It’s All About The Climb: Problem-Based Learning In The Arts & Sciences

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It’s All About the Climb:

Problem-Based Learning in the Arts & Sciences

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A Dissertation

Presented to the

The Faculty of the School of Education

The College of William and Mary in Virginia

_________________________________________________________

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

By

Alexis Irina Harvey

May 2021
It’s All About the Climb:

Problem-Based Learning in the Arts & Sciences

By

Alexis Irina Harvey

Approved May 2021

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Dedication

For my father, Joel, who is in the folds of this dissertation in spirit and my brother, Mical.

You are in my heart always.
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I have been fortunate to have an amazingly supportive and encouraging group of people who have been unwavering throughout this process. I especially wish to thank my mother, Patricia and my brother, Colin, who kept me grounded. I also thank my dear friends, Cheryl, Heather P., Heather J, and Lori who kept me from giving up. Finally, I must thank Pamela Eddy, who is more of a mentor than a dissertation chair and who rescued me from the fall.
# Table of Contents

Chapter 1: Introduction ................................................................. 2
  Background .............................................................................. 2
  Problem Statement .................................................................. 11
  Research Questions .................................................................. 16
  Significance of the Study .......................................................... 17
  Summary .................................................................................. 19
  Definitions of Key Terms ......................................................... 20

Chapter 2: Review of Literature ..................................................... 23
  Adult Learners and the K-12 Standards Movement ..................... 23
    Learning Theories ..................................................................... 24
    Active Learning ....................................................................... 25
    Andragogy .............................................................................. 26
    Constructivism ........................................................................ 29
    Experiential Learning ............................................................. 32
    Kolb’s Experiential Learning Theory ........................................ 33
    Inquiry-based Learning ........................................................... 35
    Project-based Learning ............................................................ 36
    Problem-based Learning .......................................................... 37
    Transformational Learning ....................................................... 41
  Faculty Development and the PBL Approach ............................ 44
    Teaching Strategies: PBL ......................................................... 46
    Academic Planning Model ....................................................... 50
Summary .............................................................................................................................................. 52

Chapter 3: Methods .................................................................................................................................. 53

Research Design ...................................................................................................................................... 54

Research Questions ................................................................................................................................. 55

Case Study Method ................................................................................................................................. 55

Data Collection ...................................................................................................................................... 58

  Definition Panel ................................................................................................................................. 58

  Survey Panel ...................................................................................................................................... 60

  Survey Instrumentation ...................................................................................................................... 61

  Interview Protocol .............................................................................................................................. 62

  Document Protocol ............................................................................................................................. 63

Data Analysis ........................................................................................................................................... 64

  Trustworthiness ................................................................................................................................. 66

  Credibility .......................................................................................................................................... 66

  Transferability .................................................................................................................................... 66

  Dependability .................................................................................................................................... 66

  Confirmability .................................................................................................................................... 67

Researcher Statement ............................................................................................................................. 67

Ethical Considerations .......................................................................................................................... 69

Delimitations, Limitations, and Assumptions ....................................................................................... 69

  Assumptions ...................................................................................................................................... 69

  Delimitations ...................................................................................................................................... 70

  Limitations ......................................................................................................................................... 70
<table>
<thead>
<tr>
<th>Chapter 4: Findings</th>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Findings</td>
<td>72</td>
</tr>
<tr>
<td>Survey Participants</td>
<td>73</td>
</tr>
<tr>
<td>Survey Themes</td>
<td>75</td>
</tr>
<tr>
<td>Thematic Finding</td>
<td>93</td>
</tr>
<tr>
<td>Faculty Knowledge and Skill Development</td>
<td>98</td>
</tr>
<tr>
<td>Community Learning Using Real-World Applications</td>
<td>111</td>
</tr>
<tr>
<td>Summary</td>
<td>122</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 5: Discussion of the Findings</th>
<th>124</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Motivations for using PBL</td>
<td>125</td>
</tr>
<tr>
<td>Faculty Challenges and Curriculum Requirements</td>
<td>134</td>
</tr>
<tr>
<td>The Influence of Institutional Context on Implementation of PBL</td>
<td>155</td>
</tr>
<tr>
<td>Implications for Policy, Practice, and Future Research</td>
<td>159</td>
</tr>
<tr>
<td>Conclusion</td>
<td>172</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appendices</th>
<th>173</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>175</td>
</tr>
<tr>
<td>Appendix B</td>
<td>176</td>
</tr>
<tr>
<td>Appendix C</td>
<td>177</td>
</tr>
<tr>
<td>Appendix D</td>
<td>184</td>
</tr>
<tr>
<td>Appendix E</td>
<td>185</td>
</tr>
<tr>
<td>Appendix F</td>
<td>186</td>
</tr>
<tr>
<td>References</td>
<td>187</td>
</tr>
</tbody>
</table>
List of Tables

Table 1 Survey Demographics relative to Overall Arts & Science Faculty .................. 73

Table 2 Arts, Humanities, and Social Sciences, Gender, and PBL................................. 85

Table 3 Mathematics and Sciences, Gender, Use of PBL........................................... 85

Table 4 Rank Order of Active Learning Strategies by Weighted Mean......................... 86

Table 5 Information and Pseudonyms for Interview Participants ................................ 94
Abstract

Problem-based learning (PBL) is a method of instruction that challenges students to answer questions in a practical manner using their understanding of learned course content. The question at the heart of this study concerns if and how faculty in one institution are currently using PBL. I used an exploratory descriptive case study to research the perceptions of Arts & Sciences (A&S) faculty on the use of PBL as an instructional approach to support the academic learning of students. The use of PBL is suggested in the university’s general education requirements, and yet may not be familiar to all Arts & Sciences faculty members. I designed a survey instrument sent to all A&S faculty to determine if and how PBL is being used, and what resources or supports may be needed to support the use of PBL in A&S departments. This study found that while many faculty members had heard of PBL, there were concerns, across all disciplines and programs of instruction, about the implementation, resources, and training needed to support the use of PBL. This study concluded that faculty participants desired greater professional development in the use of PBL and improved access to resources germane to specific fields of study. Differences in use of PBL emerged based on discipline, faculty career stage, and tenure status. Faculty using PBL saw its potential as an effective method to meet the needs of students as they pursue further study or enter the workforce.
IT’S ALL ABOUT THE CLimb:

PROBLEM-BASED LEARNING IN THE ARTS & SCIENCES
CHAPTER 1: INTRODUCTION

The engagement of students in learning has been a touchstone of higher education and educational practice for decades (Astin, 1984; Kuh, 2008) in the quest to improve students’ educational experiences and to provide students with enriching learning opportunities, which may positively impact student outcomes. To this end, many institutions of higher education and their faculty members seek out different pedagogical approaches to improve instruction and develop curricula. Increased use of educational technology to promote learning increased over time, especially in online programs (Kauffman, 2015). The uses of a variety of technological advancements to support student collaboration can provide students with contextually relevant learning experiences that are connected to practical applications in a specific area of study, while also incorporating material acquired through other courses and life experiences (Barr & Tagg, 1995; Prince, 2004; Savin-Baden, 2003). Several elements contribute to engaging students in learning.

**Background**

Two approaches to improved learning experiences for students involve authentic and active learning, which are often used interchangeably by some in the educational community. They do share some qualities such as providing students with positive, productive, and complex learning experiences which may, in turn, have an impact of their future professional goals (Duch et al., 2001; Lombardi, 2007; Savin-Baden, 2003). However, they are distinctively different in their approach and the learning results achieved.
Authentic learning is a form of constructivism, which encourages kinesthetic and hands-on experiences to facilitate learning, and specifically includes involvement from students and those working with students (Piaget, 1977). Authentic learning is defined as learning that connects the skills being learned within the context of a profession or professional setting. It engages students in real or realistic activities designed to produce a tangible, sharable product, which relates to a profession or a community issue (Lombardi, 2007). The product is based on a specific skill or skill set which resemble those found in a profession and utilize the cognitive process of a profession (Herrington et al., 2014; Woolley & Jarvis, 2007). Furthermore, Lombardi (2007) added specifics to define authentic learning as focusing on real-world issues, which are complex in nature. The core foundational element of authentic learning is its focus on application of learning to real-world issues. It is the community-centered nature and context of authentic learning that delineates it from other forms of learning experiences, in particular active learning.

Active learning is defined as any instructional method that engages students in the learning process (Prince, 2004), and it is not necessarily linked to real-world issues. Active learning is processed-based and may not result in a tangible product from students. In an active learning setting, students engage in learning through multiple forms of learning opportunities, which may occur in small groups or as large class activities and are centered around content related-discussions, written tasks, reflection or reflective practices, or use problem solving skills. A form of active learning is problem-based learning (PBL). PBL is an instructional approach in which complex problems are used to promote and activate student learning of specific concepts, practices, and principles as opposed to direct instruction or lecture format methods. Educators and administrators striving to implement PBL must understand the difference of teaching
strategies (e.g., authentic learning, active learning) to employ PBL appropriately and to the best effect.

The differences between authentic learning and active learning lies in the process-based nature of active learning and the product-centeredness of authentic learning. Often in both the literary and colloquial use, the terms active and authentic learning may at first appear to be interchangeable given their description of similar approaches used to support student learning, and because both are forms of constructivism and sociocultural theories (Evensen & Hemlo, 2000). It is important to note that these two learning pedagogies have seemingly become interchangeable in the literature, as one could argue that they are describing the same process and that preference to one term over the other is a matter of field of study, geographical location, timing of the research, and personal choice. Yet, the difference is important for this study, as PBL is a form of active learning and as such more processed-focused versus outcome-focused as found in authentic learning.

**Active Learning**

Active learning is a form of social constructivism and unlike authentic learning is collaboratively based. In active learning, a focus is on students doing things and thinking about the things they are being asked to do (Bonwell & Eison 1991), with the control of learning resting primarily in the hands of the learner (Smith et al., 1998). In authentic learning, it is the instructor who exerts more control over the boundaries of the activities. The use of a collaborative environment in active learning allows students to share and talk through shared tasks or activities.

The foundations of active learning grew from research in adult learning and educational research into how student engagement differs in courses taught with a passive learning or
traditional lecture style (Duch et al., 2001). The active learning approach is designed to encourage students to participate in learning that uses the application of learned content through experiences and the use of developing skills in a variety of contexts (Savin-Baden, 2003). Active learning allows for the development and use of activities in which students work collaboratively or cooperatively to solve a problem or scenario that reflects their knowledge of learned material, while fostering communication skills and demonstrating advanced problem-solving techniques (Prince, 2004). The use of active learning strategies is designed to provide students in a variety of disciplines with possibilities to connect academic content to scenarios with potential application in the greater community.

**Active Learning In K-12 Education.** Despite origins in adult learning theory, there has been more research in the use of active learning in elementary and secondary education (Honey et al., 2014), particularly in science, technology, engineering, and mathematics (STEM) classes. Active learning approaches, such as PBL, center on thought and learning processes that enhance connections between the classroom and practical application of learned content. Understanding more about the history and evolving nature of learning, in general, and more specifically active learning approaches may provide a constructive road map for those wishing to address student needs and interests while also providing curricula connected to practical applications of skills in the classroom or workplace.

The use of active learning strategies is common in K-12 education to align students’ needs with curriculum (Duch et al., 2007; Honey et al., 2014). Jarvis (1992) provided a general definition of learning, especially as related to young learners, as being built on the notion that learning is essential to everyday life; he argued that learning is “the process of transforming that experience into knowledge, skills, attitudes, values, and beliefs” (p. 11). Learning can be a
transformational process, moving individuals beyond their prior experiences to embrace new ways of thinking (Mezirow, 2000). The learning experiences students had in K-12 education is related to the development of how people attain, construct, and implement knowledge throughout their lives (Piaget, 1977). Therefore, the learning experiences individuals may have in their K-12 education may well influence how they learn as college students and adults.

**Active Learning in Higher Education.** Since the 1990s, higher education faculty have been encouraged to utilize active learning strategies to engage undergraduate students and to enhance opportunities for applying learned material outside of traditional classroom settings and direct instruction practices (Prince, 2004). Like in K-12 instruction, the use of active learning strategies may be formal or informal and are generally organized by the instructor. In a formal setting, active learning activities are generally classroom-based and may be structured around a specific concept, practice, or learning objective. The activities are crafted by the instructor, but they are designed to encourage students to use any relevant content as part of the process for completing the activity. Formal active learning is usually geared toward pre-set goals or objectives, and measures of accountability are employed to ensure that academic rigor and uniform learning is taking place (Prince, 2004). As learning is an active process and with the emphasis placed on process over product, there may be challenges with instruction and assessment that may include the use of interdisciplinary content, evaluation of student learning which may not take a traditional written format, or the application of content outside of the classroom setting.

Informal active learning is not typically classroom-based, highly structured, or standardized. For example, informal active learning may occur in non-academic settings, such as when students are engaged in a service learning and a community engagement event at a local
center, school, museum, or library. Internships sought by students outside of the institutional setting, may also be another informal active learning opportunity as these opportunities may provide relevant and practical applications of learned content. In general, most forms of formal and informal active learning opportunities are crafted by the instructor to provide for opportunities to build upon prior knowledge in a manner that encourages positive learning experiences and empowers students to create informational bridges to enhance their understanding of learned content (Savin-Baden, 2003).

Active learning is a teaching approach that can be tailored by the instructor to meet the learning needs of students or specific course objectives. Emphasis on changing how students, on both the graduate and undergraduate levels, are taught is reflective of the need to align learning with student needs (Tagg, 2008). Students have changed over time, as have the expectations for how they are asked to learn. For example, an incoming first-year student might have graduated from a high school in which collaborative learning is built into the curriculum or have received a multi-pedagogical approach throughout their educational experience. Knowledge of how students learn and what skills need to be developed to carry over into the areas of professional aspirations of students are also topics in which there has been a shift in perspective. Ambrose et al. (2010) suggest that learning is process-based, which results in a change to a student’s knowledge base, past beliefs, attitudes towards certain topics or concepts, and they argue that “learning is not done to students but rather what students do” (p. 3). Learning that is process-oriented engages students in a dynamic learning opportunity that encourage lifelong learning skills.

**Challenges to Active Learning.** Faculty in higher education can draw on lessons learned in the K-12 sector for understanding how active learning may be used in a variety of disciplines
to enhance student learning experiences. Examples of active learning in K-12 education supports
standards-based K-12 instruction and provides useful models for higher education faculty. Active
learning can employ technology to create leaning environments that support such learning
initiatives (Honey et al., 2014). Yet, higher education contexts, in general, may be a more
complicated environment for designing curricular to include active learning activities compared
to K-12 settings. Tagg (2008) argued that most higher education institutions are “behind the
curve and generally cannot describe what they are trying to get students to learn, much less
produce credible evidence of what they do learn” (p. 1). Beyond the debate about what
constitutes learning, another challenge to implementing active learning in higher education is to
determine how to best use the practice in specific disciplines and how it can be used to reflect the
specific learning outcomes and requirements of the subject being taught.

Another potential difficulty in using active learning in higher education settings may be
the departmentalized approach in these institutions (Barber, 2014; Tagg, 2008). Although all
campus faculty are part of a larger whole, they may operate as individuals within their
departments and be more concerned with meeting the curricula goals of their respective
disciplines, rather than viewing themselves as a part of the greater college experience for their
students (Barr & Tagg, 1995; Mintzberg, 1989). The silos which may exist in an institution may
impact how faculty react to new instructional approaches and how faculty respond to large-scale
institutional changes in instruction of content. The design and implementation of courses to fit
certain preconceived molds based on content or when faculty see themselves as separate from the
greater college community and as individual practitioners, both influence class design and
planning. These challenges may limit the ways in which students can access information across
disciplines and influence the shape of the course offering. As the discussion and the needs of
learners continues to be a changing dynamic for educators, alternative approaches to instruction and curriculum design will continue to evolve (Nilson et al., 2013). Active learning strategies, such as PBL, may provide an avenue to shift the focus of instruction from more traditional teaching methodologies to a more dynamic means of learning that meets the 21st-century needs of students.

**PBL in Higher Education.** PBL falls into the active learning approach category as the learning experience is community-based, and knowledge, motivation, and skills are developed as a group effort. This approach allows for a culture of learning to develop that focuses on the process versus the product (Vygotsky et al., 1978). PBL is defined as an instructional model that fosters the ability to identify the information needed for an application to practice, where and how to seek that information, how to organize that information in a meaningful conceptual framework, and how to communicate that information to others (Duch et al., 2001). PBL bridges the real-world connections found in authentic learning and the collaborative nature found in many active learning strategies.

In general, the focus of PBL as an active learning strategy is not necessarily determined by area of study or discipline. Rather, it is a learner-centered approach that engages students in acquisition of research skills, use of appropriate theories and practices, application of relevant knowledge on a topic or subject, and development of skills to craft a possible solution to an established and structured problem (Savery, 2006). Students determine what information is needed to solve the problem, how to use the information, and what skills they need to utilize to solve the problem while also managing the problem-solving process (Savin-Baden, 2003). Furthermore, Savin-Baden (2003) describes the use of PBL to help students realize that learning and life occur in “contexts that affect the kinds of solutions that are available and possible” (p.
3). The use of PBL may engage students in a process that allows for development of independent and student-centered thinking that goes beyond traditional direct instruction (Barr & Tagg, 1995) as it challenges students to use newly acquired and prior knowledge to solve complex problems rooted in authentic scenarios and applications.

Specifically, the use of PBL encourages student-centered learning in which the design of multifaceted problems with practical application, which promotes critical thinking, develops problem-solving skills, and encourages communication through group work (Savery, 2006). This approach to learning provides opportunities for developing research skills using concepts and principles found in course content, rather than through the traditional lecture format found in many higher education courses (Duch et al., 2001). PBL allows students to take more ownership of their learning and to develop critical thinking skills through actives that are designed to challenge them. Regardless of the format of a PBL experience, the learner acquires knowledge based on their personal experience, motivation, interests, and skill level (National Academies of Sciences, Engineering, and Medicine, 2018).

For example, Nilson et al. (2013) discusses the use of PBL as a method which may be used in higher education STEM courses to emphasize the process of instruction versus the outcomes; she argues that active learning allows “students to solve the particular case or problem and follow the process the experts do” (p. 48). The focus on the learning process, rather than emphasizing a work product or graded task, allows students to understand better how experts approach a problem. In experiencing a variety of different ways of applying and using collaboration as part of the learning process, students will better understand how to work as part of a team. The use of several approaches may allow for PBL to be used as a tool when using a hybrid approach to teaching. A hybrid approach involves a combination of pedagogies that
reflects a differing approach to learning through mixed teaching modalities, such as PBL, flipped design, and traditional lecture.

According to Groh (2001), in some cases, such as large undergraduate general chemistry courses, a combination of PBL and Socratic-style lecture may be appropriate, as some topics covered may not lend themselves to a complete PBL format. Guided questions and directions can provide content and approaches for filling possible informational gaps. Student engagement in PBL is supported in this case by the complement of first learning relevant concepts important to the building understanding of the subject via lecture and then actively using this learning to solve a problem.

PBL allows for the development of a culture of learners, with this group learning dynamic providing students enriched educational opportunities that promote the development of new skills and experiences (Ambrose et al., 2006. Active learning encompasses many strategies and approaches that deviate from the traditional lecture style commonly found in most higher education institutions (Duch et al., 2001), as active learning tasks are often self-directed by the learner (Hemlo & Lin, 2000). When learning is student-centered, and the learning environment fosters the use of collective knowledge, experiences, and skills to complete a task as a collaborative effort, students become engaged in experiencing learning as a process (Savin-Baden, 2003). Student-centered learning approaches encourage students to interact with peers of differing backgrounds, share ideas, make choices, and ultimately take responsibility for their learning.

**Problem Statement**

Limited use of active learning strategies by higher education faculty has occurred (Duch et al., 2001). In the main, students graduating from K-12 schools since the passage of No Child
Left Behind (2002, later reauthorized as the Every Student Succeeds Act (2015), are accustomed to national standards and accompanying changes to classroom teaching practices that may involve more active learning opportunities. It is important for higher education faculty to understand the exposure incoming college students have from their K-12 classroom experiences based on evidenced based activities that are student centered (Honey et al., 2014). What remains unknown is the extent to which college faculty are incorporating a variety of educational approaches using active learning, including PBL, to enhance and focus the learning of class content and acquired skills.

The use of active learning strategies may enable college instructors to use a multilayer approach to designing curriculum which provides structure via scaffolded learning, which ultimately engages students in higher ordered thinking and practical application of content. The use of active learning strategies may also encourage similar skill development in a variety of programs, particularly in the areas of STEM, although active learning strategies are practiced in a variety of subject areas, including humanities-based programs (Savery, 2006). Today, STEM subjects, especially in the applied sciences, seem to be where emphasis is placed on the use of practical applications of learned content (Honey et al., 2014).

Active learning approaches like PBL may be used in STEM-related studies, business programs, health care professional programs, and medical schools (Albanese & Mitchell, 1993; Barrows, 1994; Hemlo-Silver, 2004). Teaching of the humanities in college settings provides opportunities to incorporate PBL, though this strategy may be less obvious and more challenging to design. One way in which humanities programs may leverage active learning strategies is through tapping into the digital humanities movement. The use of digital humanities is a term
increasingly used in higher education within the past decade. Kirschenbaum (2012) offered this general definition of the digital humanities:

The digital humanities, also known as humanities computing, is a field of study, research, teaching, and invention concerned with the intersection of computing and the disciplines of the humanities. It is methodological by nature and interdisciplinary in scope. It involves investigation, analysis, synthesis and presentation of information in electronic form. It studies how these media affect the disciplines in which they are used, and what these disciplines have to contribute to our knowledge of computing. (p. 2)

Kirschenbaum (2012) further described the digital humanities as “more akin to a common methodological outlook than an investment in any one specific set of texts or even technologies” (p. 2). The development of transferrable skills, situations, and opportunities for collaborative work and the emphasis on a collection of scholarly practice is at the center of the digital humanities. The digital humanities and the use of other forms of educational technology are areas that are becoming more influential in higher education settings to provide students with more opportunities to connect relevant and practical applications to learned content. What remains unknown is how faculty in the humanities are using PBL in their classroom teaching as this teaching strategy has been more common in the STEM disciplines (Ambrose et al., 2010).

Savin-Baden (2003), a seminal author on PBL, argues that PBL should be used in higher education and be given a more prominent role as a learning tool in higher educational institutions. PBL acts as a connection between academic program objectives, student academic goals, and the professional communities in which students will enter upon graduation. The combined use of PBL with other instructional approaches can motivate and engage students in an active manner. The concept of integrating multiple approaches, which may be reflective of
potential workforce practices, is a trend in higher education today. For example, integration of learning (IOL) and developing connections to learned material to concepts based on workforce-related needs is not a new concept in higher education. Barber (2014) described IOL as “a process by which individuals bring together experience, knowledge, and skills across contexts” (p. 9). It is the concept of creating relevant experiences that connect to workforce expectations that appear to be supporting PBL and the use IOL in higher education setting.

Although literature exists that advocates for the use of IOL and active learning strategies like PBL, a research gap exists to describe how students proceed through the process of learning and in particular, what roles faculty should take when utilizing these learning methodologies. Historically, more of the research on student learning focused on the students (Prince, 2004), and a gap in the literature exists regarding faculty perceptions, use, and supports of active learning in their courses. Although it would seem logical to expect that faculty and, by extension, college administrators would take a role in the IOL process, there is little literature that delineates how or even if, faculty and administrators influence the integration of active learning strategies, despite student interest in engaging with faculty as part of the IOL experience (Barber, 2014).

As PBL and other active learning strategies are being used in both undergraduate and graduate courses, the development of skills and concepts across disciplines with a nod to student life experiences is becoming a consideration when courses are imagined and designed (Savin-Baden, 2003). In some institutions, the use of co-curricular transcripts are used to not only show academic records, but to also provide a record of learning activities and experiences which are related to the content of a specific program or major. In taking this approach it is hoped that prospective employers or graduate programs, will be better able to visualize what a student has learned based on a range of modalities (Thomas, 2018).
The uses of PBL have been studied from the undergraduate student engagement and outcome perspective (Savin-Baden, 2003), yet PBL has not been widely studied from a faculty development standpoint that includes both STEM and humanities instructors. In providing for a variety of contexts and applications, PBL has become more widely used in both graduate and undergraduate courses to promote collaboration and generate new learning experiences, yet less is known about how faculty members set up their teaching to engage students in the active process of learning.

Faculty, in general, may seek to challenge students to produce large-scale written works that incorporate learned material with practical or theoretical applications situated in real-world contexts. These learning goals provide a natural bridge to the use of PBL in higher education classrooms. However, the use of PBL may require additional support for faculty members to use, and a clearer conceptualization of how, when, and why PBL to use PBL in their courses. Faculty unfamiliar with PBL may not see it as applicable to their instructional philosophies. There are references and generalizations to the implementation of PBL, but no current studies documenting how faculty use PBL, the issues faced when implementing PBL, especially for the first time, and how faculty apply it to their curricula or specific program of study. This gap in the literature is important to fill because PBL has the potential to positively impact both undergraduate and graduate students learning by actively engaging them in a manner that is challenging and effective.

