 1.3 Change in Process According to Developmental Needs

Driving Question/Macro Theme	Categories/Micro Theme	Evidence
Change in Process According to Developmental Needs	Scaffolding	Adult support
		Basic skills
		Main points
	Directed Choice	Freedom of choice
		Conformity to group choices
		Levels of exploring

Table 1.4 Contextual Factors

Driving Question/Macro Theme	Categories/Micro Theme	Evidence
Contextual Factors at Institution-wide level	Evolution of learning lenses	Original vision
		Community Focus
	Collaboration	Vision
		Learning
	Common Values and Beliefs	Embedded philosophy
		Reflection
		Student investment
	Learning Environment	Role of leadership
		Teacher motivators • Teacher autonomy • Bigger picture
		Teacher attitude

Table 1.5 Challenges

Driving Question/Macro Theme	Categories/Micro Theme	Evidence
Challenges	Internal Challenges	Time • Planning • Depth and breadth of content knowledge
		Standards and Assessment
	External Barriers	Lack of teacher support
		Lack of unifying philosophy

Discussion

"A successful innovation may be one that reconceptualizes existing ideas that stakeholders value, but have not yet become practice. Innovation can be an evolution, not necessarily a revolution" (Welch, 2011, p.63).

Ray Budde, who coined the term charter, envisioned a movement to empower groups of teachers to develop educational charters and innovative educational programs to local school boards. Albert Shanker, president of American Federation of Teachers, expanded Budde's suggestion to entire schools (Malloy et al., 2003, p.3). Schools are socially conceived institutions that are extraordinarily difficult to change. Charter schools are only the most recent iteration of a long history of American educational reforms, most of which have had little significant impact on the basic structure of schooling (Tyack & Cuban, 1995). Project-based learning, however, has its roots in mastery/apprenticeship learning, and was brought onto the American scene by Dewey and Kirkpatrick in the early 20th century.

The above quote by Welch seems to reflect what has occurred at School A. While project-based learning is not a new idea, it's one that is widely promoted amongst progressive educators; a quick visit to some of the leading educational websites and social networking sites - Edutopia; Edmodo; ASCD (formerly the Association for Supervision and Curriculum Development); and The Buck Institute for Education being just a few – and a reader can find multiple articles and group discussion boards aimed at describing the practice and benefits of project-

based learning. The approach is becoming more popular at both whole-school levels and with individual teachers trying out the approach in their classrooms (Mitchell, 2008; Nargund-Joshi et al., 2013; Selmer et al., 2014; Rust, 2005). While quantitative research studies that support specific best practices for project-based learning are still scarce (seemingly due to the inherent complexities in controlling environment and other confounding variables), particularly at the elementary level, there have been more studies published and articles written in the last decade (based on my findings) than in previous decades.

What is the definition of a "successful innovation"? As success pertains to a charter school, I return to Paino's (2013) list of four expectations - 1. Academic Scores; 2.Providing a distinct, community-based service; 3. Compliance with mandated rules and regulations; and 4. Financial compliance with use of public tax dollars. If these four areas are being met, can a charter school can be considered successful?

In May 2013, the Board of Regents for Elementary and Secondary schools renewed School A' charter for another five years. In regards to state assessment, the School A is one of the top-performing schools in the state. The School A was also recognized by the Department of Education as one of sixty-five Green Ribbon Schools nationwide for 2013, honoring its efforts to reduce environmental impact and costs, promote better health, and ensure effective environmental education (RIcharterschools.com). In regards to the standardized state assessment, New England Common Assessment Program (NECAP), School A has been one of the top-performing schools in the state, in looking at data released by the Rhode Island

Department of Education (RIDE) in 2008.

Of course, there are other factors to consider in forming a more holistic picture of School A. In 2012, the student population at School A was 145 students, about a quarter of the size of many public elementary schools in Rhode Island, not taking into account the middle-level grades. The size of School A was purposeful and part of the founders' vision for a more community-based school. School A is also not without its potential faults; a media article published in 2012 informed of a lawsuit that was brought against School A by another district in Rhode Island. The lawsuit questioned whether or not School A was "sending back" students that the school found difficult to educate or who were disabled. School A and the district approved a memorandum of understanding in 2012.

The other half of a successful innovation is the idea of doing something that is viewed as new and different. Welch (2011) defines innovations in this case as practices that significantly depart from the conventional instructional mold and significantly alter conventional teaching structures, like schedules and subjects (Tyack & Tobin, 1994). In particular, pedagogical innovations are instances where organizations like charter schools are able to "develop practices that are new within the publicly funded school system (Welch, 2011, p.56). Welch further remarks on the fact that college entrance requirements; standardized applicant tests like the SAT and ACT; state accountability systems; and ubiquitous parent, student, and teacher expectations of "real school" are common obstacles toward pedagogical transformation. A central obstacle to all types of school reform is that "organizations seek legitimacy by aligning themselves with the institutions of their social

environments" (p. 59).