Many public universities offer faculty development websites where information about active learning and PBL are available, but there is often no specific or detailed training provided to assist faculty in developing a plan to use these strategies. If faculty are expected to practice these teaching approaches, support and training may be needed to ensure it is effective and
supports student learning goals. The goal of this study is to uncover if faculty, in general, are using PBL, why they do or do not use it, and if supportive structures and opportunities exist to encourage the use of PBL in both undergraduate and graduate programs of study.

**Research Questions**

This research was guided by the following research questions to more fully understand how, when, and where Arts & Science faculty employ PBL in their courses.

1. How much are Arts & Science faculty using PBL in their classroom teaching?
   a. How do higher education faculty determine if and when to implement PBL in their courses?
   b. How do higher education faculty implement PBL in their courses?

2. What institutional or departmental structures and supports are in place that facilitate or impede the implementation of PBL among higher education faculty?

**Statement of Purpose**

The purpose of this study was to survey Arts & Sciences faculty across disciplines at a mid-sized, public research university to determine if they use PBL to engage students, and to determine what types of PBL strategies faculty members are using in their classrooms, if any. Further, this study sought to understand any influencing factors on faculty decisions to use PBL in their classroom teaching. This study can inform practice to help support other faculty because of the collation of strategies current employed and can identify how different disciplinary areas are using PBL.

The findings from the research questions can begin to address how PBL is used as a teaching approach. Many colleges and universities are considering or have already begun to use more online and self-directed learning platforms, particularly in the STEM fields (Lombardi,
2007), which may utilize PBL approaches. Additionally, faculty may be encouraged by administrators, students, and other faculty members to use active learning strategies, like PBL, over the traditional Socratic method of lecture in their instruction. The purpose outlined helped tease out why faculty are using PBL and what types of supports would help expand the use of PBL in higher education.

**Significance of the Study**

The research that exists on the use of PBL in higher education focuses on student outcomes or the role of the facilitator, instructor, or tutor, depending on which model of PBL selected by the individual faculty member or institution for implementation (Duch et al., 2001). A research gap exists regarding how and why faculty members chose to implement a PBL model in their classes. As there is increasing internal and external pressure being placed on faculty to use a variety of teaching approaches to connect content beyond the classroom, it is important to understand how PBL is used or why it is not selected as a teaching strategy by faculty members. Equally, it is important to better understand what supports are needed to encourage more faculty in the use of PBL and to view it as part of a positive learning paradigm which allows for the shared creation of a community of learners. Faculty response is needed to understand the processes they employ to determine the use of PBL and to develop support structures to encourage more implementation of PBL by faculty. The use of PBL may present unique opportunities for learning and challenges in implementation for faculty as they seek to design, implement, and assess student learning on PBL strategies.

The challenge for higher education faculty is twofold regarding teaching and learning. First, faculty members must balance the differences among students’ previous learning experiences. Many of today’s students are the product of the standards movements in K-12,
which began in 2010, but other students who pre-date the standards movement may have
different learning experiences and prior knowledge. Active learning and PBL is practiced in
some K-12 settings and is regarded as having a positive impact on learning outcomes, which may
aid students in applying content in their future professional endeavors (Savin-Baden, 2003).
Students may anticipate the use of active learning strategies, as they may have had previous
exposure to their usage in their K-12 learning backgrounds. The difficulty for faculty members is
not only to determine how and when to use particular active learning strategies like PBL, but
how to incorporate this approach in a learning environment that also builds student efficacy in
the course content area (Duch et al., 2001). Faculty who are tasked with implementation of PBL
may look for resources that provide information and direction to effectively utilize the strategy.
Second, faculty may be encouraged by administrators, other faculty members, and students to
utilize active learning approaches, such as PBL, to support the use of learned content in
scenarios, which reflect issues found in the workforce in their chosen fields of study (Savin-
Baden, 2003). Yet, faculty may lack the training to implement requested changes in their
teaching.

Administrators may also wish to acquire information on the use of PBL and how to
encourage faculty to use PBL in the courses. The use of PBL presents challenges for faculty and
administrators as they seek to overcome resistance to change in classroom practices and embrace
new modalities of instruction (Duch et al., 2001). Helping faculty understand more about the
appropriateness of using PBL, how to effectively design a course or program of study which
includes PBL, implementation of PBL across disciplines, and assessment of student learning
using PBL as a main teaching approach could result in more use of active learning strategies in
higher education classrooms. Knowing what concerns faculty members have about the
instructional, physical, and technological resources available to engage students in this type of learning can alert administrators and academic leaders about what topics of faculty development are needed.

**Methods Summary**

This research employed a case study as it is set in a single higher education institution identified via purposeful sampling (Yin, 2014). Purposeful sampling included selection of “individuals and sites for study because they can purposefully inform and understanding of the research problem and central phenomenon of a study” (Creswell & Poth, 2018, p. 158). The participants were members of the School of Arts & Sciences who teach a variety of courses on both the graduate and undergraduate levels. Survey responses allowed for a beginning understanding of the faculty perspectives in the use of PBL. Using Lattuca and Stark’s (2009) Academic Planning Model (APM), a skip-logic question qualitative survey was created using the eight elements of the APM: purpose, content, sequence, learners, instructional processes, instructional resources, evaluation, and adjustment. Thematic analysis was used to analyze the data collected and given context to the results of the survey instrument.

**Summary**

Increasingly, the use of active learning in the higher education context connects academic content to practical skill development. As a form of active learning, PBL is facilitated and augmented by the facilitator/instructor in periodic lectures, but ultimately the students are responsible for determining what content information is needed and how to proceed in developing a solution to a problem (Savin-Baden, 2003). This type of teaching strategy may require faculty members to acquire professional development to employ in their classrooms (Duch et al., 2001).
PBL has the potential to prepare students for their chosen professions though the creation of meaningful and enriching learning opportunities that connect multi-disciplinary content to the professional goals of students. Additional training and support on an institutional level for faculty can contribute to effectiveness and acceptability of the strategy amongst those faculty members unfamiliar with PBL. Therefore, it is important to understand the extent to which faculty use PBL and how it is used to connect content to practical applications, which may be necessary in a workplace setting.

Chapter 2 presents a review of literature pertaining to adult learning theories, the development of PBL, the presentation of more contemporary information relevant to the implementation of PBL in higher education settings in the 21st century, and the theoretical framework based on Lattuca and Stark’s (2009) academic planning model. Chapter 3 outlines the tenets of this qualitative single-site case study, which employs a survey-based methodology. Findings are presented in-depth in Chapter 4 and discussed in Chapter 5. This study concludes with recommendations for future studies on the topic of PBL and implications for practice using PBL instructional strategies.

**Definition of Key Terms**

The following section identifies key terms used throughout this study. Notations are included for terms that may be substituted for one another in the document.

*Active learning*

Any instructional method that engages students in the learning process through completion of meaningful learning activities in which students must think about what they are doing (Bonwell & Eison, 1991).
**Authentic Learning**

A learning approach which uses a variety of strategies and instructional techniques to focus student learning on real-world, complex problems and their solutions that are product based (Lombardi, 2007).

**Collaborative Learning**

Any instructional method in which students work together in small groups toward a common goal to achieve higher learning and retention of content (Millis & Cottell, 1997).

**Cooperative Learning**

A structured form of group work in which students pursue common goals while being assessed individually (Millis & Cottell, 1997).

**Constructivism**

A theoretical approach to instruction that encourages kinesthetic and hands-on experiences to facilitate learning, which includes involvement from students and those working with students (Piaget, 1969).

**Experiential learning**

A theoretical framework in which learners are given opportunities to explore their previous knowledge by developing new understandings via the use of activities developed to stimulate thought and challenge preconceived notions (D. A. Kolb, 1984).

**Inquiry-based Learning**

A teaching method which engages students in critical thinking that allows for internalization of concepts and the learning process rather than rote memorization of content material (Havasy, 2001).
**Problem-based Learning (PBL)**

An instructional model that fosters the ability to identify the information needed for a particular application, where and how to seek that information, how to organize that information in a meaningful conceptual framework, and how to communicate that information to others (Duch et al., 2001).

**Social Constructivism**

A theoretical approach in which learners engage with other learners to share and talk through shared tasks or activities. The learning becomes community based, which then allows for a culture of learning to develop (Vygotsky, 1978).

**Transformational Learning**

A theoretical approach to teaching based on promoting change, where educators challenge leaners to critically question and assess the integrity of their deeply held assumptions about how they relate to the world around them (Mezirow, 2000).
CHAPTER 2: LITERATURE REVIEW

This literature review starts with an overview of connections between K-12 education as a potential influencing factor to teaching approaches in higher education. The historical study of active learning and PBL from a student engagement and learning perspective highlights a gap in the literature about these approaches from a faculty perspective. The learning standards movement that began in public education circa 2010 influenced the educational sector to question how best to engage students in learning using different approaches beyond the traditional lecture format (Barr & Tagg, 1995; National Governors Association, 2010; Savin-Baden, 2003). A review of literature of adult learning theories follows to form a basis for understanding the development of active learning strategies and the theoretical underpinnings of why active learning approaches, such as PBL have the potential to transform higher education. Finally, a review of Lattuca and Stark’s (2009) academic planning model is presented as the theoretical framework for this study.

Adult Learners and the K-12 Standards Movements

In 2010, the National Governors Association and the Council of Chief State School Officers published the Common Core State Standards Initiative, which detailed a set of standards for mathematics and language arts curricula in grades kindergarten through high school. These national standards were voluntarily adopted by 45 states and the District of Columbia. The concept behind the Common Core State Standards was to codify the information being taught in schools across the country to prepare students better for college or workforce training. While not specifically mentioned as a critical element for Common Core State Standards implementation,
active learning strategies are encouraged under the Common Core State Standards to provide students with tangible and real-world learning experiences (National Governors Association, 2010).

Similarly, the Next Generation Science Standards (NGSS) were established in 2013 in response to concern that science, technology, engineering, and mathematics (STEM) were not covered enough in the original Common Core State Standards. The NGSS cover a broad range of science topics in grades kindergarten through high school, with each level built upon the next until mastery is achieved. The National Academy of the Sciences cited PBL as a major feature in the integration initiatives of many programs examined by the committee (Honey et al., 2014).

The Common Core State Standards and NGSS both promote the use of active learning strategies, like PBL. Active learning approaches utilize a combination of problem, project, and tasks designed to promote student learning through complex situations that reflect real-world scenarios (Savin-Baden, 2003). Students graduating from high school have become familiar with the use of a variety of strategies which may be part of daily instruction. Understanding more how higher education faculty use active learning and PBL to engage students in learning is the focus of this study. The next section provides a review of learning theories to highlight how PBL can enhance student learning outcomes for college students.

Learning Theories

As introduced in Chapter 1, a range of learning theories exists. The focus of this study is on PBL, thus understanding more fully how this learning approach fits into the span of learning theories is useful. This section begins with an overview of active learning and how it may be used in higher education to enhance student learning and provide enriching learning experiences that may have practical application beyond the classroom.
Active Learning

Within higher education, there is increasing focus on implementing instructional strategies that engage students in active learning rather than passive learning that occurs in lectures or recitation of information. To this end, institutions are encouraging and training faculty in the use of a variety of active learning strategies that allow dynamic learning experiences in classes. Active learning strategies generally engage learners in higher-ordered thinking processes, such as analysis and evaluation, giving students an opportunity to express their thoughts or conceptualizations of learned material (Prince, 2004).

Active learning is an umbrella term that encompasses many strategies in which students are tasked with applying material from a variety of sources as they participate in the learning process. Prince (2004) defines active leaning strategies as “any instructional method that engages students in the learning process” (p. 223). This broad definition incorporates active learning strategies that provide opportunities for students to engage in higher-order thinking (e.g., analysis, synthesis, evaluation), development of skills across disciplines, engagement in a variety of activities which encourages students to explore their own mindsets and beliefs (Bonwell & Eison, 1991). Student activity and engagement in the learning process are the primary goals of any active learning experiences. Prince (2004) identifies three types of active learning: collaborative learning, cooperative learning, and PBL.

Each of these active learning strategies present an array of learning opportunities, which engage students in a process of learning that may or may not result in a traditional or typical product for assessment purposes. Collaborative learning refers to any instructional method in which students and instructors work together in small groups toward a common goal to achieve higher learning and retention of content (Miilis & Cottell, 1997). Cooperative learning is a
structured form of group work in which students pursue common goals while being assessed individually (Miilis & Cottell, 1997). PBL is described as an instructional model that fosters the ability to identify the information needed for a practical application of learned content, where and how to seek that information, how to organize that information in a meaningful conceptual framework, and how to communicate that information to others (Duch et al., 2001). All three of these active learning strategies are dependent on students directing their own learning as they engage in the learning process. The type of active learning that will be the focus of this study is PBL. To facilitate understanding of this particular learning strategy, it is important to know the history associated with its development as it encompasses its own place in the active learning paradigm.

**Andragogy**

Andragogy refers to a theoretical model for adult learning. Credited to Malcom Knowles (1968), this learning theory argues that children and adults learn differently and have contrasting learning needs. Recognizing the learning differences between children and adults, Knowles (1968) created a learning theory that reflected what he believed to be the unique learning needs of adult learners and presented four principles that would aide those working with adult populations. The four underlying principles of Andragogy Theory state that adults are first self-directed learners and, that as such, they should have a say in the learning process. Second, adult learners have an array of experiences in their backgrounds and this prior knowledge should be used to build new knowledge. Third, adult learners are interested in the practical nature of content as it applies to their lives and future work, content should reflect the practical applications of learned material. And fourth, adult learning should not focus on memorization, but on problem solving applications, which allows for a richer learning experience. It is in the
context of learning experiences that adults thrive. It is important to note that later research by Knowles (1984) revised Andragogy Theory to recognize that the principles and underlying assumptions about adult learners did not apply to all adults and that children may also benefit from the tenets of Andragogy Theory as well.

The concept of Andragogy Theory expanded to also consider the context in which learning occurs. According to Merriam et al. (2007), “An adult’s major use of experience in learning is on reintegrating or transforming meanings and values, while children tend to use their experience in accumulating new knowledge and skills” (p. 424). Thus, adults re-conceptualize their settings through their learning and the ways they see what they have learned influences their understanding of prior experiences.

The work of Knowles (1980) sparked interest in the how adults learn and what motivates adults to engage in learning content. The expansion of thinking about Andragogy Theory now highlights “a number of theories models, and frameworks, each of which attempts to capture some aspect of adult learning” (Merriam et al., 2007, p. 103). For example, predating Andragogy Theory but still relevant to higher education today is McClusky’s (1963, 1971) theory of margin, which emphasized the changes to one’s personal life and how those changes impact one’s ability to learn at a specific moment in time. Building on the role of experience and context for adult learners, Kegan (1994) described the purpose of higher education and adult learning in general as a process to “assist adults in creating in creating the order of consciousness the modern world demands” (p. 287). The concept of adult development and the multiple factors, both internal and external, that might affect a learner’s ability to engage in education is still very much a topic in 21st-century higher education. Over time, research began to emphasize how adult learners engage in the learning process (Illeris, 2002; Woolley & Jarvis, 2007).
On the one hand, Illeris’s (2002) three dimensions of learning has learning at the center of a continual process that incorporates aspects of the learner’s emotional, social context, and cognitive state as part of a learning experience. It is the interaction of the three aspects or dimensions within the learning environment, which allows one to understand better why some students resist learning while other students are seemingly more willing to engage in learning on a more challenging level.

On the other hand, Woolley and Jarvis’s (2007) learning process, took a different, but related perspective. In this model the learner is seen as a whole person with thoughts, beliefs, and lived experiences that influence the learner’s engagement in the learning process. The learner experiences different emotions, thoughts, words, and actions throughout the process, which results in changes to learner.

The seminal work on Andragogy Theory and other learning process models to uncover how adults learn provided conceptualizations that we continue to apply today as part of the ongoing quest to unravel the learning process in adults. The notion of incorporating learning experiences rather than solely using rote learning paved the way for new conceptualizations and ideas that encouraged different approaches to higher education pedagogy. The concepts of studying engagement in the adult learning process gave rise to new schemas describing how learners use their previous learning experiences and interests to guide their learning process. Challenging adult learners with increased focus on process redirected interest in the use of building learning experiences that encompassed learning strategies based on a student direct approach (Merriam et al., 2007). What remains unknown is how the faculty responsible for creating these learning experiences perceive their roles and how this may craft student-directed
activities that meet the requirements of the course while allowing for transformative learning to occur.

**Constructivism**

Constructivism is a theoretical approach to instruction that encourages kinesthetic and hands-on experiences to facilitate learning, which includes involvement from students and from those working with students. Constructivism is rooted in the cognitive development work of Piaget (1969, 1977). Piaget’s research highlights how learning is based on existing cognitive structures, in which learners set their own goals and actively assimilate new material. Piaget (1969, 1977) suggested that children develop the capacity to learn in four stages from birth to adolescence and theorized the concept of learning as a developmental process. He postulated that learning changes over time as new skills and experiences lead to a shift in how one processes and learns information. Merriam et al. (2007) described Piaget’s approach: “Meaning is made by the individual previous and current knowledge structure. Learning is thus an internal cognitive activity” (p. 291). One possible implication of this internal cognition is the potential for learning to be built on experiences and knowledge over time, which may allow for the development of new contexts for learned material in college students.

The work of cognitive development theorists, principally Piaget (1977) led to the constructivist approaches to adult learning. The use of constructivist approaches may allow students to create and explore, in order to build upon their prior knowledge and interests as part of the learning process. Fosnot (2005) explained the basis of this theory on the works of constructivist learning theorists, such as Vygotsky et al. (1978), who believed that children, and to some extent adults, learn when they are given opportunities to learn by doing (e.g., active learning process). Constructivism is rooted in the concept of moving learning from a traditional
product or results-based model to a process-based learning model in which students use their insights, higher order thinking skills, and processing of information as opposed to learning focused on a particular result or predetermined product (Savin-Baden & Major, 2004).

The work of Vygotsky et al. (1978) falls into what has been termed a social constructivist approach, which as a subset of constructivism, as the model incorporates use of an individual’s experience to construct meaning. The social constructivist approach allows learners to engage with other learners to share and talk through shared tasks or activities. The learning becomes community based, which then allows for a culture of learning to develop within a group or class. The concept of the cultural or community-based approach to learning is addressed by Vygotsky et al, (1978) who suggested that a zone of proximal development exists in which students learn material at a certain level and that the level then expands to an optimal zone via collaborative assignments. Here, adult learners use social interactions with others to solve problems collaboratively. “This [social constructivist] approach involves learning the culturally shared ways of understanding and talking about the world and reality” (Merriam et al., 2007, p. 292).

The foundational work of Piaget (1977) and Vygotsky et al (1978) were influential and led to the development of other learning theories that encouraged the use of more active learning in the traditional classroom.

More recently, there has been increased research in the use of collaborative learning models built on constructivism. One such model is Kuh’s (2008) Student Engagement Theory in which achievement in academic settings are connected to positive connections between students and faculty. Student Engagement Theory focuses on an active and collaborative model to encourage students to become engaged in learning experiences to construct meaning together. This collective process then allows the student to develop a level of expertise that can be applied
in other contexts (Kinzie et al., 2011). Yet how learning occurs within groups depends on who is in the group.

Barhoum and Wood (2016) conducted a study to determine if race or ethnicity made a difference when active and peer collaborative learning was implemented in a developmental writing course in a community college setting. The results of the study indicated that native Hawaiians self-reported higher frequency of active and collaborative learning compared to other ethnic groups in the study. The results also showed that all ethnic groups demonstrated a higher level of active and collaborative learning after taking the course. The use of active and collaborative learning in the classroom was considered to be effective with different groups of students regardless of the race or ethnic groups. What remains unknown is the influence of faculty approaches to teaching using collaborative learning strategies and how faculty were supported in this type of teaching approach.

Constructivism is the basis for many contemporary learning and teaching modalities, including active and collaborative learning. It continues to be influential in 21st-century higher education. As Merriam et al. (2007) assert, “All forms of constructivism understand learning to be an active rather than passive endeavor. Consequently, learning occurs through dialogue, collaborative learning, and cooperative leaning” (p. 29). When facilitated by well-trained instructors who understand how to foster this type of learning, students exceed their original learning levels and develop new understanding of material facilitated by the use of collaborative assignments. Yet, it is assumed that faculty members receive training on collaborative learning prior to using this approach in the classroom. I sought to determine what type of faculty development the teaching faculty had and how they make use of collaborative learning in their classes as part of the PBL process.
Experiential learning is based on the work of Dewey (1938), who theorized that learning is a continual process and based on learned experiences. As part of this theory, the role of the facilitator is to gauge the level of students’ prior knowledge through a series of intentionally structured activities, and then to move the students toward a new level of understanding. Dewey (1938) argued that “all genuine education comes about through experience” (p. 41). Yet, Dewey did not hold that all experiences were necessarily educationally relevant or beneficial. Trying to determine which experiences successfully produce a learning experience can be a challenge as “every experience is a moving force. Its value can be judged only on the ground of what it moves toward and into” (Dewey, 1938, p. 31).

Two principles ground experiential learning, namely the continuity of experience and interaction. Merriam et al. (2007) described the principle of continuity of experience as experiences in which “learners must connect what they have learned from current experiences to those in the past as well see possible implications for the future” (p. 162). Experiential learning not unlike general adult learning theory, focuses on conceptualizations of learning connected to not only the present experience, but also to past experiences and one’s ability to see future implications of those experiences.

According to Dewey (1932), “an experience is always what it is because of a transaction taking place between an individual and what, at the time, constitutes his environment” (p. 41). When viewing experiential learning from Dewey’s perspective, it is the situation which is central to promoting learning in which learners can connect their past, present, and future experiences in meaningful ways. The PBL approach likewise uses academic and personal connections to support learning of content.
**Kolb’s Experiential Learning Theory**

D. A. Kolb (1984) built on the foundational work of Dewey (1938) in developing his experiential learning theory. Here, adult learners are given opportunities to explore their previous knowledge by developing new understandings via the use of activities developed to stimulate thought and challenge preconceived notions. D. A. Kolb (1984) postulated that “learning is the process whereby knowledge is created through the transformation of experience” (p. 41). The four stages of experiential learning theory include: concrete experiences whereby an individual is open and willing to have a new experience; reflective observation in which one views the experience from a different perspective; abstract conceptualization which involves using observations to integrate concepts in an analytical manner; and active experimentation in which the learner uses decision-making and problem-solving to in an actual learning experience (D. A. Kolb, 1984).

Faculty members as learners are the products of their own learning experiences. As such, the manner and methods they choose to use with their students may reflect the ways they learned in their higher education experiences and their disciplines (D. A. Kolb, 1981). For example, fields related in social professions, business, and education are considered concrete experience and active experience-based as they use instructional methodologies, such as clinics, seminars, and practicums, which encourage students to use what they have learned in a practical context. Social sciences and humanities disciplines, such as modern languages, psychology, and theatre, fall under the concrete experience and reflective observation categories as students are asked to learn through observation of techniques and apply what they have learned. For example, psychology students often observe counseling sessions in which a graduate student or faculty member demonstrate techniques. The observing students are then asked to reflect on what they
have learned from the observation. The natural sciences and mathematics fall under the abstract conceptualization and reflective observation categories in the model. Students are asked to make conclusions from their learning experiences which are conducted through reviewing of theories and then completing laboratory experiences in which they formulate conclusions based upon learned content. Lastly, disciplines like engineering, computer science, and economics, fall into the abstract conceptualization and active experimentation categories in which students plan what they will do and try out what they have learned through a learning experience in which conclusions may be drawn. Faculty members may rely on their own experiences as learner to inform their practice.

Each of these elements relate to different modalities of learning that can help one to tap into acquired skills already developed by the learner. A. Y. Kolb and Kolb (2005) expanded earlier work and created six general statements about experiential learning. Their first statement states “learning is best conceived as a process, not in terms of outcome” (A. Y. Kolb & Kolb, 2005, p. 194). The second statement is that students must understand that sometimes learning may require relearning after exploring material. Third, in order to learn, students must resolve conceptualizations that may involve actions, thinking, feelings, and reflection. Next, learning is holistic rather than being piece-meal. Fifth, the learner must interact with the environment and not be passive. Lastly, is that all learning is constructivist in nature. It is the confluence of the constructivist nature of PBL that for students to actively engage in dynamic learning experiences, they must go beyond the boundaries of simply learning content.

Educators play an integral role in the learning process, but in experiential learning the role is different than the traditional instructor vested with all the power in the classroom. In this learning approach, “educators serve as facilitators of reflection and encourage learners to discuss
and reflect on concrete experiences in a trusting, open environment” (Merriam et al., 2007, p. 169). Educators using experiences as a focus in the classroom provide the means for the learning experience through crafting activities that ask students to engage in challenging exercises to solve a problem and then offering opportunities to reflect on the experience. The educator also creates assessments that incorporate reflective practices and allows students to demonstrate their prior knowledge through experiential learning activities.

In experiential learning, as in constructivism, both the learner and the facilitator/educator are involved in the learning process. The facilitator provides the basis for the experience and the student taps into their prior knowledge by engaging in the experience. Experiential learning is designed by the educator to challenge students to use content through a range of activities thus allowing for personal and collaborative exploration of material with directed reflection that builds from one experience to the next. PBL and other active learning approaches encourage collaboration that uses the combined knowledge and experiences of the group as part of the learning process.

**Inquiry-Based Learning**

Inquiry-based learning engages students in critical thinking that allows for internalization of concepts and the learning process rather than rote memorization of content material (Havasy, 2001). Learners are central to inquiry-based learning and their interests are an important element in the learning process. According to Sincero (2006), inquiry-based learning is “a learning process through questions generated from interests, curiosities, and perspectives/ experiences of the learner” (p. 3). Not unlike experiential learning, inquiry-based learning builds on the work of Dewey’s (1938 conception that action and learning is directed by those doing the learning and is centered on building connections between the learner and the greater world. The thought and
learning processes are enhanced by making connections between the classroom and real-world applications, giving a practical purpose to learning class content.

Inquiry-based learning also aligns with the work of Freire (1970) who argued that students learn best when they are active participants in their learning environment, and in that environment, students are given opportunities to produce their own knowledge in relation to the content being studied. Under the Freirean approach, the facilitator/professor provides the students with support, guidance, and encouragement to produce their own knowledge and make connections to learned content. Freire (1970) also focused on a socio-cultural aspect that uses education as a platform of social reform, which encourages inquiry using the learner’s social constructs to engage in inquiry experiences. Given the use of inquiry-based learning for instruction in higher education, there is growing quantifiable evidence to demonstrate effectiveness with regard to student achievement (Taasoobshirazi et al., 2006). The use of inquiry-based learning places emphasis on the learner as a constructive element within the learning process and allows for self-directed learning and less teacher-centered instruction, which may allow for a richer and more relevant learning experience.

**Project-Based Learning**

Project-based learning is an inquiry-based theory that has found traction in 21st-century teaching practice. Project-based learning may be viewed by some to be a conflated term as it often associated with problem-based learning, especially in the K-12 setting. Interestingly, several prominent educational online resource organizations, such as Buck Institute, now use the acronym PBL to describe project-based learning while the acronym PrPBL or PBL may be used interchangeably to describe problem-based learning. While the term project-based learning may be seen by some in the educational field to be an umbrella term that incorporates both project
and problem-based, there are differences in the tenets of each approach. Project-based learning is a “systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed projects and tasks” (Markham et al., 2003, p. 4). Project-based learning allows for a learner-centered approach and environment that uses the experiences, practical understanding of technology, concepts, and tools that are rooted in real-world scenarios (Tal et al., 2006; Markham et al., 2003). Another definition of project-based learning that provides a better insight into this strategy as an independent learner-based approach is offered by Markham, et al. (2003) as “a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic (real-life) questions and carefully designed products and tasks (p. 4).

It is the use of projects, and a focus on the product of learning, that aligns with standard and accepted assessment practices. Yet, as argued above, the focus of this study centers on the process of learning, which is supported by PBL.

**Problem-Based Learning (PBL)**

PBL has a long history of use in medical schools and other health professional programs to bridge complex learned content to clinical practice, which incorporates use of deductive reasoning skills, and expert knowledge of multiple and specific contextual scenarios (Barrows, 1994, 1996). In the 21st century, PBL became the basis of instruction as a multi-disciplinary strategy to provide students, at a variety of learning levels, with real-world applications of learned material. Researchers argue that PBL “fosters the ability to identify the information needed for a particular application, where and how to seek that information, how to organize that information in a meaningful conceptual framework, and how to communicate that information to
PBL is process-based and asks students to collaborate to work through a problem while demonstrating knowledge of content.

At the center of PBL is the integration of information, making meaning of the information, and application to solve a real-world based problem. PBL includes the use of cooperative learning strategies as a principal modality of learning, effective communication skills, and specific skills gained by incorporating critical thinking skills in the analysis of complex and solutions of real-world problems. To facilitate the use of PBL, students must also demonstrate the ability to find appropriate resources, evaluate those resources, and utilize appropriate content knowledge of learned content material. As this study focused on the use of PBL in higher education, the connection to real-world scenarios may be reflected in the professional world that students aspire to enter. Furthermore, Hemlo-Silver (2004) characterized PBL as a method of learning in which students acquire content with collaborative group work to determine the information needed to solve a complex problem, apply the newly acquired information, and reflect on the process of answering a problem that may not have a single current solution. Given the process focus of PBL, faculty members may be required to shift their perspective from more traditional practices of assessment and evaluation. What remains unknown is if the required work to shift teaching approaches presents a barrier for some faculty members and ultimately results in them not opting to use PBL as a teaching strategy.

The use of PBL has the potential to meet students’ needs while also having the flexibility to be adapted to multiple disciplines and provides a link between content and practical application. Online learning platforms in higher education use PBL in several disciplines to allow students to direct their own learning and provide for opportunities to apply their learning in a professionally relevant context-based learning experience (Lombardi, 2007). PBL is an
approach to instruction and curriculum that is learner-centered and enables students to research, apply prior and newly acquired knowledge, and use a variety of skills to produce a solution for a real-world or contextual problem (Savery, 2006). For example, in a pre-service teaching course on student discipline, student collaborative groups are presented with a scenario in which a fictional middle school student is found with concealed drugs and becomes hostile. The fictional student claims that he did not own the drugs, nor did he know they were hidden in his belongings. The groups are presented with a series of questions specifically designed around the content of the course and with emphasis on how teachers may encounter these situations in practice. Through the learning experience, students work together to formulate a plan to handle this scenario, the of discipline problem which may be useful in their future teaching careers.

PBL has many uses as an instructional approach in higher education across disciplines but may require faculty members to receive some form of training on how to construct PBL activates relative to their respective subject content and curriculum (Hemlo & Lin, 2000). The implementation of PBL may take on different forms as would be apropos to subject and skills needed for student success in the professional field. The use of PBL in certain graduate and undergraduate programs has been studied to some extent, particularly in the areas of medicine, nursing, STEM fields, and business as related to student outcomes (Smith et al., 2005). Yet, there is comparatively little literature about how faculty at the university level may influence, guide, and design PBL activities for students in other fields or may begin understanding the challenges academic faculty face when implementing PBL into their courses.

There are several ways in which faculty may wish to utilize the flexible nature of PBL to accommodate student needs and available institutional resources. Duch et al. (2001) described four models of PBL successfully incorporated into medium to large undergraduate classes,
providing the caveat that the use of PBL in certain situations needs to be considered. These factors include class size, the maturity level of the students, facilitator/ instructor teaching preferences, the objectives of the course, and the use of tutors, either peer tutors or graduate students, to assist in the learning experience.

The first model presented by Duch et al. (2001) is the medical school model in which groups are assigned, and a faculty member is responsible for acting as a discussion leader or tutor for the group as the group resolves a case or problem. In this model, there is minimal classroom seat time and groups schedule times to meet to work on the material related to the case or problem. Very often this model is used in small, upper-level undergraduate classes or seminar-style classes. The second PBL model is called the floating facilitator model, which may be used in larger classes, such as those typical at the undergraduate level, and does not required an assigned faculty member to assure the completion of tasks. In this model, a set period of time is set aside for group work and the instructor acts as a facilitator that floats between groups to ensure that the class material is being discussed in a productive manner. The groups then share what they have discussed with the entire class. Another feature of this model of PBL is that it allows time for full class discussions, short lectures, and for an array of activities such as role-plays, debates, or sharing of problem results as the use of activities designed to engage learners and appeal to a broad range of learning styles is encouraged.

The peer tutor model of PBL relies on the use of undergraduate peer tutors to assist in monitoring of groups and to ensure that discussions are pertinent to the class objectives. In this model, the peer tutor acts as an extension of the instructor, provides feedback to the instructor about group discussions, and acts in a role model capacity. In some ways the peer tutor model is not unlike the medical school model with similar logistical issues for large class sizes. The fourth
PBL model outlined by Duch et al. (2001) is the large class model, which is more instructor-driven. Here activities are planned in advance with instructor-generated problems and additional materials are made available to support opportunities for critical thinking and discussion. Individual faculty members may determine which model is best for their classes based on a variety of factors such as the size of the class, the type of course, and the ability level of the students in a course.

As institutions of higher education seek to create new learning environments and experiences for students, the use of PBL encourages students to control their own learning with the guidance of a trained facilitator/instructor. Savin-Baden (2003) argued that PBL be given a more prominent role in higher education institutions as this strategy provides a connection between the realms academic program objectives, student academic goals, and the professional communities in which students will enter upon graduation. What remains unknown is faculty perspectives on the use of PBL in their classes, why they may not be using this strategy, and what type of institutional supports are available should the faculty member desire to use PBL.

*Transformational Learning*

Transformative or transformational learning leads to “dramatic, fundamental change in the way we see ourselves and the world in which we live” (Merriam et al., 2007). Two of the best-known approaches to transformational learning are found in the work of Freire (1970, 1985 and Mezirow (1991, 2000). Both approaches advocate for critical reflection as part of the learning experience, with the Freirean approach focusing on learning to promote social change in a large-scale context and Mesirow’s approach focused internally on the individual and how they learn and grow from the experience.
Freire (1985) roots transformation in context, such as poverty and illiteracy, with the end goal of reforming society. This approach argues that “personal empowerment and social transformation are inseparable processes” (Merriam et al., 2007, p. 140). Freire (1985) poses that there are two forms of education, banking education and problem-posing education. In banking education, the teacher directs learning and the students are the passive recipients of the teacher’s knowledge. The teacher controls the content and student interpretations of the content. When power is in the hands of the teacher, a “culture of silence” emerges (Freire, 1985, p. 72). Freire (1985) describes the second form of learning as problem-posing education in which the teacher and students work together to co-create learning experiences through discussion of derived from the concerns or interests of the learners. Here, learning is a social construct which has the potential to influence or change society.

Mezirow (2000) took a decidedly different approach to transformational learning. He described transformational learning as “an approach to teaching based on promoting change, where educators challenge learners to critically question and assess the integrity of their deeply held assumptions about how they relate to the world around them” (p. xi). Transformative learning has become a popular construct in higher education and in other fields as it encourages people to use self-reflection to change the way they learn based on prior experiences and how they view these beliefs based on newly learned perspectives. The goal of transformational learning is to challenge learners to become collaborative partners while also developing them into independent thinkers through a process of self-reflection. Transformational learning is a process of changing or transforming one’s beliefs or attitudes, or to transform one’s entire perspective, leading learners to become “more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions that will prove
more true or justified to guide action” (Mezirow, 2000, p. 8). Transformative learning does not necessarily occur in every learning experience but promoting opportunities for transformational learning to occur provides powerful learning experiences.

The concept of reflection is essential to understanding and using transformational learning as a learning approach. Mezirow (2000) developed a 10-phase process of transformational learning. The process begins with the learner having a new experience that establishes the context for learning, in which the learner’s worldview extends and adjusts to incorporate the new experience as it relates to challenging a pre-held belief, perspective, or perception (Mezirow, 2000). The learner begins the learning process through self-reflection and examination through a new lens. The learner then participates in a reflective discussion about their learning experience. The final part of the transformational learning process is action, which can be as seemingly simple as deciding to become involved in a social or political movement.

Reflection is a key component of transformational learning. Mezirow (1991) identified three types of reflection: content reflection in which individuals think about the actual experience, process reflection in which thought centers on how to handle an experience, and premise reflection in which beliefs, values, and assumptions are challenged. In transformational learning, “the learner must critically reflect on his or her worldview in order to gain the best judgment, and act on the new perspective” (Merriam et al., 2007, p. 137). Transformational learning may occur as part of PBL. The challenge for faculty in using transformational learning is how to provide a safe environment for learning while also crafting activities that allow learners to explore their beliefs and reflect on what they have learned in an appropriate and ethical manner. The ability to reflect on what was learned and how to apply learned content can be a challenge for learners. Likewise, it can present difficulties for faculty who strive to create
meaningful PBL activities as transformational learning requires attention to how to situate learning experiences and grounding those experiences to be of relevance to both the individual learner, but also to reflect the objectives of the class and institution. The shared goal of both transformational learning and PBL is the intention to inspire learners to go beyond what is written or taught in order to facilitate deeper understandings and perspectives of content material.

**Faculty Development and the PBL Approach**

Higher education institutions are embracing changes to teaching of undergraduate and graduate courses to achieve higher student learning outcomes. For some institutions, providing meaningful learning experiences for students includes providing practical applications of course content to post-graduation careers (Amador et al., 2006; Duch et al., 2001). Despite these institutional goals, however, there may exist a level of hesitation and even resistance on the part of faculty to shift from a lecture model of teaching to constructivist learning approaches like PBL (Donnelly & Fitzmaurice, 2005; Pascarella & Terenzini, 2005; Savery, 2006). As McMurtrie (2018) asserts, “the structures of college often stand in the way. From conventional classroom architecture to cultural norms that value lecturing over more active forms of learning” (p. 25). Understanding more about how faculty perceive incorporating PBL into their teaching is therefore important to changing norms.

Research on PBL in higher education has been most active in STEM-related fields of study. The focus of this research addresses a range of topics such as, learning outcomes, higher-ordered thinking skills, critical thinking skills, and self-directed learning contexts (Hemlo-Silver, 2004). The research in the areas of student outcomes and developing thinking skills has shown that students acquire informationally differently in PBL experiences when compared to traditional lecture-based instruction (Dochy et al., 2003; Walker & Leary, 2009). As highlighted in the
previous section, PBL encourages practical application of learned content in authentic contexts (Albanese & Dast, 2014; Norman & Schmidt, 2001; Vernon & Blake, 1993). PBL in its many forms offers faculty the opportunity to create a learning environment that is collaborative, allows for the development of self-efficacy, and can be designed to reflect student interests (Wijen, et al., 2017).

In 2018, a study focused on STEM was conducted by 20 university researchers and co-sponsored by the National Institute of Health and the National Science Foundation. The study consisted of more than 2,000 college STEM classes taught by 550 faculty, across 25 institutions throughout the United States and Canada (Stains et al., 2018). The findings revealed that 55% of all courses taught were instructed in traditional lecture formats; 27% of the courses studied used a combination of lecture and interactive activities; and only 18% of the classes observed utilized a student-centered approach. However, 42% of faculty observed incorporated two or more modalities or teaching approaches during a semester. The authors did not specifically mention causes for faculty pedagogical choices; therefore, it is unknown if the use of active learning strategies are dependent on the cultural norms of an institution or department. Also unknown is the type of development faculty members received on active learning strategies.

Some instructional and departmental cultural norms are firmly rooted in the history of higher education in the United States when the emphasis was placed on memorization of specific information and facts directly linked to an area of study (Davidson, 2017). The move to more widespread use of active learning strategies has been uneven. McMurtrie (2017) argued that the reliance on passive learning needs to change as “our rapidly evolving economy requires workers who are adaptable, can analyze a constant flow of data, solve problems quickly, and act independently” (p. 26). Faculty need to become comfortable with using active learning because
these strategies allow students to take in information across multiple fields of study, use that information in a variety of contexts, and create new applications for that information which may have an impact beyond the classroom setting.

**Teaching Strategies: PBL**

The use of PBL in higher education offers opportunities for faculty and students to meet course objectives while also broadening the scope of the learning process. Amador et al. (2006) identified two faculty goals for teaching: the desire for students to learn knowledge and acquire resources to develop skills germane to their disciplines of study and the opportunity to encourage students to expand their learning beyond the scope of an individual course or program of study. Active learning strategies, such as PBL, are often practiced and suggested by faculty developers or instructional resource providers to meet these goals (Prince, 2004). This emphasis on providing relevant learning experiences, with practical application of content focused on professional goal attainment, has generated more discussion and increased study of how learners may benefit from the use of PBL in university programs designed prepare students for their future careers.

Much of the current discourse on the use of active learning strategies, including the use of PBL is focused on meeting the changing demands of students and administers to shift how instruction of course content is enacted. “PBL shifts the center of our courses from what we do and what we say, to the problem with which our students are confronted… It shifts the control, pacing, and direction of classroom activity to our students” (Amador et al., 2006, p. 18). As previously noted, PBL has been used for decades in professional schools to promote practical application of workforce related skills. There is an increased emphasis being placed on meeting students’ needs through student-centered pedagogy, integration of knowledge, and reflective
practices in which the students are asked to think about why and what they are learning in their courses (Barr & Tagg, 1995; Davidson, 2017). The use of active learning strategies promote collaboration, discussion, and reflection, in a learner-centered environment.

Faculty may employ a range of teaching strategies to engage students in active learning. The use of PBL has the potential to meet students’ needs while also having the flexibility to be adapted to multiple disciplines. The ability to link content and practical application provides increased opportunities for active learning (Prince, 2004). An example in practice is the use of PBL in online courses that allows students to direct their own learning, work collaboratively, and provide for opportunities to apply their learning in a professionally relevant context-based learning experience (Lombardi, 2007). PBL provides students, in both brick and mortar settings and online situations, opportunities to develop higher order thinking and self-directed learning skills, while at the same time meeting the requirements of a course or program of study and applying the appropriate professionally-accepted practices (Hemlo & Lin, 2000).

The collaborative nature of PBL sets it apart from other active learning strategies as the PBL activity is designed, scaffolded, and mentored/facilitated by an instructor, groups of students are assigned to work on a question, and the decision made by the group drive the learning process (Savery, 2006). Faculty use PBL to offer students the opportunity to work both independently and as a group, which provides an opportunity to learn important skills required for the workplace. The use of PBL in the higher education setting has the potential to use learned content and information beyond the scope of the classroom (Amador et al., 2006).

The dynamics of making curricula changes to accommodate active learning is not new to higher education. Paradigms of instruction and learning have been shifting since the 1990s, with more importance being placed on learner-centered curricular rather than the instructor-based
curricula of the past (Barr & Tagg, 1995). As noted, medical colleges have used PBL to create learning experiences that “emphasize that learning should be constructive, self-directed, collaborative, and contextual process” (Dolmans et al., 2005, p. 8). The move to student-centered learning moves attention to the teaching role of faculty. Many higher education institutions have also begun to develop active learning classrooms or learning spaces that offer flexible seating, mobile furniture, multiple writing surfaces, and access to a variety of multi-media technologies for faculty to use in their classes to promote collaborative learning models like PBL (McMutrie, 2018).

In some institutions, active learning approaches, including PBL, create disruptive moments and opportunities for disruptive innovations. Internally, institutions attempt to improve curricula across disciplines as a means to retain and attract students who might seek educational opportunities elsewhere in a competitive atmosphere that values learning experience as a measure of quality (Christensen & Eyring, 2011). The external influence of concepts traditionally found in business environments reform practices in education too and can encourage the use of active learning strategies in classrooms. In many institutions of higher education, the shift from being teacher-centered to student-centered represents a challenge for those developing curricula and programs of study (Bass, 2012).

The inter-disciplinary nature of active learning also necessitates removing barriers that can lead to departmental silos and impedances to cross-communication between departments. In a recent study of 300 STEM discipline faculty members at the University of Virginia, the data suggested that a major reason faculty resist active learning is the culture of the department and the level of support for the use of active learning strategies (Sturtevant & Wheeler, 2019). The culture of the institution and the departmental cultures may play a role regarding if, how, and
under what circumstances active learning strategies are implemented and how faculty are to be held accountable for meeting the learning objectives of the department. Bass (2012) asserted “that campus leaders need to address how to reinvent a curriculum that lives in this new space” (p. 2). The new space described by Bass (2012) is founded in balance between meeting student needs, reinventing departmental and institutional culture, and promoting student-centered learning to overcome faculty resistance.

In putting together classes, faculty members may seek to blend or integrate different learning approaches to emphasize student-centered, collaborative, and contextually based learning processes (Dolmans et al., 2005). PBL provides a means to support the integration of learning (IOL; Barber, 2014). Connecting relevant experiences that connect classroom learning to workforce expectations support the use of PBL and the use IOL in higher education setting. Despite the support for using IOL and active learning strategies like PBL, a research and informational gap to describe how students proceed through the process of learning and what roles faculty should take when utilizing these learning methodologies with students.

Although it would seem logical to expect that faculty and, by extension, college administrators would have a part in the IOL process, there is scant literature that delineates how or even if, faculty and administrators influence the integration of active learning strategies across departments and disciplines in an effort to promote campus-wide change (Barber, 2014). As PBL and other active learning strategies are being used in courses, the development of skills and concepts across disciplines with a nod to student life experiences is becoming a consideration when courses are imagined and designed (Amador et al., 2006).

Another example of PBL, as applied in higher education context, may be found in the dissertation process which is a process to apply learned content while answering a question of
series of questions through a process which demonstrates theoretical and practical applications of content. Although dissertations are largely independent student efforts, there is increasing interest in the impact of formal or informal seminars and workshops which foster a collaborative environment for students to share resources and experiences. In a recent opinion article, Cassuto (2018) described the use of dissertation groups with students, which can promote a collegial and collaborative writing process. Cassuto found that writing or working groups provided students, particularly those in non-STEM fields, to work collaboratively and form a community of scholars who work together to achieve a common academic goal. The experience of dissertation work group may encourage students to collaborate of future professional endeavors. Graduate students may benefit from group mentoring that encourages students to work together to produce research, scholarly writing, and the building of a sense of community through a shared sense of purpose. It is this flexible nature of PBL that may allow it to be used across disciplines and levels of instruction.

The Academic Planning Model

Lattuca and Stark’s (2009) academic planning model (APM) provides the theoretical framework for this study. The authors focus their planning model around eight elements that provide critical elements in building curricula. As definitions of curricula abound in higher education, the APM does not attempt to create a one-size-fits-all approach, but instead focuses on crafting enriching and engaging academic learning opportunities.

According to Lattuca and Stark (2009), the academic planning process “should be designed with a given group of students and learning objectives in mind” (p. 4). Further, the authors suggested that the subject matter of the course is a secondary objective, with the primary
goal centered on meeting the academic and educational needs of students enrolled in a course or program of study. The eight elements of the APM include:

1. Purpose, which encompasses the knowledge and skills to be learned;
2. Content, which as the name suggests, includes subject matter specific material and skill development;
3. Sequence, or the organization of subject matter and related learning experiences with specific outcomes;
4. Learners, which focuses on the specific group of students in a course or program of study;
5. Instructional processes or activities designed to promote learning objective and outcomes;
6. Instructional resources, which include materials, settings, educational technology, and other ancillary equipment needed as part of the learning process;
7. Evaluation of the methods, approaches, and decisions made about the academic plan are being used effectively; and
8. Adjustment, in which the faculty member makes corrections or improvements based on the course experience and evaluation of the course.

Taken together, these eight elements provide a framework for planning curricula and courses which will reflect the changing needs of students, provide consistency, and allow for the course to be adapted as needed.

The APM encourages academic planners and faculty to see beyond content and assessment of student learning to understand that curricula may include aspects germane to meeting student needs while also providing relevant content as required by departments and
institutions. For this study, purpose, content, learners, instructional processes, and instructional resources will be emphasized as these elements are crucial to providing insight into the choices faculty may when determining if, how, and when PBL may be used in their individual or departmental academic plans.

Summary

PBL is an approach to learning that provides students with opportunities to experience learning in context and with practical applications. The challenge for faculty is having enough information, support, and training to successfully and effectively use this student-driven approach to instruction. Most studies on the use of PBL have been focused on student engagement and outcomes. Only in recent years have studies been conducted to determine if, how, when, and why faculty members use PBL in their classes. The role of faculty and the supports that may need to be in place for the use of PBL and active learning strategies is no less important that increasing student engagement. For without the faculty and their efforts to improve their classes, progress might be stymied. Therefore, it is important to consider the faculty role and their needs when implementing departmental or institutional use of the PBL approach to learning and instruction.
CHAPTER 3: METHODOLOGY

Using PBL to engage and enhance student learning is a topic of ongoing debate in higher education (Duch et al., 2001; Knowlton, 2003; McMurtrie, 2019; Savery, 2006). In colleges and universities around the country, educational pedagogies are being rethought to encourage critical thinking, to develop skills, which may be practical for the field of study, and to connect content across disciplines (Duch et al., 2001). PBL and other forms of active learning are used as a means of providing students with a different approach to learning material instead of a traditional lecture style format (Savery, 2006), and most studies on the use of PBL have focused on student perspectives and student engagement (Albanaese & Mitchell, 1993; Barrows, 1996; Boud & Feletti, 1991, Savery, 2006). Few, if any, studies have occurred on the use of PBL from the faculty perspective, and scant research exists about the challenges faculty members may face in implementing PBL in undergraduate and graduate courses across the arts and sciences.

PBL is more common in K-12 school districts as a strategy to meet current standards of learning and as a means to promote collaborative learning experiences, especially in STEM-related classes (Honey et al., 2014). In institutions of higher education, positive student outcomes across student demographics and disciplines of study are evident when using PBL (Duch et al., 2001). However, there is little attention paid to derive and ascertain the concerns, challenges, and resources needed to provide higher education faculty with the means to implement PBL in their classes. The data from this qualitative study sought to provide insights and relevant information that may be useful when planning faculty development or when assisting a faculty member who wishes to use PBL as an approach.
Research Design

This study used a qualitative approach research method because it allows investigation into how, when, and why faculty use or do not use PBL as a pedagogical approach in their courses (Creswell & Poth, 2018). This approach allows for multiple perspectives and the sharing of experiences, positive and negative, in the implementation of PBL, whereas a quantitative method may not have allowed for analysis of perceptions faculty regarding their understanding of PBL and its use as part of their curricula and related courses. Other research designs were considered in the formation of this study but were not selected because of the exploratory nature of this study. The inclusion of PBL in the new general education (GENED) curriculum at the site institution provides an opportunity to understand how faculty see the use of PBL as an active learning strategy. The findings from this study provide a list of future topics of inquiry that can further understanding of the challenges and success of using PBL from the faculty perspective.