Looking at its individual parts, the School A may not be considered overly "innovative" on a more global scale - project-based learning has been remade in the image of educators for years (although still not practiced on a mainstream level), and various forms of experiential learning have been implemented in other public, independent and charter schools; the ideas of social responsibility and environmental sustainment are embraced in other educational institutions; looping is used widely in other countries, such as Finland; and small, community-based schools have existed in some form since the dawn of American education. Perhaps the greater picture, just as in creating the projects at School A, is the more important question. School A appears to be able to take each of these ideas and to integrate them into a greater, innovative whole that thrives and survives.

While these elements are more than relevant and important to consider when assessing the success and degree of innovation at School A, this study primarily sought the perspectives of the participants who are at heart of the institution, responsible for making the decisions and taking the actions that control the inner workings and yield results. While I initially chose the School A because of the project-based learning at the center of its curriculum, the themes of constant reflection, collaboration, and vision stood out amongst the data collected on project-based criteria and processes. I turn the focus back to the concept of successful organizational learning. The data, qualitatively, supports a degree of action in each of Senge's (1999) proposed disciplines - 1. Systems Thinking; 2. Personal Mastery; 3. Mental Models; 4. Shared Vision; and 5. Team Learning. Considering *Systems Thinking*, which

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integrates all five concepts, in which an organization examines itself as being part of a complex whole, many of the School A staff realized its place as part of the greater context of educational models.

Through a socio-cultural lens, Bruner (1996) defines antinomies as pairs of large truths, which when looked at closely are still true but contradict i.e., pragmatic versus logical resolutions. One of these is experiencing the world. Bruner remarks on the "situatedness" of school and learning, and remarks that what a school actually teaches cannot be separated from how a school is situated in the lives and culture of students. He contrasts a higher 'authoritatively' imposed knowledge that services to undermine legitimacy, a type of hegemonic experience (whether intended or not), with the active search for an authoritatively universal voice that gives legitimacy to the broader culture.

In relation to this "universal voice", Welch (2011) notes that the truly innovative schools (examining charters and those schools in the Eight-Year study) that were markedly different and produced increased achievement for students did not sustain growth to scale. The Eight-Year Study showed that institutional pressures may make drastic, radical changes difficult to achieve and almost impossible to scale (p.61). Both Mr. Brady and Mel made comments about the "bigger picture" or School A' approach not necessarily being the best fit for all schools that use the project approach. There is not one best way. All ways must be considered according to contextual factors.

Bruner notes that schools provide a powerful opportunity for exploring the implication of precepts for practice, a consciously aware platform for asking how and

why educators enter into practices. There is a need to recognize and return to the first antinomy of education, that of the function of education - is the goal to reproduce the culture or should it enrich and cultivate human potential? According to Bruner, both should constantly be considered in light of practices. Before, or after, such practices become habits that shape biases and predispositions. Mindlessness is an impediment to change. This notion leads to the idea of the birth of "countercultures" that serve to raise consciousness and meta-cognition of participants, as well as self-esteem. Schools that are an example of counterculture serve as centers of cultivation for new awareness about what it's like to live in a modern society - not simply trying to reproduce the culture as has always been done. This type of participatory reform (p. 84) seems to be evident at School A. In response to the quote by Bruner during our participant check, Mr. Brady gave the following viewpoint:

> Mr. Brady:…my first reaction is it kind of says you never get out of the box; well, it's saying you fit things into what's there...as I'm reading it; you might need more context but - if you're fitting the culture to its members, and you're fitting the members to the needs of the culture, how do you change, how do you do something different, why - are charters different from regular public schools, or should we - the culture, rote learning, I mean it's not as simple as that...so I guess my initial thought is that I don't agree with it, just because it's talking about fitting things, people into a given way already, that already exists...unless I'm reading it wrong (*Observer's comment: Mr. Brady laughs*) (Lauren: no, there's no wrong or right, that's a very interesting thought, because I didn't um, I mean like obviously I didn't have that interpretation when I read it, but that's not...so in your, I'm just curious, just in your words how would you define School A as sort of…from it's very nascent roots, how might it stand in contrast to this quote) I probably can't use the same kind of words, but I guess you gotta define what culture is first of all, but I mean...I guess I'd more like to think we're trying to more lead changes to the culture of the education.