In considering the best design approach for this study, a single site, exploratory, descriptive case study was selected as it provided information in an area of research that, to date, has not been widely explored. Yin (2014 defines a descriptive case study as “a case study whose purpose is to describe a phenomenon (‘case’) in its real-world context” (p. 238). An exploratory, descriptive case study design includes field studies in natural settings, and this setting provides little control over variables. The data collected can contribute to the development of theory or explain phenomena from the perspective of those being studied (Brink & Wood, 1998). This method provides the ability to bound this study to include the Arts & Science faculty at a single institution (Merriam & Tisdell, 2016). Faculty members provided information on their perspectives via a qualitative survey. Details on data collection and analysis appear in the sections that follow.
Research Questions

For this study, the research questions were:

1. How are Arts & Science faculty using PBL in their classroom teaching?
   a. How do Arts & Science faculty determine if and when to implement PBL in their courses?
   b. How do Arts & Science faculty implement PBL in their courses?

2. What institutional or departmental structures and supports are in place that facilitate or impede the implementation of PBL among Arts & Science faculty?

Case Study Method

Merriam and Tisdell (2016) define a case study as “an in-depth description and analysis of a bounded system” (p. 5). A bounded system is “a single entity, a unit around which there are boundaries…. The case, then, could be a single person who is a case example of some phenomenon, a program, a group, an institution, a community, or a specific policy” (p. 38). The case boundaries for this study are the A&S faculty at a specific institution, across disciplines and levels of instruction. Selection of the case site was based upon recent changes to the GENED, which provided an opportunity to see how the curriculum changes may or may not have encouraged the use of more active learning teaching strategies, such as PBL.

Because this study has the potential to be used for academic and practitioner applications, a case study provides context and analysis that includes a balance of rigor, clarity, and usefulness to higher education administration, faculty and professional development staff (Bazeley, 2013). Furthermore, case studies are used to explain, describe, illustrate, and enlighten the decisions and evaluation of those decisions when there may be not be a predicted set of outcomes (Yin, 2014). A case study approach allowed for the examination of context and other conditions that are
important to developing a broader understanding of faculty perspectives on their decisions to use or not to use PBL in their teaching. The case study approach allows for the development of themes, which correspond to issues, situations, or specific contexts to study in each case (Creswell & Poth, 2018). Because I sought to understand the unique perspectives of A&S faculty toward using PBL, a qualitative case study allowed for comprehensive insight into the reasons why faculty may or may not decide to use PBL in their classes. Furthermore, Yin (2014) highlighted the purpose of an exploratory case to be one in which research questions or procedural elements are identified for use in future studies.

The case study method and framework selected for the study is based on the five steps Yin (2014) identified as elements of case study design: design, prepare, collect, analyze, and share. The rationale for using this approach was to provide a logical framework in which a relevant, real-world situation provides the setting for research. The first four steps are reviewed in the following sections. The sharing aspect of the approach, the fifth step, occurred in the final writing of the findings and discussion of the dissertation.

**Design**

The design of this case study starts with the selection of the type of case study used for the research, and the focus of an exploratory, descriptive case study on a particular phenomenon allows for in-depth study. The purpose of this exploratory, descriptive case study (Yin, 2014) was to explore the use of PBL in three ways. First, I sought to see if faculty are using PBL in A&S across disciplines to support curricula, create co-curricular transcript opportunities, and present course content in both undergraduate and graduate level courses. Second, the study was designed to understand the supports and challenges faculty members encounter as they design and implement in their courses (Duch et al., 2001). The findings of this research can provide
understanding on how to prepare faculty in the use of PBL and what resources might be helpful to encourage the use of PBL across disciplines. Third, faculty members may not have received sufficient training in the use of PBL, which may also influence their decisions to use PBL in their courses. As little research related to faculty considerations in the use of PBL exists, this study provides relevant information about faculty perspectives on the challenges and successes of using this pedagogical approach to teaching and learning.

**Prepare**

Limited research is available on the faculty considerations for using PBL in classroom teaching. Although there are recent studies that have begun to explore the implications of designing and using PBL in STEM courses from the faculty perspective (Stains et al., 2018; Honey et al., 2014; McMurtrie, 2018), comparatively little research has been conducted in the use of PBL in the humanities and social sciences from the same perspective. This study adds research beyond STEM and into other disciplinary areas. The preparation for the study involved the creation of a qualitative survey instrument to explore the perspectives of A&S faculty in a single site on uses of PBL to promote student learning and to enhance course instruction to promote student learning experiences.

A qualitative survey involves the “study of diversity (not distribution) in a population” (Jansen, 2010, p. 2). Fink (2002) suggested that surveys of a qualitative nature allow the researcher to explore experiences and meanings in a study. Specifically, a qualitative survey was used to determine if, when, and how faculty use PBL in their classes. For the purposes of this study, the use and application of PBL were considered. One definition of PBL states that it is “an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable
solution to a defined problem” (Savery, 2006, p. 12). PBL may involve several considerations and implications for use which may be different course to course, within programs of instruction, between departments, and from school to school within a higher education setting.

The decision to implement PBL may be the domain of the individual instructor or department. However, other stakeholders exist beyond the faculty who may have a say in the decision as to the use of PBL. As part of the survey, sufficient space was provided to encourage faculty respondents to express their motivations in using PBL in their classes. The decision to design and implement PBL in a course, program, or school may involve multiple considerations and requirements that need to be addressed.

Data Collection

The survey instrument was reviewed prior to deployment to the A&S faculty to ensure that the definition of PBL and the survey items were clear and written in such a way as to invite open responses, without bias or leading questions. The use of the pre-screening pilot helped provide face validity or credibility to this instrument (Yin, 2014). The information gathered in the pre-screening involved an expert panel to help assure that the collected data was relevant to the purpose of the research (Bazeley, 2013). There were two pre-screening panels used to determine the face validity and credibility for the survey instrumentation.

Definition Panel

The first screening panel evaluated a definition of PBL that was crafted for use in this study. Three department chairs who represented humanities and STEM areas of instruction (Classical Studies, English, and Geology) were contacted via email to review the definition. The department chairs were provided a copy of the definition of PBL and two questions related to their understanding of the definition as it applied to content areas and asked for suggestions for
improvement on the definition. I conducted a short 15-minute interview with each department head to solicit their feedback. The interviews were recorded to allow me to listen to the responses multiple times to assure accuracy of understanding, but these interviews were not coded as part of the study. EDIRC permission was given prior to the commencement of these interviews.

An initial challenge in creating the definition of PBL was that PBL has been defined in many ways since it was originally developed as an instructional approach. The definitions that exists generally include jargon that may not be familiar to faculty members of differing backgrounds and subject matter. For example, a recent example of a jargon-laden definition is found in the Wiley Handbook of Problem-based Learning (Moalleum et al., 2019): “pedagogical system used in tertiary education both undergraduate and graduate, particularly in medicine but also in fields as diverse as law, engineering, psychology, and liberal arts” (p. 4). The definition is predicated on an earlier definition, in which PBL is described in the Wiley Handbook of Problem-Based Learning (Moalleum et al., 2019), based upon the work of Barrows and Tamblyn (1980), as “the basic principles of [PBL] are the use of realistic problems as the starting point of self-directed, small-group-based learning guided by a tutor who acts as a process guide rather than a point of knowledge transfer” (p. 4). The challenge for the survey was to provide a clear and concise definition of PBL that was as jargon-free as possible.

After the definition screening panel members were interviewed and adjustments made to the definition, the final version used on the survey to be given to the A&S faculty was:

PBL is an instructional approach that uses specific academic content and collaboration amongst learners to address realistic problems. Students engage in the development of knowledge and skills through the process of problem-solving as part of a learning
experience. The learners apply content learned in any class as it relates to the
collection of an answer to the problem. PBL is used to connect related knowledge to a
professional field (e.g., medicine, law, or educational leadership) or PBL can demonstrate
knowledge of what content helps in solving the problem. The instructor should consider
what knowledge the learners need to acquire, what types of problems will demonstrate
the learned content, and which PBL would be appropriate to meet the objectives of the
program or course in which PBL will be implemented.

**Survey Panel**

The second pre-screening pilot consisted of a survey instrument-screening panel that
consisted of four current or retired faculty/staff who evaluated the survey items. The reviewers
did not participate in the survey, as they are either not A&S faculty members or are retired A&S
faculty. The panel evaluated the survey items for clarity and for connection to the research
questions. The comments from the screening panel were used to rectify any inconsistencies and
add clarity to the survey items to ultimately assist participants in responding to the survey. As a
result of this review, it was determined that the survey needed minor revisions to the phraseology
of the short response questions to facilitate easy of understanding for the participants.

A confirmatory crosswalk table was created to reflect the alignment of the provided
definition, research questions, and survey items (Appendix A). A crosswalk table is used to map
relationships between fields of different metadata schemas or coded data in a study (Evergreen,
2017). As PBL is often a conflated term, it may be difficult to understand the subtle nuances in
determining the use of PBL amongst faculty. Although faculty were not asked specifically to
align the provided definition of PBL to their personal definitions, it was important that all
participants had a common definition from which to respond to the survey items.
After all the reviews of the PBL definition and survey occurred, an informational email was sent to the department chairs of all A&S departments (total of 51, which includes both graduate and undergraduate programs) via the Dean of A&S listserv. The email to department chairs (see Appendix B) described the nature of the study and served as a request to the department heads to forward the survey link to all faculty, adjunct faculty, and instructional graduate students who are currently teaching graduate and undergraduate courses through their departmental listserv. The survey link took potential participants to the Qualtrics survey tool available to faculty, staff, and students at the institution. The faculty had 30 days to respond to the request.

After the 30-day period, there were 15 completed surveys; I requested the Dean of A&S resend the email to the department heads with another 30-day period given for responses. At the conclusion of the second 30 days, five more surveys were received. A final request was made to the Dean of A&S to use the faculty listserv to send the survey to the all faculty and instructional staff across all programs of instruction with an additional 30 days given to complete the survey. In taking this step, a further 31 completed survey were submitted bringing the total number to 51 surveys received. It should be noted that, including the incomplete surveys, there was a total of 100 surveys at the conclusion of 90 days allocated for the survey; but only the completed surveys were analyzed.

**Survey Instrumentation**

As part of this exploratory descriptive study, a survey instrument was developed to collect data from faculty members regarding their use of PBL (Appendix C). Other researchers have used survey instruments with follow up interviews in a similar fashion to this research.
study (Pennamon, 2013). This form of data collection and analysis provided additional insights to address the research questions.

Data collection for this exploratory descriptive case study included a survey instrument with open-ended questions that focused on the perceptions and experiences of designing courses, which includes PBL as a teaching and learning pedagogy (Yin, 2014). The survey was created to align the survey items and participant responses to the research questions using the literature of both the APM and PBL.

Participants were given 2 weeks to complete the survey and to submit their responses via the Qualtrics program. The timeline for the survey was as follows:

1. The A&S department chairs received the initial letter and link to the survey.
2. The following week a reminder email was sent to the department heads.
3. Three days after the reminder email was sent a final reminder was emailed.
4. I contacted the Dean of A&S and asked to resend the survey to all department heads.
5. I contacted the Dean of A&S again and asked to send the survey to all instructional faculty and staff using the official Dean’s office listserv.
6. The completed survey data were collected via Qualtrics software.
7. The data from the survey were analyzed and codes created.

The survey was set so that only one response could be submitted per person. The submitted surveys were reviewed and sorted to ensure only completed surveys were included in the analysis. The survey instrument represented one part of the data collected for the study.

**Interview Protocol**

A total of 12 faculty members completed follow-up interviews. The interview questions were structured to be open-ended, non-specific, and pertain to the focus of the study (Creswell &
Poth, 2018). The questions for the interviews were based upon the survey items and designed to allow expanded responses, which included information beyond the survey responses that encouraged discussion of the uses of PBL (Appendix D). The selection of the 12 faculty was based on their indicating a willingness to be interviewed at the end of the survey and representation from different disciplinary areas. Those selected for interviews signed an additional consent form for this stage of the study (see Appendix E).

The individual interviews lasted approximately 15-30 minutes. The interviews often ran over the 20-minute mark, as the faculty being interviewed had much to share and questions which they wished to have answered. The first six interviews took place on-campus in faculty offices. The remaining six interviews were conducted via the Zoom web-based communications platform, which is available to all faculty, staff, and students at the institution. Due to the closure of the institution related to COVID-19, Zoom was used to complete the interviews and interviews were scheduled at the time determined by the faculty member. The interviews were recorded on a handheld device, which had voice recording software. The recordings were kept confidential and are accessible only by me. The interview responses were transcribed verbatim for analysis.

Document Protocol

The third element of data collection included a review of documents voluntarily provided by interview participants. The documents included copies of course syllabi which included individual and group assignments to be completed as part of the class. The syllabi were reviewed for evidence of use of PBL. The document analysis provided supporting information and details regarding the presence, or not, of PBL.
Data Analysis

In using a triangulation of collected data, a deeper and broader understanding of faculty perspectives on the use of PBL was sought. For analysis, the survey responses were separated by demographic information and survey response categories. For example, the demographic data included the department or program of study for the faculty member, gender, tenure status, length of teaching experience, and faculty role (e.g., tenure track, non-tenure track, graduate student). This information provided a way to look for trends based on demographics and faculty profiles. For example, social science departments, humanities, and the natural and hard sciences faculty responses were tallied and compared. This comparison, while not for use in statistical analysis, helped profile the response rates in these disciplinary areas.

The data collected from the survey responses helped triangulate the analysis. Yin (2014) defines triangulation as “the convergence of data collected from different sources, to determine the consistency of findings” (p. 241). The second portion of the triangulation of data included the faculty interviews. The final part of the triangulation was the document analysis of the items the interviewees bring to the interview session. The documents helped provide context for understanding how instructors are using PBL in A&S departments.

The survey responses, interview data, and documents were coded using the eight elements of the Academic Planning Model (Lattuca & Stark, 2009; see Appendix D). For example, if a participant explicitly mentioned the importance of the sequence of a class in relation to another class in the same program of study, the information would be coded as “S” for sequence for data analysis. Other emerging codes were assigned on themes not aligned with the APM codes. For example, there were references to prior knowledge of PBL (PK) and prior training in PBL (PT). Bazeley (2013) stated that coding “provides a means of access to evidence;
it is a tool for querying data, for testing assumptions and conclusions” (p. 125). The codes allowed for the management and tracking of the data, helped build ideas or concepts from the data, and assisted in developing queries that may asked about the data. The coding schema also allowed for an audit trail as a record of decisions, ideas, and questions that arose during data analysis.

Deductive coding of the data based on the theoretical framework provided one part of the data analysis. Emerging themes were evaluated for connecting patterns and themes using an inductive approach. As Yin (2014) suggests, this approach can “become the start of an analytic path, leading one farther into the data and possibly suggesting additional relationships” (p. 137). This approach allowed for the development of concepts and patterns to emerge that provided further directionality to the study. The themes, patterns, and relationships that emerged during the study were placed on a crosswalk table (Appendix A) and formed the basis for determining the factors that influence if, how, and why PBL may or may not be used in Arts & Science courses.

A crosswalk table helped to show the triangulation and interrelatedness of the survey responses, document analysis, and the faculty interviews regarding the use of the PBL approach to instruction. A crosswalk table allows readers better visualization for the organization of the data analysis. Evergreen (2017) suggests that visualizing data assists in communicating the research results, adds credibility, and support research findings, as it allows for those unfamiliar with a topic of inquiry to have a road map in understanding connections made in a study. The framework for the crosswalk table used the a priori codes based on Lattuca and Stark’s (2009) APM and included emergent themes.
**Trustworthiness**

Lincoln and Guba (1985) state that trustworthiness is critical in ensuring the quality and rigor of the results of a study by allowing for the findings of a study to reveal a “truth of the findings of a particular inquiry for the subjects (respondents) with which and the context in which the inquiry is carried out” (p. 10). The authors identified four areas that need to be addressed to ensure the trustworthiness of results: credibility, transferability, dependability, and credibility. A definition of each of these criteria and how they will be applied to the study will be presented in the following sections.

**Credibility**

Credibility occurs when the findings provide confidence in the respondents’ perceptions garnered from the data collection. In this study, credibility was addressed by having a panel review the survey items prior to the launch of the survey, the triangulation of data as described above, and the review of participant responses to ensure they align with the APM (Lattuca & Stark, 2009). The alignment of the survey items allowed for collected data to be used, analyzed, and the results were used to present the perceptions and perspectives of the participants.

**Transferability**

Transferability refers to the generalizability of the study which occurred by providing information pertinent to the research context and how the results may be used to inform future studies. Lincoln and Guba (1985) also indicate that transferability also allows a study to be used in other contexts. The results of the study can be replicated in other settings.

**Dependability**

Dependability provides the logical and documented track of the research process. The application of all data collection methods and decisions pertaining to the data should be
consistent (Lincoln & Guba, 1985). The authors also suggest several modalities for ensure the dependability of a study. For this study, dependability was addressed by tracking both the peer review/pilot of the survey and the final survey results on crosswalk tables (Appendix E). Peer review was also used in the coding of the data to ensure that the codes reflected the participant experience with PBL and that they were consistent. The peer review helped support the validity of the coding schema developed from the collected data.

**Confirmability**

Confirmability establishes that the research findings, the researcher’s interpretation, and the conclusions are connected to the data (Lincoln & Guba, 2002). To this end, confirmability was ensured by tying together the triangulated data, the process of analysis, and findings in well-reasoned manner that allow for others to understand why and how decisions were made throughout the study.

**Researcher Statement**

My research focuses on the use of PBL in higher education from the faculty perspective. My study provides exploratory information about the perceptions of instructors across the A&S departments have regarding the applications and challenges they face when determining if, when, and how to implement PBL in the classes. In considering which active learning strategy to focus on for this study, I selected PBL for the connection to practical applications and for the emphasis placed on learning as a process. I have seen students learn by doing and by discovering how to answer questions that may not have easily found answers. In a sense, PBL allows students and faculty to explore how to use collaboration to answer questions that reflect the community concerns beyond the higher education experience.
As a former high school educator, curriculum designer, and professional developer, I have had the opportunity to be trained in multiple approaches to teaching and learning, including active learning strategies. I used my experience and training as a staff developer at the school and district levels. I also implemented a variety of active learning strategies in my practice as a high school teacher of English, History, and literacy classes. I found that my students, who were mostly English Language Learners, struggled to learn when information was presented through lectures or without hands-on application. I began to design and implement daily lessons that incorporated active learning strategies to engage my students and allow them to experience learning as a process. In my capacity as a curriculum designer, I would include “mini-lessons” for each topic covered in the curriculum as the lessons were intentionally crafted to give students the opportunity to work collaboratively and to foster communication. Although the differences were anecdotal, I noticed that there was a marked improvement in grades and student rapport seemed to improve when active learning strategies were used. It was at that point that I began to realize the potential impacts of teaching “outside of the box.”

Throughout my higher education experience, the classes that I enjoyed most and influenced me most as a learner, incorporated some form of active learning as an instructional approach. I can still recall examples and the topics that formed the basis for those nights of class. The use of gallery walks, think/pair/share, collaborative problem solving, use of educational technology, and visits to other parts of campus brought energy and interest to the class. I also experienced the traditional lecture style classes, and while I found the content important, I did not retain the same detailed memories that I have for the active learning-based classes. It was in reflecting upon my learning experiences as a lifelong learner and as a progressive educator,
which led me to consider the myriad dynamics at work when higher education instructional faculty and staff consider using PBL in the classes.

**Ethical Considerations**

To ensure that ethical considerations are met and conform to the requirements for Institutional Review Board approval (IRB) for human subject studies, each participant received a consent form as part of the initial email accompanying the survey. The initial email requesting participation noted that IRB approval from William & Mary was obtained and included relevant information about the study, the expectations for participation, the securing of collected data, and the researcher’s contact information, in case a concern arose during the study (Appendix D). Participants were told that their participation was voluntary and that could leave the study at any time without needing to provide a reason for their decision. The study was conducted with the knowledge of the dean of A&S at the institution.

**Assumptions, Delimitations, and Limitations**

Research involves making decisions that underlie a study and ensuring that the study results will be acceptable and useful to the academic community. To this end, I must address any assumptions that may have influenced how participant responses were evaluated, the delimitations of the participants as representative of a specific group within the case site of the study, and the limitations of the participants given the differences in understanding PBL.

**Assumptions**

There were three assumptions for this study regarding the use of PBL in graduate and undergraduate courses in the A&S. The first assumption was that participants provided honest responses to the online survey questions as they reflected on their use of PBL in their courses. A second assumption was that participants fall under one of the teaching categories (tenured
faculty, non-tenured faculty, clinical staff, and part-time adjuncts/graduate students) and are recent instructors in the one of the departments in A&S at the site institution. As the study utilizes a survey methodology, a third assumption was that the participants represented a cross section of the target population.

**Delimitations**

This study was delimited to a single school within a mid-sized university. The participants for this study consisted of individuals that instruct undergraduate and graduate A&S courses at the site institution. Each participant holds his or her own perspective about the use of PBL as an educational approach to instruction. Responses of the participants may be influenced by their standing within their departments and which courses they teach within individual programs of study in A&S.

**Limitations**

There are several limitations to the conducting the study that should be addressed. The responses to the qualitative survey in this study were small (51 out of a total of 604 A&S faculty), thus not all faculty perspectives may be represented in the findings. Another limitation is that the use of PBL may be new or unfamiliar to the faculty at the site institution. The institutional focus on GENED course revisions may or may not promote the use of PBL. Another limitation may be the availability of resources to implement PBL across disciplines, and finally the conflation of the definition of PBL with other forms of experiential learning may also be a limitation as it may cause faculty to not see themselves as practitioners of PBL.

**Summary**

The purpose of this qualitative case study was to explore the perceptions of A&S faculty on their use of PBL in their courses. A notable research gap is evident about faculty
considerations regarding if, how, when, and why they choose or do not choose to use PBL as an instructional pedagogy in their courses at the graduate and undergraduate levels. Although literature exists to guide those teaching courses in using PBL (Amador et al., 2009; Duch et al., 2001; Savin-Baden, 2003; Savery, 2006), there is little written about how instructional faculty perceive PBL and any underlying challenges that may occur with the design and implementation of PBL in an institution.

Participants in this study were instructional faculty in the A&S unit of a mid-sized university. A qualitative case study design in this study allowed me to delve into the perceptions of instructional faculty use of PBL in their courses. The method of data collection of the study included an anonymous, open-ended question, online survey. The survey focused on the perceptions the participants have of PBL as aligned with Lattuca and Stark’s (2009) APM. The data were triangulated using the survey instrument, document analysis, and follow-up interviews of faculty to present a deeper understanding of the use of PBL at the site institution and if any barriers exist to implementation of PBL across the A&S disciplines. Coding was primarily based on the eight APM elements. Analysis of the three data sources uncovered several emerging themes and findings. These are presented in the next chapter.
CHAPTER 4: FINDINGS

The use of PBL across departments in the A&S was studied given its importance to the stated goals of the GENED curriculum and the increased importance of providing students with practical application of learned content, as it relates to future educational or work-related aspirations. The findings from this study are presented in two sections. The first section reviews the survey responses and offers insights based on demographics, tenure status, and gender. The second section presents the thematic findings that emerged from the participant interviews, short survey responses, and triangulation of the document analysis, including an analysis of the syllabi provided by interview participants.

Survey Findings

The first phase of data collection for this study included a survey sent to all the Arts & Sciences (A&S) faculty via the dean’s listserv. There are 604 A&S faculty, which includes both part time and full time faculty in all departments. The survey instrument included demographic information, short response items in which participants described how they used PBL in their classes or did not use it at all, and a matrix of questions in which faculty identified how frequently they used 15 active learning strategies, including PBL.

Within A&S, there are 42 majors across five broad designated headings: fine arts, humanities, social sciences, mathematics, and the sciences. Organizationally, the fine arts, humanities, and social sciences are further grouped together by the institution, which includes subjects such as art history, classical studies, history, modern languages, public policy, and
theatre. Under the mathematics and science grouping are majors that include biology, chemistry, data science, and physics. For the purposes of presenting the survey findings, I have used the two overarching areas (fine arts, humanities, and social sciences; and mathematics and science) to present information since this is the designated format of A&S departments at the institution.

**Survey Participants**

A total of 51 teaching faculty in A&S responded to the survey. The survey respondents ranged in discipline, gender, and tenure status. Previous experience using PBL was not required to participate in the survey. Most participants (76%) represented disciplines in the arts, humanities, and social sciences; the remaining 24% represented mathematics and science. The gender representation of respondents was 53% (27) female and 43% (22) male participants, with 4% of participants (2) not indicating gender. Of those in the arts, humanities, and social sciences, 64% were either tenured or were in tenure-track positions. Of the mathematics and science respondents, 85% were in tenured or tenure-track positions.

To situate this demographic information on survey participants, I looked at the overall demographic information for all A&S faculty personnel. The open nature of the survey meant that all faculty had an opportunity to participate, and the intention was that the composition of survey respondents would reflect the faculty at large in the institution. On campus, there are 604 full- and part-time faculty in the A&S division, with 85% (515) of the faculty members full-time and 15% (89) part-time. In the fine arts, humanities, and social sciences, 68% (359) are full-time, 28% (142) work in the applied sciences, computer sciences, mathematics, and natural science departments, and 4% (14) work in interdisciplinary programs, which are uncategorized and associated with institutes found on campus. Table 1 below highlights how the survey participants align within the overall faculty demographics of A&S.
Table 1

*Survey Demographics Relative to Overall Arts & Science Faculty*

<table>
<thead>
<tr>
<th>Category</th>
<th>Respondents</th>
<th>A&amp;S Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Arts/Humanities/Social Sciences</td>
<td>39 (76%)</td>
<td>425 (71%)</td>
</tr>
<tr>
<td>Computer Science/Math/ Natural Sciences</td>
<td>12 (24%)</td>
<td>153 (25%)</td>
</tr>
<tr>
<td>Interdisciplinary/ uncategorized departments or institutes</td>
<td></td>
<td>26 (4%)</td>
</tr>
<tr>
<td>Full-Time</td>
<td>36 (71%)</td>
<td>515 (85%)</td>
</tr>
<tr>
<td>Part-Time</td>
<td>15 (29%)</td>
<td>89 (15%)</td>
</tr>
<tr>
<td>Female</td>
<td>27 (53%)</td>
<td>259 (43%)</td>
</tr>
<tr>
<td>Male</td>
<td>22 (43%)</td>
<td>345 (57%)</td>
</tr>
<tr>
<td>Prefer not to answer gender question</td>
<td>2 (4%)</td>
<td>-</td>
</tr>
<tr>
<td>Tenured/tenure track</td>
<td>36 (71%)</td>
<td>386 (64%)</td>
</tr>
<tr>
<td>Non-tenured eligible</td>
<td>9 (18%)</td>
<td>218 (36%)</td>
</tr>
<tr>
<td>Adjunct/part-time instructor/ graduate student</td>
<td>6 (12%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Average years of Service</strong></td>
<td><strong>15.06</strong></td>
<td><strong>12.89</strong></td>
</tr>
</tbody>
</table>

Note. Blank cells represented information which was not provided or did not apply to the respondents.

The survey respondents varied in terms of gender, tenure status, and years of service. The A&S faculty have a majority of faculty that are men (57%), with women representing the remaining 43% of the faculty. This representation is reversed in the survey participants with women respondents in the majority (53%) relative to men (43%). Because the university does
not collect gender-neutral designations for faculty members, the two respondents who opted not to disclose their gender (4%) do not have a comparative group.

Like gender, there is a difference in tenure status between the overall faculty population in the A&S and survey respondents. On campus, the total number of those who are tenured or tenure eligible at present is 386 (64%) and those not tenure eligible is 218 (36%). The survey responses were overwhelmingly from tenure-eligible faculty (71%), which may affect the analysis of the data as it may not represent the full range of non-tenure eligible faculty on campus. Additionally, survey data includes an overrepresentation of part-time faculty and staff (29%) relative to the number of part-time faculty overall in A&S (15%). The larger number of part-time respondents to the survey indicates a skewness in those identifying as contingent faculty. The average years of service of the respondents was slightly higher (15.06%) than the average for the overall faculty (12.89%), a difference that may be explained by the 24 (47%) survey respondents indicating they had 15 years or more years of service at the institution. As the table above shows, there was potential non-response bias in the survey responses based on who responded to the survey and who did not. The findings from the survey are not generalizable given the response rates and the presence of non-response bias, yet the survey responses are able to provide information to contribute to the initial exploration of the topic of use of PBL on campus.

**Survey Themes**

Responses to the survey highlighted that what faculty knew about PBL and how they developed skills in using it in their classroom teaching, if they did, influenced perceptions of the use of PBL. Faculty were motivated to use PBL for a variety of reasons, with career stage, the influence of student evaluations, and competing time demands having a role in their decision to
use (or not) PBL. Gender differences also emerged in the faculty members’ choice to use PBL or not.

**Awareness of PBL**

Of the faculty surveyed, 25% of respondents indicated that they either did not fully understand PBL or that they lacked enough training to implement the approach in their classes. Even though 80% of those surveyed indicated having some knowledge of PBL prior to completing the survey, 34% of those who indicated prior knowledge of PBL did not know the term PBL. Instead, these faculty members thought PBL meant “learning by doing” as one respondent described their understanding of PBL prior to seeing the supplied definition on the survey. Hence, the vast majority indicating knowledge of PBL may have in fact conflated PBL with other active learning strategies.

The faculty noted that their use of PBL occurred as a result of a trial and error processes to adjust for student needs and not as part of a larger plan to adjust their curricula to be more PBL-based. As one survey respondent from the classical studies department (CLS/T/F/16) said in the short response section, “My use of PBL was by trial and error, as I try to refresh my pedagogy over the years.” The high number of respondents indicating they had some knowledge of PBL may be overrepresented given the fact that what individuals “thought” was PBL differed from the definition used for this study.

The implementation of active learning strategies, in general, to invigorate curricula and student interest was likewise expressed by another survey respondent as evolving over time. A tenured faculty member in psychology offered in her short response survey section comments, “I have developed [PBL] approaches through an attempt to find active approaches to learning in my classes.” In seeking out strategies to make learning more active for students, some of the faculty
turned to PBL as an approach and fine-tuned the process over time, with the objective to engage students in learning.

Further complicating the identification of the use of PBL by the faculty members was a lack of understanding of what constitutes PBL and absence of knowledge about the correct terminology for PBL specifically, as it was more common to use the generic term of active learning due to its vernacular use at the institution. Some faculty members may have used PBL and just been unaware of the naming of the strategy as PBL. Pointedly, 47 (92%) survey respondents indicated that they use some form of PBL at some point in the semester. This higher percentage reflects how the participants used the provided definition of PBL and then realized that their classes aligned to that definition, even though only 80% indicated they had some prior knowledge of PBL. It is also likely that those who were familiar with PBL from previous experiences could directly relate their instruction closer to the use of PBL.

Participants learned about PBL in a few different ways. Eight (16%) of those surveyed indicated that they learned about PBL as result of having experience from classes they took in the graduate or undergraduate courses, and four (8%) respondents stated that they learned about PBL from departmental colleagues. These passive mechanisms, which may not have involved formal professional development or training, for learning about PBL as a strategy corresponds to the finding that shows 59% of those who have implemented PBL activities in their classes received no formal training in the use of PBL. The remaining 41% of those surveyed indicated that their knowledge of PBL came out of their professional lives outside of academia or from personal research they conducted to find new instructional methodologies. For example, two survey respondents used their experiences as professional artists and dancers to demonstrate and explain to students how to improve their studio learning through solving problems related to
difficult to understand technical issues faced in the studio learning context. Seven participants (14%) referred to learning about PBL as a result of personal research into instructional strategies by means of various articles, blogs, conference sessions, and webinars created by other institutions and professional organizations. Here, the respondents learned about PBL for the first time or were encouraged to use it as a result of their professional development experiences. It should be noted that four of the survey respondents could not recall where they first learned about PBL and three left the item blank on the survey. Faculty learn about PBL in a variety of ways, and as a result of this background with PBL, there may be inconsistency in their understanding of PBL and how they use it in their classes.

**Motivation to Use PBL**

At present, problem-solving activities are being actively encouraged by the upper administration of the institution as part of the changes being made to the GENED requirements to provide students with learning experiences that extend beyond the classroom. The former dean of A&S stated in a 2013 interview about the changes to the GENED, “this curriculum ensures that each student leaves (the institution) able to think deeply and critically and to make new connections between various kinds of knowledge – the best kind of preparation for their future success “ (Staff, 2013).

The need to adapt and shift focus to bridge education with the skills students will need for future success was echoed by Mike (Phy/T/M/25):

> We have a new track in the physics major called engineering physics and applied design. It is attempting to base much more of the curriculum on, say, “OK you have some theoretical tools and mathematical tools, you have learned how to use machine shop or 3D printers, what can you do?” And we're trying to get students when they take this
track, they will have a final year design project. You may have seen in the university news that someone was hired in the applied science Department to run the makerspace and has been making face shields for hospitals with some of our students. It was like, here is a real-world problem and what can we do with these tools to help fix it and design it? So, I'm hoping we will build more and more of that in the curriculum. Although it tends to happen later in the curriculum.

PBL provides students with practical applications for learned content and encourages collaboration amongst students. The participants from the faculty survey expressed that even though they felt that PBL is a useful strategy, it was not always practical or necessary to use PBL in every course in a program. Interestingly, faculty respondents included the titles of specific classes in which they use PBL as part of their instructional approach. Though not asked for this information, some respondents voluntarily provided this class listing to highlight the match between course topic and PBL as a pedagogical approach.

**Career Stage**

The survey also queried about age, department, and tenure status to see if these factors had a role in if and when the faculty chose to use PBL or not. As this study is exploratory in nature, it is important to note that the focus was on establishing patterns amongst faculty, but given the sample size, no statistical tests were conducted. Some trends were identified based on different demographics that might be explored in further research. Of the 23 more established tenured faculty (more than 15 years at the institution) responding to the survey, 12 respondents (52%) indicated that their choice to not implement PBL was about having time in a semester to implement a new strategy, being motivated to do so, and having adequate resources. Although they expressed issues with implementation, of the 28 faculty respondents with less than 15 years
at the institution, nine indicated that they learned about PBL as part of their educational experiences in undergraduate and graduate school, four learned about PBL as part of a training program or presentation at a conference, four developed PBL activities without any formal training, nine had not heard of PBL before reading the definition provided as part of the survey, and two did not respond to the questions if they use PBL and how they learned about PBL. The newer faculty represented a diverse range of knowledge about PBL given their differences in educational backgrounds and disciplines.

The faculty respondents with under 15 years at the institution, revealed a higher rate of using PBL in their classes as 68% of newer faculty indicated that used a PBL approach, compared to 48% of those faculty with over 15 years at the institution. Of the newer faculty who indicated that they use PBL, nine indicated that they had received no formal training in the use of PBL. In three cases, PBL was used in their graduate programs or learned via webinars, and faculty members did not consider the latter option formal training. Of the remaining nine faculty members, five indicated formal training received through direct instruction in the use of PBL as part of a professional development experience. There were three faculty who did not respond to the question about receiving training in PBL.

Influence of Student Evaluations

In several instances, some survey participants mentioned a trepidation about receiving lower student evaluations should the use of PBL not produce desired outcomes from the students’ perspective. This stance was corroborated by Mike (Phy/T/M/25) in his interview. Mike stated:

If I give them a problem-based topic, it will delve deeply into a small fraction of what they know, but it does not cover a range of other things. So, especially in a course where
we have to fulfill the curriculum needs of standardized tests, like the MCAT or the GRE in physics … they won’t have been exposed to as wide a range within the subject matter.

Another challenge is assessment and grading. I always struggle. There is some peer assessment you can do, but sometimes it is hard to parse out the differences in contributions to a project, if a project becomes a significant fraction of a grade. Labs give us more opportunity for doing it. The problem is introductory labs have to meet medical school criteria. There is a wide range audience of the students for how much they want to get out. Trying to balance that so the students who do out in the effort and learn something will get the grade they need.

Mike noted why he does not use PBL given the need to cover a wide range of content and the perception that PBL strategies truncate the ability to cover all topics and could result in lower student evaluations.

The concern about evaluations based on student expectations was mentioned in two other follow-up interviews. Megan (Psy/T/F/16) expressed her concerns for potential reaction in her 200-level classes in this way:

It's really scary and overwhelming to me. I don’t want to put even more work on them. I would not want to say, well now we are going to discuss this paper when they already have listened to a lecture and have read the textbook. I can see them complaining about that as it would be like the workload of an upper semester seminar as opposed to second year class.

In Mitzy’s (MDL/T/F 17) interview, she spoke about the issues she has found when working with her 100-level classes:
If it's just the freshmen initially, of course, they've got my class and a million other classes or things to be doing and it's not going to speak to everyone. So, if a course is problem based and a student just takes the course because it is required, they may not see it of value. So, I think there can be mixed results. It can backfire for if the students do not understand the purpose of the experience. If students give negative evaluations, it may have consequences for the faculty member, which could affect their pay and types of courses they teach.

The similar language in the comments by these two faculty members underscores the concern of student evaluation responses and aligning PBL strategies based on the level of course instruction. The concern appears to stem from the amount of work being asked of students and if they will be open to learning PBL experiences. The concern for student workload was also voiced by a survey respondent from the Biology department, “If students don't like it (they feel it is too much work) and a review me poorly. Student reviews are important for tenure.” The concerns about evaluations and how they may affect faculty status may play a greater role in the decision to use PBL.

**Competing Time Demands**

In the short response section of the survey, 12 participants, who identified that they use PBL on a weekly basis, stated concerns about the amount of time planning PBL might take and how they might assess the learning from PBL activities should they be included in their course designs and planned assignments. In the case of some mathematics and science faculty, a third of the survey respondents who use PBL weekly (4 of 12) voiced concerns about having their funded research agendas interrupted and expressed other concerns about using PBL. The 12 faculty interviewed, based on their survey responses, were asked why they do or do not use PBL and
what additional resources they would need to implement or continue to use PBL in their classes. Despite using PBL on a weekly basis, Mel (Phy/T/M/16), one of the long-tenured faculty, stated:

A lot of R&D is driven by curriculum and education departments or by smaller schools that typically do teacher training. So, we spend half our time doing research and supervising PhD students. So, we have less time for that, and the smaller programs might not do it well because they don’t have as many majors or resources…. There are professional organizations which meet once a year [that focus on teaching], but in a PhD department there is not much of an incentive to go. It is not where your biggest rewards comes from, publish or perish, bring in grants, and support of grad students is more critical to your ongoing success and reputation.

A similar stance preferencing research over teaching was voiced by Max (Bio/T/M/19) who expressed his concerns about taking time away from his other responsibilities in this way:

The idea of spending time explaining things that are really kind of outside of the scope of microbiology to me is taking away time from things that I feel like they need to know. Coming up with a streamlined way to do that and I just need some kind of incentive. Somebody to light a candle under me so that I will be willing to say I will do one. I’m looking down the barrel of retiring in the next five or six years. The idea that I might have to rework or innovate a class is not easy to swallow.

Some of the survey respondents focused on the time constraints of course preparation for PBL that would compete with their other professional responsibilities, such as research and other forms of funded activities. They believed that implementing new strategies like PBL takes time away from research goals.
**Gender Differences**

The demographics of faculty respondents who used and did not use PBL show some patterns, in particular regarding gender. Although the sample size numbers are small, the data may be used for informational purposes with respect to the current use pattern of PBL and the development of future professional development designed to meet the needs of the different A&S disciplines. Tables 2 and 3 show how men and women in the arts, humanities, and social sciences, and mathematics and sciences use PBL in their classes. Men and women in the arts, humanities, and social sciences employ PBL at approximately the same rates (69% and 71% respectively).

In the mathematics and sciences, however, a stark difference occurs for the use of PBL by men and women, with men much more likely to use PBL (78%) compared to women (33%; see Table 3). Of the 15 faculty in mathematics and science, nine were men and five were women (with one respondent not indicating their gender), and the men were more likely to be tenure track 67% and at the university longer. Four of the tenure track faculty men have been at the university for 20 years or more, the remaining three have been at the institution between 4 and 19 years. Comparatively, three women in mathematics and science are tenure track, with two of these women working at the institution for 19 or 27 years, and the remaining woman in her position for 13 years. Of the remaining four faculty members in the unit, three indicated they were adjunct faculty and one did not response with their number of years of service or their rank.

Of the 27 women survey respondents across the units, 13 (48%) had less than 15 years of experience at the institution and of those 10 women (37%), were either adjunct or NTE faculty. Women respondents were more likely to be non-tenure track (10) compared to men (4). One female NTE survey respondent expressed her concerns about possible negative teaching
evaluations using PBL as “It takes too much time. I am afraid I'll do poor job. If it is poorly executed or poorly understood by students, faculty, and supervisors it is problematic especially if it sacrifices content.” Another female science faculty member with 27 years at the institution, voiced that her decision not to use PBL in her classes was due to negative evaluation a colleague had when using PBL at another institution, “My colleague at another university reported low course evaluations relative to colleagues teaching the same course when using PBL.” Interestingly, none of the male survey respondents mentioned evaluations in their survey responses, but instead seemed more concerned with assessing PBL work products and covering required course content. The lack of direct reference to evaluations does not necessarily mean that male faculty are not concerned with the possibility of negative evaluations and can indicate an area of future study regarding how the evaluation process influences faculty teaching strategies. Caution in interpretation should occur, however, given the small sample size. Further exploration into this pattern must occur before information is generalizable.

Table 2

*Arts, Humanities, and Social Sciences, Gender, and PBL*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Humanities/ Social Science</th>
<th>Use of PBL</th>
<th>M Years of Service</th>
<th>Tenure Track</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Often/ Sometimes</td>
<td>Rarely/ Never</td>
<td>No Response</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>16 (73%)</td>
<td>6 (27%)</td>
<td>0</td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>9 (69%)</td>
<td>3 (23%)</td>
<td>1 (.8%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

85
Table 3

Mathematics and Sciences, Gender, and PBL

<table>
<thead>
<tr>
<th>Gender</th>
<th>CSI/Math/Natural Sciences</th>
<th>Use of PBL</th>
<th>M Years of Service</th>
<th>Tenure Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5</td>
<td>3 (60%)</td>
<td>2 (40%)</td>
<td>13.4</td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
<td>7 (78%)</td>
<td>2 (22%)</td>
<td>20.5</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Teaching Strategies

Table 4 shows the ranked order of teaching strategies as indicated by survey respondents. Faculty responses showed that they used instructor-centered (94%) and traditional lecture formats (92%) most often used by faculty in their classes. The use of real-world strategies, such as PBL and career-based applications, were used less frequently by faculty respondents despite the assertions of survey respondents to the contrary. Thus, even if faculty are using PBL, it may not be a primary pedagogy. The short answer responses showed that while PBL is a known instructional approach, it is not used on a regular basis by the faculty surveyed. The incongruence of the self-reported use of PBL as reported above and the actual choices by faculty members on teaching strategies presents a contradiction. On the one hand, survey respondents indicated having used PBL at least one time in the Fall 2019 semester which suggests a high use of PBL (92%) in their courses. On the other hand, when asked to indicate the use of teaching strategies in their classes, the vast majority rely on passive teacher-centered practices most regularly.

The survey asked how frequently a particular active learning strategy was used: nearly every session (5), weekly (4), several times a term (3), once or twice a term (2), or never (1). The
means for each strategy were then calculated separately and weighted to determine the average use. This approach helps to identify patterns among the various active learning strategies as measured by how often the survey participants used the particular strategy.
### Table 4

*Rank Order of Active Learning Strategies by Weighted Mean*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Nearly Every Session (5)</th>
<th>Weekly (4)</th>
<th>Several times a term (3)</th>
<th>Once or twice a term (2)</th>
<th>Never (1)</th>
<th>Weighted M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor-student (n=50)</td>
<td>16</td>
<td>26</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>4.02</td>
</tr>
<tr>
<td>Traditional Lecture (n=49)</td>
<td>23</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>Provide structure, supports, and scaffolding for challenging content (n=48)</td>
<td>21</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>3.93</td>
</tr>
<tr>
<td>Incorporation of prior knowledge in course design and instruction (n=49)</td>
<td>22</td>
<td>10</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>3.91</td>
</tr>
<tr>
<td>Problem-based Collaboration (n=51)</td>
<td>17</td>
<td>11</td>
<td>12</td>
<td>7</td>
<td>4</td>
<td>3.85</td>
</tr>
<tr>
<td>Connect course content to student interests (n=51)</td>
<td>18</td>
<td>11</td>
<td>13</td>
<td>6</td>
<td>3</td>
<td>3.56</td>
</tr>
<tr>
<td>Assignments and projects which span multiple class sessions (n=51)</td>
<td>18</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>3.50</td>
</tr>
<tr>
<td>Interdisciplinary connections (n=51)</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>4</td>
<td>3</td>
<td>3.43</td>
</tr>
<tr>
<td>Application of course content to current events (n=50)</td>
<td>10</td>
<td>13</td>
<td>18</td>
<td>2</td>
<td>7</td>
<td>3.34</td>
</tr>
<tr>
<td>Connect to careers (n=50)</td>
<td>4</td>
<td>9</td>
<td>21</td>
<td>1</td>
<td>8</td>
<td>2.58</td>
</tr>
<tr>
<td>Metacognitive (n=51)</td>
<td>3</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>19</td>
<td>2.37</td>
</tr>
<tr>
<td>Cooperative (n=50)</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>22</td>
<td>2.2</td>
</tr>
<tr>
<td>Use of content skills outside of the classroom (n=49)</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>16</td>
<td>17</td>
<td>2.06</td>
</tr>
<tr>
<td>Production of content/materials for community sharing (n=51)</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>14</td>
<td>27</td>
<td>1.76</td>
</tr>
</tbody>
</table>
Table 4 reflects the instructional trends and choices of the faculty who participated in the survey. The instructional strategies that had a high weighted mean reflect traditional instructional methodologies: instructor-student strategies, traditional lecture, scaffolding of difficult content, and use of student’s prior knowledge of previous related content. These strategies are familiar to most faculty as they may have had similar learning strategies used in their educational experiences. The mid-range of weighted mean averages included approaches that encourage students to work together, make interdisciplinary connections, and use multiple classes sessions to produce assignments or products, and include PBL and collaborative learning strategies. The lowest ranked strategies included career connections, cooperative learning, use of content outside of the classroom, and the production of material to be shared with the greater community. The differences in the understanding of these strategies may have played a role in how faculty identified their use patterns of the survey.

The strategies presented in the survey were chosen to represent a broad range of possible instructional methods that may be utilized in a variety of content areas. The top four strategies (instructor-student, traditional lecture, scaffolded design, and incorporation of prior knowledge) that survey respondents used the most provide students with information in a clear and structured format, which supports learning via context and retention of large quantities of new material, particularly information which is abstract in nature (Duch et al., 2001). The use of these more traditional methodologies may be more familiar to faculty and illustrate a more teacher-centered approach to instruction (Barr & Tagg, 1995).

The data provided in the short response section of the survey provided respondents an opportunity to express what supports would encourage them to use PBL rather than a more traditional methodology. A male adjunct faculty member who had been working at the institution
for two years in the Mathematics department, and who rarely uses PBL, said in the short response section: “I think the framework is already there, I would just need time outside of class to research potential applications of the material I teach to see what types of problems would even be relevant.” The reliance on more traditional forms of teaching strategies may be more common in newer faculty members, in particular those in contingent faculty roles. More research is required to know if this perspective holds across all new and contingent faculty. Providing faculty who are willing to consider using PBL with opportunities to learn how to adapt course content and implement PBL may provide needed support to begin the process of encouraging faculty to design curricula which includes the use of PBL across disciplines. The topic of support was further explored in the follow up participant interviews.

The next two mid-ranked strategies, which are more student-centered rather than instructor-based, are problem-based strategies and collaboration. These strategies form the basis for PBL. Of the faculty who indicated using problem-based strategies, the most common form of PBL used was the case study approach in which students, either independently or in small groups, applied course content to an assigned case. The use of collaboration was left open to interpretation as it may include small groups tasks or larger projects in which students work together. Even though 10 survey respondents identified the use of case studies as their primary means of using PBL, the remaining faculty who indicated they use PBL applied it in different ways to engage students in the learning process. For example, a seasoned female tenured faculty member from the theatre, speech, and dance department (at the institution for 37 years) stated, “[PBL is] used to support demonstrations, exercises for students to familiarize themselves with techniques, hands-on participation in laboratory or projects assigned to address specific aspects of problem-solving.” A female member of the MDL and film studies departments who was also a
seasoned tenured faculty member (at the institution 30 years) shared her use of PBL in a film studies class:

I have the students work together to make posters showing how an animal might change over time from one color to another or might grow claws, etc. I have my students watch a clip of a film and work to read the clip as a formal artwork and as a social or political document.

The use of actively creating the posters and linking this information to a film provided students with active, problem-based experiences in this class. PBL may take on a variety of forms from case studies to the creation of products that require the application of learned content using varying skills to solve either real-world or theoretical questions posed in a course assignment or task.

The use of PBL, as an independent strategy, ranked fifth amongst the instructional strategies presented in the survey (Table 4). From the data, it should be noted that in the arts/humanities/social sciences disciplines, a majority of those who use PBL are women. However, in the mathematics and sciences division more men tend to use PBL (Tables 3 and 4).

The next four active learning strategies in Table 4, which represent the lower mid-tier strategies, were used several times in a semester: connection of course content to student interests (weighted mean = 3.56), multiple class session assignments and projects (weighted mean = 3.50), interdisciplinary connections (weighted mean = 3.43), and application of course content to current events (weighted mean = 3.34). This cluster of teaching strategies provide students with opportunities to make content connections across disciplines and to explore their interests which may or may not be directly related to a specific course. The use of a more interdisciplinary approach was also discussed in 3 of the 12 interviews as being of interest.
because it provides a chance to bring together information and resources students may possess from other courses and can demonstrate how cross-content may be used to better comprehend difficult concepts or content. Having an opportunity to apply what they are learning in classes to current events provides an active means to actively connect learning for the students.