Based on Mr. Brady's perspective, it would seem that the use of project-based learning at School A is a part of a grander goal to encourage a participant-driven

society, serving as a tool in a vehicle for cultural reform. Bruner (1996) notes that cultures have always been in the process of change. Procedures in place for absorbing change reasonably are different for various cultures, but united "faith in ability to change for the better…knowing a final and settled end can never be attained", seems to be a central unifying value in practice at School A (p.97).

Possible implications for field

For schools interested in reform, one of the most poignant lessons that can be gleaned from this study is the level of power, over daily and ongoing initiatives, that is held by the teachers at School A. Welch (2011) comments that the most salient lesson from the Eight-Year Study was that it "focused on people rather than programmatic permanence, recognizing that the most direct and powerful way to improve education is through educating educators and then working to create organizational systems that support and sustain their continued development" (p.62). Bruner also believes that the ultimate action for reform rests with teachers (p.35).

The community - staff, students, family, and local businesses - are also involved in supporting the school's mission and in influencing its decisions. Reed (2001) notes that a successful learning school would invite such members of the school community - students, parents, support staff, business leaders, council members; ordinary citizens to become valued members of central planning or school improvement teams. This type of involvement would create community connections leading to increased community involvement in school activities (pp. 11-12).

New Questions and Suggestions for Further Research

What are best practices for helping elementary students to develop the art of

inquiry?

The ability of students to generate their own questions was not found to be a

significant challenge brought up in the literature on project-based learning; however,

considering the importance of questioning in project-based learning, this would be a

skill worth exploring in further research, particularly at the elementary level.

Additional research can also be done on other, more specific evidence-based

instructional strategies that demonstrate which elements of PBL are important for

particular kinds of outcomes.

What are the best options for individual or groups of teachers who want to use

project-based learning but are not part of a greater system that embraces the idea as

a whole?

Geist and Baum (2005) asserted that "projects are compatible with other

curricular approaches, [and] can complement or expand and support other classroom

activities" (p.32). There is also evidence that K-12 teachers using the project-based

approach apply it through several different modes or roles - reinforcer, extender,

initiator, and navigator - supporting the idea that there is not just one form or approach

(Grant & Tamim, 2013, pp.84-89). Garran (2008) also acknowledges that the No

Child Left Behind legislation (NCLB) has resulted in increasing rigidity in curricular

requirements. Test-driven schools leave little time for project-based work; however, the author (a middle school social studies teacher at a Cape Cod charter) contends that there are ways to modify projects - coordinating with other teachers or using cooperative groups to reduce amount of work for each student (p.10). More in-depth research needs to be done on how teachers have been successful in integrating PBL into an already existing system.

Can PBL exist on a spectrum?

A question posed by Grant and Tamim (2013), that is also relevant to this study, is can PBL exist on a continuum? Thomas (2000) indicated that centrality was an important criterion for true project-based learning, but this question is particularly relevant in elementary classrooms for two primary reasons (particularly since all subjects are traditionally taught in one classroom, which makes the beginning implementation of the project approach a formidable task). An area of future research interest might be a study that looks at the effectiveness of student learning in project-based learning used primarily in one subject versus a more integrated approach; a variable for consideration would be a charter school or more traditional public school setting.

A related area of interest is whether the project approach is more or less effective at the elementary level when content/skills that are needed to complete the project are pre-taught, versus an approach that introduces the content and skills in more sequential fashion, once the project has already been launched.

APPENDICES

APPENDIX A – Excerpt of Participant Check ("Pastiche") for Mr. Brady

Interview with **Mr. Brady**

**There's…a level of learning that comes out of
being able to do this kind of approach**

Part of the curriculum is also that the kids have to learn their basic skills.
The project-based part of the curriculum ties
into the rest of it, but it's not the whole day.
it's more science or social studies, the
project part, they'll have a general topic and work on it -
it can be other areas, but it's often those. I
like the fact that the kids learn how to do
research, and those skills have to be taught. Yes
you're doing a project, but the project should
reflect what you've learned, and you should be
able to, when I come up and ask you about your
project, you should be able to explain. I mean I think that kids
learn how to have basic skills and they also learn how to think -
that's the importance piece.

You (students) have a choice of how you want to do it

Individual students will have the ability to go out
and research pieces of that topic on their own
at the end they all do some sort of a share, we call it a project share, but -
they often do it for their parents it's really kind of neat to see the kids
sharing what they learned with other people they're very good at
public speaking, they're very good at talking
about their ideas…um, more so than other places
just having the opportunity to talk and to share, and to talk

about something you know about, is important

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