The remaining five strategies, representing the bottom tier of the strategies, were used with less frequency in classroom teaching, typically once or twice a semester: connections to careers (weighted mean = 2.58), metacognitive strategies (weighted mean = 2.37), cooperative strategies (weighted mean = 2.2), use of content outside of the classroom (weighted mean = 2.06), and production of materials for community sharing (weighted mean = 1.76). The lowest weighted means occurred for the strategies that link curricula to career connections or to encourage students to work beyond the scope of the classroom by applying content to outside activities, such as externships internships, or volunteer work. This category may also include writing publications or other materials for outside groups or organizations. The fact that metacognitive strategies and cooperative strategies were used infrequently raises the question of how much the respondents know about these strategies, and in the case of cooperative strategies if they thought collaboration strategies more closely aligned with what was occurring in class as cooperative strategies relies on more equal buy-in from the students involved. Collaboration, instead, can occur with individuals contributing to a project, but not necessarily cooperating on a level that requires a different type of working together.

Though these strategies were used infrequently overall, a faculty member in sociology (Soc/T/ F/13) described the ways in which she connects students to authentic learning opportunities: “I design assignments that require my students to leave the classroom and engage in the real world. They enter middle schools, interview community members and participate in
community meetings or interview community members.” Another survey respondent in the government department (Gov/T/ F/13) described using content outside of the classroom setting as well, offering: “I integrated it [PBL] into my international service-learning class.” In this example, the faculty member created a course designed to support a service-learning experience in a country that experienced genocide. This project began in 2001 and provides students with the opportunity to volunteer in communities in the country and conduct research in governmental issues for four weeks during the summer. One of the stated goals of the project is to promote communication and understanding across cultures. The course was created to provide an international service-learning experience for students accepted into the project. As some of the least used strategies in the survey, the application of content to the greater community outside of the institution is an area for possible growth in the future as the GENED curricula encourages the use of real-world opportunities as a way to diversify teaching pedagogy while supporting student learning experiences.

The data provided by the respondents to the survey section on classroom strategies gives context for understanding which strategies are currently used by A&S survey respondents and how often those strategies were employed during the Fall 2019 semester. These results are not generalizable given the non-response bias and response rate, yet the patterns they highlight can provide fodder for future research.

**Thematic Finding**

In the second phase of the study, interviews were conducted with those faculty members who provided consent to be interviewed on their survey response. The interviews of 12 faculty members were done either in person or using an online Zoom platform. A transition to online interviewing occurred part way through this study as the campus closed in response to the
COVID-19 pandemic in mid-March 2020. In the final phase of data review, a document analysis occurred on the syllabi provided by 7 of the 12 faculty interview participants. The syllabi included copies of one or more syllabi from the faculty participants’ fall 2019 classes. A total of 13 syllabi were provided from seven faculty, and all syllabi were reviewed. The document review assessed the types of current instructional approaches in use by the faculty participants. All three data sources were then coded based upon the elements of the Academic Planning Model (APM; Lattuca & Stark, 2009; see Appendix E for a list of a priori codes).

Table 5 summarizes the demographics of the interview participants, their pseudonyms, their reported use of PBL, and if they provided a syllabus for review. I created all of the pseudonyms for the participants.
### Table 5

**Information and Pseudonyms for Interview Participants**

<table>
<thead>
<tr>
<th>Name</th>
<th>Department Code</th>
<th>Status</th>
<th>Gender</th>
<th>Years of Service</th>
<th>Use of PBL</th>
<th>Provided Syllabi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>Biology (Bio)</td>
<td>Tenured (T)</td>
<td>Male</td>
<td>19</td>
<td>Rarely</td>
<td>Yes (2)</td>
</tr>
<tr>
<td>Megan</td>
<td>Psychology (Psy)</td>
<td>T</td>
<td>Female</td>
<td>12</td>
<td>Sometimes</td>
<td>Yes (2)</td>
</tr>
<tr>
<td>Morgan</td>
<td>Modern language (MDL)</td>
<td>T</td>
<td>Female</td>
<td>30</td>
<td>Often</td>
<td>No</td>
</tr>
<tr>
<td>Mitzy</td>
<td>MDL</td>
<td>T</td>
<td>Female</td>
<td>17</td>
<td>Often</td>
<td>No</td>
</tr>
<tr>
<td>Manuel</td>
<td>Psychology (Psy)</td>
<td>Tenure Track (TT)</td>
<td>Male</td>
<td>1</td>
<td>Often</td>
<td>Yes (2)</td>
</tr>
<tr>
<td>Margret</td>
<td>Psychology (Psy)</td>
<td>Non-tenure eligible (NTE)</td>
<td>Female</td>
<td>16</td>
<td>Rarely</td>
<td>No</td>
</tr>
<tr>
<td>Mark</td>
<td>History (His)</td>
<td>Adjunct (Adj)</td>
<td>Male</td>
<td>7</td>
<td>Often</td>
<td>Yes (2)</td>
</tr>
<tr>
<td>Maggie</td>
<td>Computer Science (CSI)</td>
<td>TT</td>
<td>Female</td>
<td>3</td>
<td>Sometimes</td>
<td>Yes (2)</td>
</tr>
<tr>
<td>Maxine</td>
<td>Kinesiology (K)</td>
<td>NTE</td>
<td>Female</td>
<td>5</td>
<td>Often</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Mel</td>
<td>Physics (Phy)</td>
<td>T</td>
<td>Male</td>
<td>16</td>
<td>Often</td>
<td>Yes (1)</td>
</tr>
<tr>
<td>Mike</td>
<td>Phy</td>
<td>T</td>
<td>Male</td>
<td>25</td>
<td>Sometimes</td>
<td>No</td>
</tr>
<tr>
<td>Matilda</td>
<td>Public Policy (PP)</td>
<td>NTE</td>
<td>Female</td>
<td>4</td>
<td>Often</td>
<td>Yes (2)</td>
</tr>
</tbody>
</table>

The codes from Table 5 are used to identify the participants’ interview responses and the information they provided throughout the findings. The codes are used in the order in which they appear on the table: name, department, status level, gender, and years of service as needed to provide context and description in the findings (e.g., Matilda, PP/NTE/F/4).

Themes were identified and extracted by examining data collected from all three data sources, survey short answer responses, interviews, and syllabi review. These data reflected the instructional decisions and practices of the responding faculty members. Data were analyzed using NVivo, a qualitative software program, and both survey short answer responses and
interview transcripts were included for this analysis. The document analysis of the syllabi that some of the interview participants provided gives context to how the faculty implement or do not implement PBL in their classes. The syllabi helped determine if those who indicated a use of PBL actually used it in the Fall 2019 semester as they stated or if they have confused another active learning approach, such as collaborative learning, for PBL. Of the 51 survey respondents (80%) indicated that they had some knowledge about PBL and 92% had used a problem-solving activity or approach at least once in the fall 2019 term which may reflect a response bias amongst participants.

The process of data analysis on the short responses to the survey and the follow-up participant interviews resulted in two main findings, which include (a) faculty knowledge and skill development and (b) community learning using real-world applications. Faculty knowledge focused on how faculty members learned about PBL and the ways professional development supported how they applied this strategy in their classes. In this case, certain conditions existed that promoted the use of PBL. The finding of community learning highlights how faculty members design their classes to support student learning through actively addressing problems, which sometimes involves PBL and other times different forms of active learning. Word clouds aided in identifying commonly used words of participants in both the interviews and in the short-answer survey responses.

As a means of initial data analysis, word clouds were created to determine if there were words that appeared in the interviews and short response survey items. Word clouds are a way to visualize data in which text is inputted and the most frequent or prominent words are extracted (Evergreen, 2017). The word clouds provided a basis to determine how the faculty are thinking about student learning and where they could see potential uses for PBL in their classes. The
common words found in word clouds emerging from the interviews and short response survey items were learning and students. The frequency of the use of the word learning highlights its central role and value for faculty members. As faculty are responsible for addressing and meeting student learning needs, this was not unexpected. The same is true for the presence of the word students in both analysis, as students are the recipients of instruction and ultimately evaluate faculty at the culmination of each class taken during a given semester. Other words which were common between the word trees were “think” and “problems,” which connect to how faculty view their roles as purveyors of information who seek to make students think and become better problem-solvers. For some faculty, the word “problem” may also relate to the issues in creating problems or PBL activities for students.

Secondarily, the words “problem based” and “class/classes”, appeared often in the transcripts of the interviews. The word “problem” and “based,” were used together and independently in the interviews to express the creation of problems for students, problems which faculty members have successfully used, and problems with using a PBL approach in their classes. The words “class” or “classes” were used when describing the context for their responses or in providing an example of a class or classes in which they have chosen to use or not use PBL. The word cloud based on survey short survey responses highlighted the words “assignments,” “projects,” and “research,” which may indicate areas in which faculty use or would like to use PBL in their classes.

The word clouds also offer up some information about the use of problems to engage students in applying content to practical contexts. The use of problems may also reflect the shift in the language of the GENED in which problem-solving is encouraged in the upper levels of instruction. Of the faculty interviewed, four stated that they use PBL as it is encouraged in the
GENED and they find it effective for their classes at all levels instruction. Two of those who indicated their use of PBL due to the GENED changes at the university are in CSI/Mathematics/Natural Sciences and the other two faculty members teach in the humanities/social sciences.

The repetition of instructional language such as teaching and skills may also show that faculty were thinking about their instructional practices as they took the survey, which focuses on delivering class content and improving student skills. The word clouds provide a snapshot into potential areas of concern for faculty, particularly as they relate to the acquisition of course content and class work products. The emerging themes for analysis that resulted in the research findings were derived from the overall data, and the language of the word clouds helped provide an initial perspective of the themes.

**Faculty Knowledge and Skill Development**

The first finding centered on faculty knowledge and skill development. The knowledge faculty had about PBL and their understanding and approaches to teaching in general determined how faculty sought to further develop their teaching skills. Faculty members’ perspectives on how and why they worked to enhance or improve instruction influenced their use or lack of use of PBL in their courses. Practical applications of material emerged based on the use of PBL to connect content to a useful context that may exceed the typical boundaries of the classroom. This type of application of class materials challenges students to apply what they have learned in a practical manner, which may reflect the skills needed in a career or professional field. As Lombardi (2007) asserted “colleges and universities across the country are turning to authentic learning practices and putting the focus back on the learner in an effort to improve the way students absorb, retain, and transfer knowledge” (p. 4). The bridge between content and potential
applications of that content for students using PBL can provide valuable learning experiences for students.

The data from the survey and faculty interviews revealed the use patterns of PBL and other common instructional strategies tied to the skills base of faculty members in their understanding of how to use PBL. The short response survey questions were designed to give respondents an opportunity to express if, when, and how they first learned about PBL and how and why they implemented PBL in their classes of any level of instruction. The interview questions were crafted to allow participants to expand upon their initial responses on the survey questions and to gain deeper understanding of faculty perspectives on PBL. The combination of both the survey responses and interviews allows for a deeper understanding of determining how to support faculty who are considering and using PBL in their classes, and to see the range of ways faculty members are currently using PBL. The syllabi provided by the interviewed faculty indicated if PBL was used in their classes and gave context for how PBL may or may not be included in courses, particularly those with complex content or with a large number of students.

The conditions for supporting PBL in classroom teaching include more than just professional development opportunities. The conditions may include such items as class size, inflexible seating arrangements, physical/spatial boundaries of assigned rooms, and access to technology. Although some conditions may be a challenge to overcome, they may provide insight into why some faculty may feel that PBL is incompatible with their teaching environments.

**Influence of Faculty Experience**

The survey responses reflected a variety of faculty experiences regarding how they acquired information about PBL, which ranged from not having had heard of the strategy prior to
the survey (32%), to having been trained in it at their current or previous institutions (22%), to learning about it as a result of personal research in instructional practices (35%). Max (Bio/T/M/19) stated:

I first learned of PBL as a curricular format from some of my graduate students in a school of education where I received a doctorate and now teach intermittently. When that happened, I read and investigated by talking with practitioners. These teachers, now students, were using PBL at the high school level. They focused on social problems that captured the interest and commitment of their students. In my own teaching, students define their research problems and collaboration takes place with class members helping each other. Most of us have arrived at the Dewey core by knowing our subject areas, and the problems related to them very well.

As Max relates, the understanding and use of PBL for faculty may come from a variety of sources, which may connect to faculty integration of new approaches in instructional practice with the goal to improve students’ learning experiences.

The opportunity to attend training sessions, webinars, and workshops on PBL were another source of learning about PBL for faculty, as these sessions provided them with an understanding of the uses of the approach. In the short response section, 19 out of 51 faculty members indicated that they had received professional development in PBL, either out of personal interest or as an extension of learning experiences from their graduate studies. As one interview and survey respondent, Maxine (K/NTE F/5) said in her short response: “I was introduced to this concept in graduate school as a part of a course I took on teaching collegiate courses. I also have been instructed in this practice as a student in a doctoral program in higher education.” Another respondent (MDL/NTE/ M/7) echoed the importance of past PBL
experiences, stating they participated in “teacher training modules/pedagogy classes in college and graduate school.” It is important to note, that two responses specifically referred to training and workshops they completed within the last two years as faculty members at the college. They responded that this training provided them with greater awareness of how to use PBL and gave them with an opportunity to gain insights into how other faculty members may use PBL in their classes and across disciplines. Although training exists on using active learning strategies and by extension, PBL, there appears to be a disconnect between wanting to understand how to implement alternative instructional approaches and the acquiring the information through available training sessions offered at the college.

Respondents also stated that they used PBL as part of their teaching approaches without specific intention or awareness that they were engaging in using PBL. One survey respondent (Soc/T/ M/18) said that he had never heard the phrase PBL. He calls what he does, “learning by doing.” Another survey respondent (Soc/T/PNA/20) indicated that their use of collaboration was not specifically a product of training, rather based on the fact that they thought group work was a practice of good instruction: “I have not learned about it [PBL]…I employ community engagement and assignments that take my students outside the classroom and into the community.” As PBL is a practical approach that encourages students to develop potential answers to real issues and question, having students work in the field with students and teachers towards answering those questions is a highly desirable outcome of PBL implementation. Despite not all faculty having exposure to PBL via faculty development, faculty members described implementing PBL in their own practices when they better understood the definition of the process.
Using PBL to Support Student Learning

For those faculty who knew about PBL in the survey responses, the application of the strategy in their classes took the form of case study analysis, collaborative problem solving, and laboratory assignments in which students must determine possible solutions and outcomes using learned content. Those who have implemented PBL (34%) also indicated on the survey that they did so, in some capacity, to assist students in developing skills that they may use in the careers. Interview respondent, Mitzy (MDL/T/F/17) uses PBL to build career skills in this way:

I have always done [PBL]. Over the years, it has become a way of engaging students actively in the kinds of skills they might need on the job. It’s part of effective teaching in foreign language acquisition and cross-cultural expertise. However, I liken it to a seed that gets planted for greater critical thinking later in life.

PBL may be used to reinforce learned content and to help develop skills that may be applied outside of the classroom in the greater community. Given the institutional shift towards the development of skills that are relevant to specific fields of study and future professional goals, there is paradox in that faculty survey respondents listed the teaching strategy of the connection to career category (Table 5) as one of their least used active learning strategies.

The need to shift instructional design to develop student skills to meet current career needs was echoed by a member of the history department (HIS/AJD/M/7). He noted his use of PBL:

I use of case studies in the history of international politics to address current foreign-policy problems. Adjustment of course material, in part, to address changing current international problems. In recent years I have assigned a final paper requiring students to address “five lessons for current policy-makers” derived from the course.
When building in real-world examples in class, the use of current world events to construct simulations that allow students to apply learned information to generate potential solutions to current problems.

Understanding why faculty do not use PBL to support career-related skills was explored further in the follow-up interviews. The issue of time management and preparation of PBL tasks appeared to be a concern shared by several participants. For example, a member of the Physics department, who does not use PBL in certain upper-level laboratory sections and graduate classes, even though it is part of a departmental initiative described his reasoning. He stated, “PBL is labor intensive in terms of preparation and no canonical examples/resources in the field in certain areas of study as would be the case in my 600-level class.” The adaption of course materials to accommodate PBL may take faculty more time to plan and implement than using familiar traditional methods of instruction like lectures. This finding aligns with the survey responses showing higher use of teacher-centered, passive teaching strategies versus more active learning strategies like PBL.

**Reluctance to Use PBL**

Collaborative learning, critical thinking skill development, and the potential uses of PBL were mentioned in the short answer responses. These strategies have the potential to affect overall student learning objectives, which include building real-world understanding of concepts, potential workforce applications, and development of critical thinking skills. However, 12 of the 51 (24%) survey respondents indicated discomfort using PBL as they felt unprepared to use it in their classes. Margaret (Psy/NTE/F/16), a survey respondent who was interviewed as well, offered why she did not use PBL in her classes and what resources would be necessary to encourage the use of PBL: “I would find workshops, presentations, book club, Studio of
Teaching and Learning professional development, examples of syllabi, successful demonstrations, assignments helpful.” A survey respondent (MDL/NTE/M/2) echoed the same idea about access to faculty development: “Workshops, seminars, conversations across departments/programs would be helpful in how to use PBL in my classes.” Although faculty mentioned either having attended or having knowledge of in-person professional development opportunities in the use of active learning strategies, including PBL, taking time to attend the sessions seemed to be a concern for some and others felt that training would be more beneficial if it were focused on their disciplines. The desire for faculty development extended beyond practical examples and into requests for a tool kit that identifies ways in which PBL could be used in a range of classes.

Interview and survey respondent, Megan (Psy/T/F/12) stated in her short response: “I would like more ideas for incorporating this method into all of my classes would be useful.” Another survey respondent (Soc/T/F/10) concurred with a desire for more information about PBL: “I would like information about what it is and why I should use it.” As noted in the survey review above, most faculty members indicated that they do use PBL (55%). The remaining 45% of survey respondents indicating they do not use PBL provided written responses that indicate an openness to PBL, if they are provided with learning opportunities about how it may be effectively used in their classes.

**Desire for Professional Development**

Although there was a survey short response question asking for feedback on what instructional resources would be needed to encourage implementation of PBL, only 15 of the 51 survey respondents answered the question. Of the 15 faculty members who submitted a response, all mentioned the need for some type of faculty development and information about related
resources on how to implement PBL in their classes. Although professional development was available to faculty in the design and use of active learning strategies, 13 out of 15 respondents did not avail themselves of the opportunities.

Several respondents stated that they did not know the term PBL prior to completing the survey (20%), but once they read the definition in the survey, they recognized that some of their instruction met the definition, which may indicate that an information gap may exist regarding research-based teaching strategies like PBL. The lack of knowledge of the term or strategy may provide an explanation for why PBL is not used with more frequency as part of the general curricula and in the many programs offered across the A&S departments at the site institution. However, in both the interviews and survey short responses, the participants indicated that, with support and training, they would consider using more PBL activities in their classes.

Although faculty development workshops on the use of active learning strategies, including PBL, exist at the institution, only two respondents stated having availed themselves of the available training opportunities. There may be myriad reasons for why faculty do not attend available training workshops, Max (Bio/T/M/19) summarized it this way:

I think the experience [of professional development] itself would be an incentive, but it all depends on so many things like when the workshops come out, is it my busy semester, do I have the time. It is a 50/50 thing for me. I do not have an answer about how to incentivize it, but just getting me to think about it is progress.

Some faculty, like Max, have prior knowledge of active learning strategies and may have even attempted to use PBL, but extenuating considerations may provide some explanation of why they do not actively participate in available training opportunities.
In some cases, faculty mentioned their willingness to participate in workshops created to meet the specific needs of a program of study or to expand their current PBL activity repertoire. As one interview participant, Matilda (PP/NTE/F/4), stated when asked what resource supports she required to use PBL in her public policy classes:

My primary way of using it (PBL) is case studies and I would like better access to case studies. There are a lot of things that I just do not know. I am not aware of good strategies that I could incorporate that I am not already incorporating. So, I try to go to teaching workshops and things like that when I see something of interest to me. I think being more aware of other strategies and realizing how a strategy applies to public policy. I would like to know what is shown to work and what is shown to not work.

Resources supporting use of PBL by faculty might include: content specific connections to facilitate the design of courses and curricula; a list of cost free online databases for developing case studies and/or questions; examples of syllabi for courses using PBL from internal or external sources; and professional development which targets to the needs of specific disciplines, such as public policy.

Another interview participant echoed the desire for a better understanding of the research behind active learning strategies, in general, and voiced the frustration of implementing PBL without training. As Margaret (Psy/NTE/F/16), stated in her interview about her attempt to use PBL to make her class more interesting for her students:

I tried to use PBL years ago in a summer class, and I gave it up because it was too hard for me to learn this new technique and deliver my content. I felt really overwhelmed and that I was not skilled at this, and I’m not going to be skilled at this in time to make it really good. If we were offered workshops on it and they could deliver this information to
me, I would be all over it. I think it is exciting and engaging. I think it is a great way to train students for their after-college life. I would suggest that workshops be offered and that a repository of successful syllabi be put online that I could get to right away. Maybe create a small group that was dedicated to this once a month to talk about these things and also a website from the university or a list of websites where these strategies are used.

Margaret expressed an interest in getting more information about the development of the strategy and ways to integrate PBL into her courses. The professional development she seemed most interested in would provide basic information about how to implement PBL and online training sessions or workshops, live or recorded, which would be accessible as needed. It is possible that with greater understanding of PBL and resources to support learning how to use PBL in classes, faculty members may feel more at ease with the strategy. For Margaret, the challenges of using PBL were too great and the incentives not high enough, which resulted in her abandoning the strategy in her teaching.

A desire among faculty respondents and interview participants existed for faculty sharing strategies across disciplines and units. As one interview participant, Maggie (CSI/NTE/F/3), from the computer science/data science department stated:

I have participated in workshops that I have found hugely beneficial. Not just the actual training part, but also working with faculty and meeting faculty from other departments who were doing things that I would not ever think about or try.

The possible benefits of sharing strategies across disciplinary areas when participating in faculty development workshops was also expressed by Mel (Phy/T/M/16):
I think there is a difference between large lecture classes and smaller classes. If we could go across departments, we might find enough people doing the same thing that you could get them together and also bring in people from other schools that are bigger and have more large classes, it would be useful.

The challenges of using PBL in large classes (50 students or more) was expressed by 5 of the 12 (42%) faculty interviewed. They all noted a desire to learn more about how others with large class sizes implement PBL, which may provide resources for others teaching large classes on how what has worked for their peers.

**Syllabi Evidence**

Although 4 of the 12 faculty interviewed (33%) did not submit a syllabus, 8 (67%) did, with 6 (50%) providing more than one syllabus. The syllabi provide examples of how PBL is used (or not used) in regular instruction of the courses selected by the participants. The use of some form of PBL was evident in 7 of the 13 provided syllabi, although the term PBL is not directly named. However, some faculty did incorporate the problem-solving language from the GENED. For example, in his syllabi, Manuel (Psy/TT/M/1) refers to students answering questions using collaborative learning strategies. The collaborative activities identified in the syllabi to solve problems or evaluate cases aligns with the definition of PBL. The remaining six syllabi did not include language to indicate the use of PBL in any capacity.

It should be noted that of the 12 faculty interviewed, 4 (33%) mentioned that they had received formal training in PBL, and all four included problem-solving assignments in their syllabi. While some faculty have not received formal training in PBL, others had some formal training or exposure to PBL in their college experiences. This finding highlights that targeting training to faculty needs may increase the likelihood of use of PBL in classes.
An example of a syllabus that included reference to the use of PBL was provided by Matilda (PP/NTE/F/4), who learned about PBL as part of her graduate school experience and in field specific training in the use of PBL. This past experience influenced how she uses PBL in her classes, especially in her upper-level courses. An example of her use of content specific use of PBL occurs in her 300-level introduction to public policy class in which case study-based PBL approach is used. After delineating the objectives for the course in her syllabus, the document notes:

Because public policy is best understood in conjunction with the current political environment, this course draws from current or recent examples of politics that are being made or discussed. In addition to bringing in current events as much as possible, to illustrate course concepts, we will also spend a good amount of time applying course concepts to real-world problems through the use of case studies and similar exercises. These exercises compel you to apply what you are learning to real policymaking situations, thereby translating theory into practice.

In the syllabus for this class, she explains to students that the use of case studies and group work will support their abilities to interpret public policy and they will learn how to express policy decisions using examples from current events.

Formally trained in the use of PBL at a previous institution as part of his PhD program and as a post-doctoral fellow, Manuel’s (Psy/TT/M/1) syllabi for his 300-level and 400-level courses both state, “You will be conducting original research in small groups. This project will give you hands-on experience with all major phases of the research process.” In his interview, Manuel was specific about why he feels that students need more emphasis placed on using PBL to support changes in how to approach research methods in upper-level classes:
I think most departments teach statistics first and then they teach methodology. I always tell my students that no statistic will make up for bad research design. I think it would be more beneficial to teach research design using real world problems and then teach stats. Something else I did was use real world data sets in my advanced research classes. I think there is more buy-in when they are not tasked with collecting data on their own and having to deal with issues like not having enough experience with stats to produce a result. So, I used data that I have published for analysis, but there are a multitude of areas that I have never looked at with those data sets. It gives them more engagement from a practical standpoint and they are not abstract things. It brings home the idea that it is a more realistic version of what people do as researchers.

Manuel used his formal training on PBL to provide activities for his students that resulted in insights on how real world-based data and group problem-solving may be interconnected.

Although not formally trained in PBL, Maggie (CSI/NTE/F/3), who uses PBL in her classes, provided another example of a course syllabus that specifically mentions PBL. Maggie stated in her interview that she had recently added a collaborative PBL-based component to provide students with real-world contexts to her class for the first time. The syllabus for her 100-level data science programming syllabus states, “In addition to lectures, this class has a mandatory problem-solving lab each week. The problem-solving session will reinforce concepts presented in lecture in a hands-on environment with the in-person support of a graduate [teaching assistant].” Some of those interviewed had prior training that they tapped when crafting their class activities and course design using PBL.
Summary

Faculty development may encourage the implementation and practice of PBL, particularly in the upper levels of instruction across A&S disciplines. Faculty in this study who had formal training in the use of PBL were more likely to use it in their classes, although they may not use PBL in all their classes. The choice in the use of PBL was dependent on class size and the need to cover content in a proscribed period of time. Even without this prior experience, there are faculty who have received little or no formal training who have also found PBL an effective means of instruction in specific courses. Other faculty may need encouragement or incentives to attend available and future training opportunities in the use of PBL.

Community Learning Using Real-World Applications

The second finding of community learning shows how faculty participants felt that in applying content learning to real-world problems, student learning occurs via the use of collaborative activities that allow students to share their experiences and thoughts with others. As PBL and other active learning strategies, are collaborative in design, faculty participants described their perceptions of collaboration and the role of community learning in their classes. Secondary and tertiary words found in the word clouds such as knowledge, experiments, assessment, and experiences imply the types of activities in which faculty have or would likely consider using PBL. For example, faculty in the natural sciences and psychology mentioned using laboratory experiments and experiences to assess student knowledge using collaborative learning or PBL activities to solve problems. The words issues, questions, and training could be used in reference to students, but based on the interview and short questions the words more directly apply to the faculty concerns about how to best use PBL.
Conditions for PBL, for example, class size and spatial issues within classrooms, which may be perceived as a constraint of using PBL, could act to impede the choice by faculty to using of PBL to build opportunities for community learning. Understanding how and why the physical environment may affect faculty decisions regarding the use of PBL in their classes takes into account spatial considerations as a potential obstacle to using PBL and as a hindrance to building environments for community learning to occur.

PBL is an approach in which community learning through collaboration allows students to engage in exchanges of information and occasions to work together to produce a product that represents the culmination of the efforts of the group. Student engagement in learning is often viewed as one of the predominate reasons to use active learning strategies like PBL (Savery, 2006). Community learning occurs when students do group data analysis that requires collaboration, whether in a laboratory-based class or in a less structured discussion-based class. PBL strategies provides students with opportunities to learn from each other and demonstrate their understanding of class content.

The data, from both the survey and follow-up interviews, suggested that faculty who chose to use some form of active learning, either in a single class activity or as part of a larger, structured collaborative learning experience. The use of community learning encourages students to use course content to answer questions based on real world scenarios. The faculty, including those that stated that they do not use PBL, saw the potential use of PBL in assisting students in developing cognitive skills, while also reinforcing course content. In the survey, 27 of 51 respondents recognized, in some way, that use of PBL may benefit their students by applying course content to problems of practice. As PBL places emphasis on using collaboration as a form of community learning, the data from both the interviews and survey responses found benefits of
a community learning approach by faculty members. A member of the theatre, speech, and dance department stated of group work: “I use text to support demonstrations, exercises for students to familiarize themselves with techniques, hands-on participation in laboratory or projects assigned to address specific aspects of problem-solving.” The use of collaborative activities provides students with opportunities to demonstrate their knowledge and developing skills across the A&S disciplines.

Collaboration Builds Community Learning

The short answer survey responses showed that most faculty know about the potential benefits of collaboration, but the way collaboration, and by extension PBL, is used varies depending on class size, content, and discipline. The faculty respondents were asked to identify courses they taught in the Spring semester of 2019. Many of them supplied specific information about class size, content, and discipline and offered why they chose to use PBL or not. For the survey, I created a definition of PBL that formed the basis of the responses. As noted previously, the definition provided was as follows:

Problem-based learning (PBL), is an active learning approach in which a problem is presented that utilizes specific consent or concepts in which learning experience is community-based, and knowledge, motivation, and skills are developed as a group effort, which allows for a culture of learning to develop that focuses on the process versus the product.

The definition and the short response questions gave the faculty the opportunity to share information they felt was relevant to understanding how and why they use PBL in their classes.
The collaborative nature of PBL provides students ways to engage in class discussion that require use of their developing problem-solving skills. As Maxine (K/NTE/F/5) stated in her short response:

I have started to include [PBL] to a greater extent because the students get more out of the material by looking at practical problems and solving them in groups through active collaboration. We do a group share in which we discuss the findings and look at problems that may have multiple solutions.

Active collaboration, the use of learning activities which engage students in group work that allows for the exchange of ideas and stimulates new ways to solve problems, is encouraged by the problem-solving instructional practice referred to in the GENED. Faculty respondents, at all levels of instruction, indicated that they were attempting to use more active collaboration activities with problem-solving exercises and tasks. Faculty members echoed the development of problem-solving skills as reason for why they have begun to incorporate PBL into the curricula designs. Mike (Phy/T/M/25) stated in his survey respondent that in using PBL, “I do more group work with the students. I have them work together in small groups, tackling problems, with me roaming the class to observe, comment, provide hints, etc.”

In this example, Mike acts as a facilitator, having previously taught the content, he provides opportunities for his students to collaborate on answering questions that allow the students to demonstrate they understand physics concepts in their collaborative work products. This environment of students working together in a group transitions to community learning when students are asked to complete together laboratory assignments, written projects, and presentations which incorporate and expand upon their collaborative work completed in class.
PBL may also give students opportunities to move beyond merely learning content into metacognitive areas in which students begin to connect how they learn to what they learn. As a member of the Biology department (Bio/T/M/25) expressed:

Initially, I used PBL only in brief think-pair-share exercises. With more practice and experience in my classes, I’ve extended that to also include homework (that is often further developed during in-class problem solving) and to incorporate more group work involving 2-6 students. In one course, students do an extended series of formal experiments on their own thinking and learning; these are intended to solve real-world problems (ways to improve their learning or remove barriers to effective studying and learning) in a connected series of experiments intended to also develop their metacognitive skills. In my upper-level course, the students, mostly pre-service teachers, do problem-solving to apply course content on learning to develop learning exercises they could carry out with students in order to improve grades 6-12 student study, learning, and metacognitive skills.

In using collaborative PBL activities, students can apply course content using real-world examples that challenges them to use a reflective process when designing activities for their future students. PBL offers faculty more options to reach students on a deeper level and the students may be able to acquire skills that go beyond academics (Duch, et al., 2001).

The survey data also revealed that the use of PBL and active learning strategies, for some faculty, allowed students to learn content in creative and thought-provoking ways which allow students to become better consumers of information. As one survey respondent stated, “Ideas of dead thinkers can only come to life for students if they see how they can help them solve their current problems as individuals or as a society.” PBL allows students to make connections
beyond the scope of the information and developing a skill set in which ideas form the basis for future application. Real-world applications and community learning experiences help foster a network of learners who work together to share and exchange ideas to resolve issues which are complex in nature and may have no simple solution.

A survey respondent (MDL/NTE/F/7) expressed why she has changed how she uses PBL to reflect shifting priorities in foreign language instruction, “the type of problem changes with the goals (in foreign languages), the goal used to be “near-native competence.” Today, “intercultural competence” is foregrounded and cultural context, perceptions of self and other ideas are stressed.” By tying her classes to intercultural competence, PBL allows for the shared experiences and informational exchange of the group which allows student better understanding of cultural contexts and language use. The use of shared learning experiences allows students to then produce written work and projects that build a community learning environment in which all students are learning how to practice speaking a new language and have opportunities to demonstrate their developing skills.

For one faculty respondent in the religious studies department (Rel/T/M/5), skill development went beyond the direct application of content to reflect both individual and group concepts, which included the thought process in which students use the information using PBL, “If students are able to see how a particular way of thinking leads to certain problems and are able to articulate how a different way of thinking can solve that problem, they have learned something important.” Students can acquire skill development using PBL by recognizing that a problem exists and can be solved using learned content with consideration of potential future collaborative exchanges beyond the classroom setting.
Continuum of Community Learning

The faculty interviews provided more insight into how PBL may be used to further assist students in learning using class community. The faculty members cited the level of their courses when asked about the potential benefits they see in using a PBL approach in their classes. In the lower levels of instruction, faculty participants discussed the benefits to skill development that aligned with expressing ideas, sharing of information and peer thinking skills. The differences in the use of PBL in lower-level classes (100 & 200 levels) versus higher level classes (300, 400, and graduate levels) were mentioned in all the interviews. Faculty may perceive more opportunity to use PBL in the upper-level courses as these courses apply content differently than the lower-level classes that are building expertise in a content area. The faculty participants saw direct benefit to student skill development at the upper levels of instruction when content was being applied to research or culminating papers or presentations.

Participants described the use of PBL in lower-level courses as an opportunity to provide scaffolding of course content to help students build informational skills and then learn how to use academic resources through creating opportunities for community learning to occur. The skills that students develop in lower-level classes was expressed by Matilda (PP/NTE/F/4):

I use things like case studies and am constantly pulling in from current events, which are presented in a briefing format. PBL hits home the relevance of what they are learning and the applicability of it. It gets students excited about what they are learning. Often, theory gets a little dry and it is so easy, in my field, to liven it up with examples. So, they can get excited about something they know about, but practice it at the same time they use theory. I think it really shows them the relevance of what they are learning, and it allows them to practice using the tools that we talk about. They gain better understanding of
what those tools are in practice when they have to do some application versus thinking about a theory.

In practicing learning skills, students in Matilda’s class have the opportunity to build their learning as a collective in class. Maggie (CSI/NTE/F/3) expressed how she uses PBL to engage students in her 100-level introductory class in computer programming:

Often this is first class for most students and the majority of students have not written a line of code ever. They are not familiar with it. Realistically, the way you learn programming is really through problem-solving and by failing repeatedly and learning from your mistakes. So, there are two sides. One side is logistical and very logistical in a computer science sense. In my bioinformatics classes a special software environment was built that enables all the things we want to do. So, I can have students do cool stuff using real data and real human genomes. The other side, is to do things that allow more space for exploration and for students to take different pathways. The students are really interested in in programming as a tool to do other things. For them, they are not getting something esoteric, but something useful for later on in the studies.

Students are provided access to software used in the class as a catalyst to application of content and sharing of how to use the software to solve problems. The students work in collaborative groups for most problem-solving activities, once they have learned how to use the software. The groups work through the problem using their knowledge acquired in class while using the software to prepare written responses or presentations of their answers, which allows for building community learning through shared and collective experience.
The social context of PBL in lower-level courses was also discussed by two of the faculty interviewed as being of importance. Manuel (Psy/TT/M/1) teaches both 200- and 400-level courses, but emphasized why he uses PBL in his 200-level courses:

I think being able to discuss and understand what researchers are doing with real world problems and be able talk about it from that perspective is important. So, for example, using problems in the literature and working together to answer a question like what are your thoughts about it or break up into discussion groups to develop an argument about issues in mental health and I would do a Q&A with them as devil’s advocate by questioning their information. Another aspect for me, is it helps with social connectiveness through the small group aspect of it. Everyone has something of value, but you would never know it if they never spoke in class. People who are shy and may not want to talk much seem to feel comfortable and make connections,

The use of PBL to provide lower-level students with collaborative experiences that build community learning was described by Margaret (Psy/NTE/F/16) when she designed a 100-level course in this way:

One class in which I use PBL is in my freshman seminar. What I have done in that class is there are a series of assignments that lead to one another. So, they scaffold one another, and the final assignment is to create a website about a particular issue, mostly psychological issues like autism and biological or environmental factors. It is meant to be written for a lay person. The information they get is from the literature. So, they go into primary literature of scientific articles and they choose topics. What I have observed is impressive. These freshman work together through these technical biological and psychological papers. They are gleaning the information they need. I have them select
one paper to present, then they do an annotated bibliography of several articles, they do more research to do an overview of their websites. I think students do better when they have a goal. Of course, I offer a lot of support throughout the experience.

The combination of learning content and fostering social interaction appeared to be a consideration in the lower-level courses in building community learning. However, the focus shifted in upper-level courses to different skill requirements and collaborating to solve real-world problems.

The difference in how PBL may be used in the upper-level courses may be determined by the need to ensure students not only understand content but also to demonstrate that knowledge in tangible products and on examinations taken for professional programs or licensure. Mel (Phy/T/M/16) uses lab-based technology and collaborative PBL activities in his 400 and graduate level courses. This use of PBL helps encourage students to take an experimental science approach to learning challenging concepts and develop a broad range of skill through the use of collaborative laboratory groups that allow students to share their information and practice skills as a community of learners:

I have been engaged with a lot of laboratory work. If you are learning skills, you have to learn the skills. You just do not learn in the abstract. You learn by doing and learning experiences more so than you learn by reading or learning by having someone tell you what to do. It [PBL] validates your skill set. So, for example the senior thesis, makes you feel like a scientist and you are walking the walk. You can apply what you have learned for years. So, there is a sense of confidence and awareness of the things you do not know you know. You get an understanding of what you can accomplish. Sometimes there is a
bit of a harsh reality that happens with it too. To me you start to know how you fit into things. It is to actually try things and see how they work for you.

The use of PBL, in this instance, which allows students to operate in both an individual and a collaborative manner, allows students to individualize their own learning while creating meaningful contexts for sharing content with others. In providing students with opportunities to demonstrate their emerging skills, they learn how to communicate their thought processes in answering complex scientific questions, which may not have easily discoverable answers.

The use of PBL and collaborative learning is also apparent in courses that include objectives that extend to esoteric concepts such as the connection between historical events and current events or the interplay of historical politics and the rise of nations. Mark (Hist/Adj/M/7) described his decision to use PBL in his senior seminar based on his personal experiences:

I have a doctorate in history that I finished just before going into the foreign service. Just about every day on the job, I used my degree in history one way or the other. It occurred to me that I could teach the course using case studies that would provide historical examples of major issues that we are facing today and turn it into a history course that also appealed to international relations. I tend to use articles from newspapers and periodicals related to foreign policy which are academic, but also based on a current issue. The students are split into working groups almost every week and work in their groups to come up with an explanation of how a government of the country they are representing saw the issue and how government works through it. I think it makes them more rigorous analysts. It helps them understand how people may have differing thoughts about the same issue. One of the requirements for my course is a presentation to a public audience. For the past two years, I have worked with a community-based
organization that provides classes for older people which is supported by the college. The last three weeks of my senior course is a mash-up with the class I teach for the older community folks. They provide the audience for my student presentations. They ask really good questions and it keeps my students at the top of their game. They have to be prepared to go in front of a group of people to present what they have learned.

PBL offers faculty and students opportunities to collaborate within a class or as part of an exchange between communities of learners that enriches the learning experience.

Summary

PBL may be used to develop collaborative skills, enhance learning, motivate students, and provide practical contexts and application of learned content. It is an instructional approach that enriches students’ skill development and learning capacities through applying knowledge to find potential solutions to real-world problems. PBL is also an approach that encourages students to engage in collaborative learning in which students challenge each other and work together to pool their information and resources as a community of learners, drawn from multiple disciplines, in much the same way one might in a professional environment. The characteristics of PBL involves collaborative learning, interdisciplinary connections, complex authentic questions, and practical applications that provide students with opportunities to develop a collective understanding of course content. The challenge for faculty is to determine how to use PBL effectively, designing courses that meet course objectives, creating questions that have practical connections, and finding resources which support the use of PBL in the applicable discipline(s).

The data from the interviews and survey revealed the complex nature of using active learning strategies, including PBL, and the numerous options available to incorporate such
activities at all levels of study in A&S disciplines. The data highlight that the group of faculty responding to the survey relied heavily on traditional, passive teaching strategies. Problem-based learning and collaboration strategies occurred several times in a semester for many in the group of faculty in this study. Faculty respondents shared their success and concerns about using PBL across areas of study. The findings show that prior exposure to PBL resulted in more comfort for the group of faculty interviewed in using the strategy in their own classrooms. Even so, concern with the amount of time it takes to build PBL activities, and the perception of the loss of time dedicated to content, is a barrier. The faculty members in this study highlighted the importance of a community of learning, which occurs when students collaborate, work to solve real-world problems, and are actively engaged in their learning.
CHAPTER 5: DISCUSSION OF FINDINGS

The findings from this study highlight how faculty members in Arts & Sciences at one institution made decisions to employ PBL strategies (or not) in their teaching. The faculty that do implement PBL reported crafting diverse learning experiences for students using active learning strategies such as PBL. The use of real-world examples in classroom settings provided students a context to apply course content to these problems. Many of the practices faculty described involved students working collaboratively to solve these problems. Here, students learn together. In giving students opportunities to engage in group learning, they can make sense of content and use their collective understanding in a productive manner (Savery, 2006). In a broader sense, students may also be encouraged to seek out additional individuals to assist in their goals which would then extend the collaborative effort beyond the class. Despite the espoused use of PBL in their teaching, the survey findings highlight faculty relying predominantly on passive teaching strategies. Yet, some faculty in their direct and indirect statements indicated that despite their lack of understanding about PBL or uncertainty about the definition of PBL, they were in fact using PBL as a teaching approach.

The review of the literature and studies related to the use of PBL in higher education suggests that knowledge of PBL has an impact on instructional practices (Duch et al., 2001; Savery, 2006). The findings from my research support this assertion as participating faculty members who had prior professional development on PBL used this strategy more frequently in their classes compared to faculty without training. By applying active learning and learner-
centered collaboration approaches, PBL aims to improve the general outcome of teaching and learning across different majors. Incorporation of PBL in a learning environment provides a strong tool for faculty and students, enabling them to be engaged in new learning experiences as part of collaborative effort. It also encourages faculty to expand their repertoire of instructional approaches and consider alternatives to using a traditional lecture format (Duch et al., 2001).

The findings from this study showed that faculty choose to use PBL based on several conditions. Past training and experiences of faculty members using PBL influenced their use in current classroom teaching. The level of the course section also had bearing on how and when faculty members in this study opted to use PBL. The challenges of using active learning approaches, such as PBL, were reflected in the interview and survey responses, as were the relative successes of those faculty members who have incorporated PBL into their instructional practices.

**Faculty Motivations for Using PBL**

In analyzing the data collected through the interviews, survey, and syllabi a pattern of use of PBL emerged across disciplines and programs of study. The process of incorporating PBL into courses was determined by both departmental decisions and personal preference. Certain departments, such as Computer Sciences, Data Science, Modern Languages, Psychology, Physics, and Theatre encourage faculty to use a range of active learning approaches, including PBL, to facilitate student learning and application of content in practical contexts (D. A. Kolb, 1984). Mitzi (MDL/T/F/17) expressed the links to learning a language to her extended, multiple semester PBL experience in her response to a survey question in this way:

One way is to have students work through the acquisition of an art work for the university's museum, learning about the artist, learning about the ethics involved in
transnational collaborations and acquisitions, learning about the correspondence and time it takes to engage this work, speaking with officials, curators and artists.

This example highlights how faculty may be motivated to implement PBL when disciplinary content is linked to practical applications. The use of PBL in other departments appears to be based on the preferences of the individual faculty member. For example, the faculty participants from the Economics, English, History, and Mathematics departments indicated that they chose whether or not to incorporate new instructional approaches in their classes based on the courses they were teaching, if content aligned to using PBL, if required content was complicated, and if they had access to examples of how to use PBL for their specific content. Given these factors, many felt their content did not lend itself to using PBL.

The decision to use active learning strategies, in general, may be based on several considerations, which may influence if and how faculty use PBL in their classes. These considerations include the perceived applicability of PBL to course content, lack of interest in using PBL due to the time it takes to prepare PBL activities, perceptions of loss class time, and the need to address required content that students must have to move to the next level of their programs of study (Duch et al., 2001).

The importance of external and internal considerations when curricula are changed in response to meet the shifting needs of the institution and student body presents faculty choices when determining how to design their classes. According to Latulica and Stark (2009) “Curricula are subject to varied influences, including cultural and social trends, economic conditions, and national and state policies that shape higher educations and institutions and the academic programs they provide” (p. 65). Each institution is impacted by differing influences and motivations to change curricula and the methodology for delivering programs of study, with
external influences, such as social trends, governmental policies, market demands, associations for disciplines, and professional organizations, affecting how curricula are designed. In looking through the lens of the APM, the elements of content, purpose, resources, and learner expectations may be shaped by these outside forces and, therefore, may shift as needed to remain current and relevant. The findings from this research study show that while there is increased motivation to use PBL, there are course and departmental considerations that may influence the use of PBL in practice. The content of the course may not readily align with PBL, the purpose of a class may be to provide necessary required concepts or foundational understanding of a subject, resources for using PBL may not be readily available or applicable to certain courses, and students may have mixed reactions to using PBL which involves collaborative group work.

An internal influence on the work of the faculty at the university was the recent changes to the GENED requirements. The goals of the new GENED requirements support using problem-solving skills in upper-level undergraduate and capstone classes to enhance student-centered learning. Here, connecting content to workforce-related skills can build on collaborative learning skills that will be required in work-based teams. The last APM elements of instructional processes and evaluation are the most impacted by the internal constructs of an institution. How faculty members use feedback from their courses to influence adjustments is important. Consider how some of the faculty members noted prior experience with PBL and how this experience influenced their current decision not to use PBL in their classroom given the time involved and perception of time away from content. Additionally, faculty status is notable in its influence on use of PBL (e.g., tenure-track versus non-tenure-track; newer faculty versus long-serving faculty) as the use of PBL appears to cross all statuses and years of service.
Active Learning Outcomes

As faculty are encouraged to use active learning strategies, including PBL, by administrators via the GENED curriculum, there is a tension between providing a variety of forms of engagement for learning and covering the course content. The content of courses has a bearing on future classes given the assumption of a certain level of prerequisite student knowledge for upper-level coursework. Faculty indicated that providing students with content and the ability to build on the students’ knowledge as classes moved into higher levels of analysis was a goal for their instruction. As a primary motivation of faculty is student learning, PBL allows for the development of higher order skills that include collaborative skills, critical thinking skills, which provide students opportunities to demonstrate acquired knowledge.

One of the main reasons faculty identified for their implementation and use of PBL was motivation to make an instructional change to their teaching to meet student needs and because of shifting practices within their discipline of study. Several faculty members interviewed stated that they thought students would enjoy and better understand the practical nature of learned content using PBL. For example, a member of the Sociology department stated in a short answer response, “I use it [PBL] because it is good pedagogy. I employ community engagement and assignments that take my students outside the classroom and into the community.” The use of PBL to prepare students to be successful in the workforce provided motivation for some faculty to use this strategy in their classes. As students are stakeholders in their educational experiences, providing engaging learning opportunities that allow for collaboration and exchange of knowledge is an important consideration for faculty as they build their plans for course delivery.

The student evaluations of instructor performance were mentioned several times from both positive and negative perspectives. On one hand, the use of PBL might be appreciated and
well received by students, which may bolster evaluations and reflect successful implementation. The faculty who have used PBL in their classes, even on a small scale, seemed to believe it had a positive impact on their end of course evaluations. In this way, the use of PBL acted as a motivation to use the strategy again in other courses. On the other hand, the use of PBL, particularly when it was deemed ineffective or unsuccessful, by either the faculty member or the students in a class, was viewed as detrimental to end of course evaluations. In this scenario, the faculty members indicated a reluctance to attempting the strategy again as it may have a negative impact on future student evaluations as student reviews are important for tenure and promotion.

Because student evaluations are an important component in tenure decisions, they have an outsized influence on faculty choices to use different teaching strategies. Thus, even though a faculty member may think PBL provides a good pedagogical tool, the motivation to not use the strategy may occur if it is perceived students will give an instructor poor evaluation.

Those faculty who have not used PBL in the courses expressed concern that if PBL is used and it does not have the anticipated result, that they will receive poor evaluations which may affect future, promotion, and tenure possibilities which may be reflected in high number of faculty who identified traditional lecture as their principle method of instruction. This evidence highlights how even the perception of poor student evaluation influenced the instructional choices of the faculty in this study.

The faculty interviewed and surveyed indicated a desire to learn more about PBL through professional development opportunities and to understand more from the PBL literature on how to effectively implement PBL in their classes. Survey respondents and interviewed faculty expressed a desire to see extant research on how PBL engages students and how it may be used in their respective disciplines. Importantly, the literature on PBL is robust, pointing to the issue
that faculty members have either not been exposed to this background information in faculty
development sessions or in graduate programs or have not taken the time to look for this
information. PBL, when used as part of or as the primary means of instruction, encourages
students to use their developing skills as part of a learning experience that is purposefully
designed to provide students with a sense of autonomy in the learning experiences as they solve
problems, collaborate with others in a self-directed manner, use self-assessment to ensure they
have properly used relevant content, and self-monitor as they adjust strategies used to answer the
question (Perrenet et al., 2000).

The use of PBL was also shown to benefit student retention of learned content. For
example, Norman and Schmidt (1992), found that students using PBL retain information more
consistently and for longer periods than students who were educated solely using more
traditional methods of instruction. Vernon and Blake (1993) further showed that students more
successfully transfer learned skills to their professional lives through PBL learning experiences.
Jonassen and Hung (2008) studied the creation of problems for PBL activities and how to assess
their effectiveness. They found

The types of the problems being used in PBL vary from one area to another, depending
upon the nature of the discipline. …As PBL continues to migrate to other academic
disciplines, research needs to consider the nature of the problems being solved and how
efficacious PBL methodologies are for those kinds of problems. (pp. 7-8)

Research on discipline-related examples of PBL in graduate professional programs indicates the
utility of this infusion in the graduate program curricula to support students as they begin the
transition into professional fields. For example, PBL has been successfully used in graduate
programs in engineering (Perrenet et al., 2000), chemical engineering (Woods, , nursing
(Barnard et al., 2005), social work (Althshuer et al., 2003), teacher education (Murray-Harvey et al., 2013), legal education (Boud & Felleit, 1991), and leadership education (Cunningham & Cordero, 2003). Thus, it is not because literature and research does not exist on discipline-based PBL approaches, rather that the participating faculty have not accessed it.

PBL and active learning approaches have also been the subject of studies that provide information on the development of PBL, research support, practices of engagement, and suggestions for how to design classes to use active learning approaches to engage students in their own learning through practical applications of content (Prince, 2004; Smith et al., 2005). Although PBL is an adaptable approach that allows for faculty of a variety of disciplines to engage students in learning experiences, faculty members may need encouragement to participate in workshops and to begin the process of adjusting their existing curricula.

The desire for more training in general on using PBL also included requests to have specific disciplinary faculty development that would align with the content of the subject matter and with the specific objectives in the department. For example, an NTE member of the Modern Languages department who does not use PBL suggested more “workshops, seminars, conversations across departments/programs would be helpful.” An adjunct in the English department who rarely uses PBL shared how she first learned about PBL and what training would be necessary for her to use PBL, “I learned about it in pedagogy blogs, various publications, and at conferences. I would like to see more workshops, resources, and examples of projects/ assignments in my field.” The faculty in this study who were reluctant to use PBL indicated that targeted training would be useful in increasing their understanding of how to employ this strategy based on the course content. The motivations to use or not use PBL in the classroom were often linked to challenges identified by the faculty participants.
Integration of Learning

As mentioned in Chapter 2, the integration of learning (IOL) model (Barber, 2012, 2014, 2020) posits that undergraduate students make connections, apply, and synthesize information from not only their college academic experiences, but also their prior knowledge from their K-12 backgrounds and their cumulative life experiences. PBL, like IOL, is also a learning process in which students are presented with opportunities to use their prior knowledge and experiences, educational, personal, and in some cases professional as part of the learning process. IOL and PBL may be used together to provide students with a rich and vibrant learning experience that encourages students to apply learning content to practical applications, and also presents opportunities for metacognitive and transformative learning to occur such as self-authorship and self-reflection.

It is important to understand how IOL facilitates student learning and why it may be used to form the basis for future programs and professional development. The definition of IOL is “The demonstrated ability to connect, apply, and/or synthesize information coherently from disparate context and perspectives, and make use of these new insights in multiple perspectives” (Barber, 2012, p. 593). In this model, there are three categories used to describe the relationship of learning and how students develop their ability to effectively use the totality of their academic and lived experiences in their individual learning processes. My research findings highlight how faculty seek ways to connect theory to practice for students and to provide preparation for work in the field. These types of connections can occur when the IOL is intentionally applied by faculty members.

Barber (2020) further expresses the importance of the student learning in this way, “Our meaning-making, how we see the world, has a direct correlation with how we connect ideas,
skills, and knowledge. Who we are is how we integrate” (p.31). The IOL model broadens the understanding of how to better support student learning development as students move from being passive learners to active learners, and emphasized the cumulative experiences students have before college and in college that influence how they approach learning as a lifelong process. PBL can be integral to the IOL process for students as it provides them a way to become active learners and to use knowledge gained in their classes to solve a real-world problem and apply context beyond the classroom. PBL may likewise influence how students learn and collaborate with others as part of a greater community of learners, whether that be in graduate school or in the workforce.

There are three facets of IOL (Barber, 2020) that encourage students to integrate their learning: connection, application, and synthesis. Each category relates to skills which students acquire over the course of their development as learners and as such allow students to acquire skills which will, in turn, allow for continuity of skill development in the future. IOL provides students with opportunities to find commonalities and similarities between differing concepts or subject matter, use prior knowledge and acquired skills in a different way then they may have used in their past experiences. IOL also challenges students to adapt, interpret, and collaborate with others to build understanding and create new perspectives. The combination of IOL and PBL, may be used as tools to foster an interdisciplinary approach to instruction and encourage faculty to look beyond traditional as they adapt curricula.

As the site institution continues to work on creating new iterations the GENED, which will shift the curriculum toward a more holistic educational experience, students will be able to use their acquired knowledge beyond the classroom. The use of IOL and, by extension PBL, may act in concert to promote learning experiences which engage students in a variety of learning
experiences that encourage faculty to think outside of classroom and institutional boundaries. For example, a member of the Modern Languages department has created a senior seminar class in which students navigate the process of acquiring art works from Latin American artists to display in the college library and art museum. The students make connections between subjects, such as art, history, public policy, and language, apply that information in the context of the seminar goal, and then collaborate with their classmates and past seminar students to understand the process of how to engage in the complex mechanisms of acquiring art work from foreign countries. To date, three public Latin American art exhibitions have occurred at the institution in the last five years with the efforts of the students in this class. IOL and PBL are both rooted in collaboration and a community learning process to develop and expand student learning beyond the traditional approaches of instruction. The integration and incorporation of the totality of student academic and life experiences allows students to discover the interplay between their academic lives and their lives in the greater community beyond the institution.

**Faculty Challenges and Curriculum Requirements**

Faculty participants in this study mentioned several obstacles to using PBL in their classes. Some of these obstacles were at the institutional level and others were rooted in personal preferences. The GENED curriculum is written to encourage the use of problem-solving learning experiences, yet it is not a mandate as each department has control over instructional strategies. Institutional demands may influence how departments and individual faculty members determine the needs of their students and design curricula to meet the learning goals of the major and to support the GENED learning outcomes. The concerns faculty participants voiced about implementing PBL mirror discussions in other institutions considering the broad use of PBL across disciplines. For example, Amador et al. (2006) described the issues that faculty may face
when attempting to shift instruction into a PBL format, namely: applicability of PBL to the
course learning outcomes, class size, faculty resistance, increased workload, student resistance,
and influence on student evaluations. Participants in my study also raised these same challenges.
Many of these issues are considered institutional barriers (e.g., class size, use of student
evaluation for tenure, workload), with the rest being faculty centered (e.g., links to program
outcomes, faculty resistance) or student centered (e.g., student resistance). Clearly, some of the
challenges facing faculty are in their control.

Institutional debate on the curricula at the undergraduate level occurred over several
years at the site institution. Beginning in 2012, the GENED requirements were reviewed and
rewritten to incorporate active learning, critical thinking, and problem solving into all programs
of study. The new GENED was approved by the faculty in 2013, which indicates a shift in
paradigm from a traditional model of instruction centered on teachers to a model in which active
learning approaches support student-centered learning that contribute to future educational or
professional skills via practical application of content. In 2019, the faculty approved changes to
200-level GENED courses that support student knowledge of topics within a discipline that are
embedded in the larger scope of liberal arts. The revision of courses at the 200 level included
putting learned skills into practice:

These courses are about the academic disciplines -about where their practices intersect
and diverge, and the various ways they approach questions of evidence and conclusions.
This part of the College Curriculum encourages you to make coherent and meaningful
interconnections across the academic disciplines.

Similarly, changes at the 100 level provide students with an introduction to academic methods
and begin the process of developing college-level critical thinking and communications skills.
These first-year courses employ inquiry skill development through the framing of questions, reasoning, creation, and solving of problems with emphasis placed on collaboration and communication skills. The changes to the GENED reflect the administrative and faculty commitment to using collaborative approaches like PBL across all A&S disciplines and levels of instruction. Yet, the survey responses highlight how faculty still rely predominantly on teacher-centered practices most often.

The GENED requirements specifically mention using problem-solving activities at the 300 and 400 levels of instruction across all disciplines of the institution, with emphasis placed on 400-level courses. Those faculty members in the study who teach 400-level classes, which are considered capstone offerings in the major, mentioned that they attempt to use PBL or problem-solving through a mixture of individual and group assignments. The activities are designed to allow students to apply the breadth of their acquired knowledge. For example, 300-level classes are to build upon skills and requires students to go outside of the institution to use their acquired knowledge, developing question framing skills, and communication abilities to expand their cross-cultural understanding through self-reflection activities built into all classes. To achieve these goals, students either participate in a study abroad program, off campus global or cross culture programs offered by the institution, or on-campus courses in which global and cross-cultural topics are featured. For example, a member of the modern languages department described how their use of PBL allows students to develop awareness of issues of “intercultural competence,” which go beyond merely learning how to speak a language to understanding the culture of countries. Another faculty member in the history department shared that he uses his 300-level course to present material that connects to issues of international relations that encourage students to think on a global scale.
In 2019, GENED 350 level courses were approved to incorporate critical analysis of issues of power, privilege, and inequity in the United States that occur from contemporary and historical perspectives. Students are to be given opportunities to explore a range of different perspectives of inequity by using class discussion to build a deep understanding of how justice, equity, and value-based cultural, institutional, and social practices affect society. Collaboration and community learning among students in wrestling with these ideas can deepen learning (Savery, 2006). Discussion, and self-reflective practices are transformative in nature and when taken together over the progression of courses can result in transformative learning in which deep and meaningful learning occurs through learning experiences which encourage students to think beyond their assumptions and expectations to develop new approaches or thoughts (Mezirow, 2000). Given the recent approval of the 350 level courses, none of the faculty participants mentioned teaching any courses at this level. Thus, it remains unknown how faculty are employing teaching strategies in this new offering.

The GENED curriculum goal of using problem solving to achieve new ways of thinking and use of acquired knowledge culminates in 400-level courses. These courses offer a capstone experience in which students are required to select a topic of interest, conduct research, and prepare a critical analysis to solve problems in either an applied or academic context that demonstrates original material or research, which results in communication of outcomes to a diverse audience. Several faculty members in this study from across disciplines expressed that using PBL allowed students to use course content in practical applications in these capstone courses. In creating experiences and opportunities for reflection, students connected what they learned and how they used what they learned to how their beliefs or attitudes changed as a result.
of the class or a class assignment. For example, a member of the religious studies department stated:

If students are able to see how a particular way of thinking leads to certain problems and able to articulate how a different way of thinking can solve that problem, they have learned something important. I assess this by talking to them and having the write reflection papers and journal entries.

The concept of using course material and PBL to provide students with learning experiences in which learning supports student development was aligned with overall effective teaching practices for some of the participants. One participant stated, “I liken it to a seed that gets planted for greater critical thinking later in life.” By focusing on teaching strategies that allowed deeper engagement with the materials hoped, faculty hoped to improve critical thinking skills in students that lasted well beyond a single class experience. The idea of using learning experiences to build knowledge that could be applied across disciplines, developing skills needed for future professional goals, and generating connections to the community beyond the institution are important, not just for students in upper class courses, but in lower-level courses as well.

Faculty participants teaching lower-level classes were less enthusiastic about using PBL, as their classes tended to be large (40 or more students) and the classrooms not equipped for group work. The equipment concerns noted focused on lecture halls in which there is a lack of flexible seating, limited ability to move about the room, and limited access to technology which would facilitate group activities. The physical setting was also mentioned as problematic in classes taught in smaller classrooms in older campus buildings that lacked access to technology that could support group work, and faculty participants noted that the limited physical space presented additional constraints. Although the faculty praised recent efforts to make classroom
more user friendly, the faculty participants mentioned the need for more alterations to current classrooms to make them more flexible and a desire for smaller class sizes to encourage the use of active learning strategies, including PBL.

At the individual level, faculty noted informational gaps about PBL, a lack of confidence in how to use PBL, and a desire for more training in PBL before attempting to use it in a current class. As adult learners, the faculty participants expressed a need to link their past experiences to incorporating any new teaching strategies, and a desire to understand the relevancy of the strategy to their needs in current classes (Merriam et al., 2007). In addition to class size and GENED level of course, faculty mentioned the difficulty of sharing exemplary teaching practices across departments and disciplines. On the one hand, the university sought to bolster interdisciplinary teaching and learning. On the other hand, institutional policies and faculty assignments presented a barrier to widespread adaptation of interdisciplinary collaborations.

The need to break down barriers to facilitate the use of PBL and to encourage reluctant faculty to use PBL was a thread expressed in both the interviews and short response survey items. The faculty participants, in general, seemed open to the idea of using PBL, but removing obstacles, real or perceived, may influence the decision to use PBL.

The analysis of the syllabi provided by the faculty participants revealed that individual faculty members may decide to use active learning approaches like PBL, but in some contexts the decision was made at the departmental level. For example, the Physics department views PBL as essential to instructing students in the application of theory in practice, whereas the use of PBL was an individual faculty member’s decision in the Public Policy department.

Faculty resistance to implementing active learning strategies, and PBL, was evident in some of the responses to both the interview and survey questions. The nature of the resistance
stemmed from a general lack of information about PBL, a desire to see empirical research about the effectiveness of PBL, preparation time, and the need for discipline specific resources which could provide examples or ready-made activities. In a sense, the faculty who are in the process of acquiring information about using PBL are engaged in their own learning process. Considering these faculty members as adult learners when determining how to address their concerns and needs about PBL and other active learning approaches is required. As Merriam et al. (2007) asserted:

Knowing who participates in adult education activities and why adults are participating (or not) is necessary for both providers and policy makers. Since participation in adult education is largely a voluntary activity, knowing who is participating, reasons for participating, and what conditions are likely to help adult learners. An understanding of participation patterns can also raise important questions about assumptions underlying what is offered, who is benefiting from participating, and whose needs are not being met (p. 53).

As adult learners, faculty may have a variety of motivations, rationales, and purposes for why they may or may not elect to participate in professional development opportunities, especially when the topic reflects an institution change or reform. The findings align with Cavanaugh’s (2001) assertions regarding the challenge of curricular and pedagogical reform:

In part, this is due to faculty reluctance to change well-established habits without extensive evidence that the proposed approach is better, and in part to administrative reluctance to push the need for currency in view of empirical research on the efficacy of alternative approaches. The unfortunate consequence is that too often the opportunities for true innovation and improvement of student learning are lost because of faculty and
administrative proclivity to become bogged down in endless discussion and turf protection. (p. 27)

Despite the intentions of the new GENED overall, the faculty interviewed did not specifically mention the curricular changes or the administrative interest in incorporating PBL at the institutional level. Instead, they espoused that the need to incorporate problem solving in upper-level classes was driven by individual pedagogical choices and the need to meet student expectations.

**Student Evaluations**

Another area of challenge identified by several participants concerned student evaluations and student resistance to PBL activities. Faculty perceived that students may evaluate the class poorly if the students felt discomfort in the ambiguity of engaging in PBL as the process is complicated and lacks a single, correct outcome. Thus, faculty face the challenge to create a learning environment that encourages students to collaborate and to discuss content, which may be uncomfortable for some students. As one survey participant stated “Students don't like it (they feel it is too much work) and review me poorly. Student reviews are important for tenure.” Student evaluations serve many functions and students may not understand all the ways their end of semester evaluations have implications for faculty.

Several purposes exist for student evaluations, including: evaluation for renewing contracts for adjunct and NTE faculty, promotion decisions, merit salary increases, and tenure review. The adjunct and NTE faculty interviewed seemed particularly concerned about student evaluations, more so than tenured faculty. The stakes are high for these faculty members as they have no guarantee of permanent employment, which can influence their use of PBL in classrooms.
However, the concerns over student evaluations were not limited to NTE faculty members. There were two tenure track and two veteran tenured faculty members who also discussed the importance of student evaluations in considering implementation of PBL in their classes. For the tenure-track faculty, it was more than poor student evaluations causing concern. Instead, these faculty expressed concern about student resistance emerging if a planned PBL activity went awry or was not effective for all students. Even though students might voice their frustrations and objections in their class evaluations, the larger concern seemed to be about student learning of content. In the case of NTE faculty participants, the findings indicated that they felt that student evaluations might have direct bearing on if they receive another contract offer and get to teach a broader selection of classes in the future.

**Time Constraints**

The concerns outlined by the faculty participants align with the literature on implementation of PBL (Amador et al., 2006. Using a new strategy like PBL involves change for faculty members and students alike. Two of the faculty interview participants felt, for different reasons, that re-designing their current courses would be difficult and have potentially negative implications that might have a deleterious effect on students learning of the course content. Long-serving faculty members expressed how inertia proved hard to overcome to change their teaching practices. The lack of experience meant that these faculty members lacked experience with evaluating this type of learning and resisted giving up their current teaching practices that have worked to get content across. Faculty needed to be convinced that the extra effort to use PBL was worth their time. The pressure of completing the departmental objectives of a course and having time to prepare PBL activities are realties for many faculty members who want to use
PBL, but feel that it may not be effective for all students, especially those who lack prior knowledge in certain aspects of a course.

Long-serving faculty that have retirement in sight noted that as their research agenda slowed down, they may transition their focus to exploring new teaching strategies to help support student learning. The tension between a focus on research outcomes versus investing time into developing new teaching strategies is a real one. Clearly, time presented a constraint for many faculty regardless of career stage. Learning new teaching strategies is difficult regardless of career stage. A motivating factor for faculty, however, centered on their desire to support student learning.

As adult learners, the process of building knowledge and overcoming obstacles is a learning process. “An adult’s major use of experience in learning is on reintegrating or transforming meanings and values” (Merriam et al., 2007, p. 424). The transformational nature of adult learning may be a challenge for some faculty as they may have to relearn and revise previously held educational beliefs or practices (Mezirow, 2000). The learning of a new pedagogical approach is, for some, a transformational process that may take support and time to come to fruition.

**Institutional Constraints**

In allowing faculty to voice their concerns and engage in dialogue to uncover the barriers, faculty may buy into a new instructional pedagogy (Amador et al., 2006). Based on the interviews, the faculty seem aware of how active learning strategies, in general, could produce positive student learning experiences and be used to content to practical contexts. The survey responses, however, provided a different portrait with most faculty indicating they rely heavily on more traditional instructional approaches on the survey matrix. Despite the identification of
using more traditional teaching strategies in their classes, the survey respondents espoused that they used PBL in some capacity (75%; 38 participants). Classroom observations are required to ascertain the veracity of use of PBL in the classroom. The need for observational data before and after professional development is supported by other studies. For example, in Polly and Hannafin’s (2011) study of elementary school teachers, the researchers found that while teachers believed they were using techniques presented in workshop training sessions in the use of learner-centered approaches, they were in fact not using these approaches in their classroom instruction. The study revealed a host of reasons for this discrepancy, including the type of task the teachers were to perform, the type of support that was provided, and how the teachers approached using the training to construct activities. According to Polly and Hannafin (2011):

Classroom implementation was best aligned with professional development pedagogies and enacted practices when directly adopted or co-planned with project staff. Ongoing support may serve to both scaffold the transition from professional development to the classroom and support the conceptual change associated with both learning about and implementing learner centered pedagogies. (p. 129)

Thus, successful implementation of PBL in classroom teaching may require not only designing professional development for and with faculty, but also providing support for implementation. This directed support may bridge the gap between espoused use of PBL and actual classroom use.

The institutional barriers mentioned by the faculty and illustrated above show how the elements in the APM (content, purpose, instructional processes, instructional resources, learners, and evaluation) are challenged in reality (see Appendix E). The process of change is difficult and unique to each institution. As Lattuca and Stark (2009) asserted,
“an academic plan is not the product of totally rational and context-free deliberations, but rather results from a complicated process embedded in a large, complex, and somewhat unpredictable set of contexts” (p. 15). Institutions and departments within an institution need to address decisions about curricula and pedagogical change in a conscious and thoughtful manner to determine how to best achieve curriculum design which allows for faculty across displaces to collaborate and contribute to moving the institution forward. Pointedly, evaluation is required to determine if the strategies are used and to evaluate how the changes influence student learning. Tweaks to the process should occur based on this feedback (Lattuca & Stark, 2009).

**Faculty Resistance**

Making modifications to existing course designs and instructional methodology is not uncommon in higher education (Duch et al., 2001). The decision to make such changes may reflect a desire to improve instruction to meet the educational needs of students, to use less lecture, to provide hands-on learning opportunities, or to challenge students to apply content using real life examples (Savery, 2006). For some faculty, breaking with traditional approaches to instruction is difficult while others embrace the opportunity to use less traditional strategies (Barr & Tagg, 1995). Amador et al. (2006) describes the shift to implementing PBL in this way:

> It is a dramatic change in how our instruction is conceived, how the content of our courses is approached, and how our roles as faculty members are enacted. PBL shifts the center of our courses from what we do and what we say to the problem with which our students are confronted. PBL transforms our roles from purveyors of knowledge to participants in the process, from makers of problems to managers of groups. It also shifts the control, pacing, and direction of classroom activity to our students. (pp. 17-18)
The willingness to move from traditional formats of instruction, such as lectures, to including more active learning strategies, like PBL, challenges faculty to see their role as being a facilitator rather than the authority figure (Barr & Tagg, 1995). The move from central figure to facilitator may provide students with a range of learning experiences which support their future educational and professional goals.

The process of adjusting a course to incorporate PBL activities is complex. In shifting the boundaries of a class to facilitate PBL, faculty may need to guide their students in making the change from a faculty-driven model of instruction to a student-centered and directed modality of instruction. In making the decision to shift the instructional approach of a course, faculty may consider the purpose, content, sequence, learners need, and instructional resources which are available when determining if and how to incorporate PBL activities and assignments in a class. Amador et al. (2006) argued, “Changes in faculty behavior are, however, not sufficient to ensure the success of PBL. Our students need to make some changes as well” (pp. 37-38). A place to describe the changes in instruction and expectations of students is in the syllabus.

The decision to shift to active learning and collaborative models of instruction requires careful consideration of how to best meet student needs, while balancing the stated course content and objectives. Adjustment and evaluation are considered by Lattuca and Stark (2009) to be separate forms of measurement with differing criteria to demonstrate the effectiveness of a course. The adjustment of academic plans and curriculum can be used to identify areas of a course design which may need improvement and be connected to the learning opportunities provided throughout a course. Faculty may take into consideration the relative successes or failures of the teaching methodologies as part of the adjustment process. Evaluation relies on numeric data associated with student achievement-based the grades received on papers, projects,
and course examinations. Evaluation may also be used for program review and, in this capacity, would be more inclusive and generalized as the overall course effectiveness is being evaluated. Academic plans and curriculum development may require periodic updates or changes which reflect shifting priorities, such as new internal or external influences on the institutional or departmental level and the use of different instructional strategies. The recent changes to the GENED curriculum provide faculty members with an overarching framework for planning how their courses help meet the larger institutional student learning outcomes and goals. As Gaff and Ratcliff (1997) noted:

Changes to curriculum should include analysis of the demographics, politics, social contexts, economic factors, and the increasing use of technology that shape educational goals. As student needs must continually be addressed and balanced with institutional goals, it important for those involved with the development of curricula to embrace the dynamic nature of learning in the 21st Century while acknowledging the diverse voices that may influence how to best meet the needs of students. (pp. 118-119)

The recent addition of the 350 level GENED course indicates attention to these learning elements. Given the timing of the approval of this additional course requirement (2019), it remains unknown if faculty members will use PBL in these course level offerings. Faculty who seek to design courses that incorporate new methods of instruction have much to consider when determining needed changes and how a change in instruction will best serve their students.

Study participants who identified having used PBL in their classes offered insight into why they use PBL in some classes more than others. For example, case study analysis was referred to as being the most common form of PBL used in non-STEM classes, as this strategy provided students an opportunity to see better the complexity of real-life scenarios.
The need for more research in the effectiveness of active learning strategies and PBL was a sentiment expressed by all the interviewed faculty members, even those who have had some training in using PBL. The faculty participants wanted to acquire additional information with regard to the history of PBL, studies conducted on the effectiveness of PBL, how PBL is used in their specific content areas, if PBL has a positive effect on student engagements, and if research shows that PBL instruction at the undergraduate level makes a difference in graduate student learning. Interestingly, the major research and “how to” style publications on PBL do not include specific details on the professional development and research shared with faculty attendees. Yet, the literature is replete in the advantages of using PBL and active learning (Amador et al., 2006; Duch et al., 2001; Savery, 2006).

If faculty members who have successfully employed PBL in their classes presented this strategy to their departmental peers, there may be less faculty resistance. In this case, faculty using PBL can show how their evaluation of student learning helped improve subsequent classes as they used this feedback to make changes to their use of PBL (Lattuca & Stark, 2009). Here, feedback from the course offering helps faculty members evaluate the strategy and make changes in future class offerings. Faculty participants also expressed an interest in using PBL to provide interdisciplinary connections, especially when course are cross-listed for other programs of study.

Maxine (k/NTE/F/4) echoed how changing the paradigm of instruction to a different instructional approach can provide students examples from current contexts and cases to demonstrate theory in action. She described her process of changing her course design from lecture to incorporating PBL into two of her courses, a very large 200-level class and a smaller microbiology-based class. The challenges and her solutions provide insight into how adjusting
courses may be achieved in carefully planned small steps. Maxine described how her background informed her decision to use PBL and how she adapts her use of PBL to reflect current concerns of practice in her discipline. She uses feedback to make adjustments and does not grade all exercises, which removes a student concern and offers for more engagement as the threat of a poor grade is not looming. Maxine also has students write case studies, as this exercise requires them to pull from the course material in their writing.

The use of PBL to encourage students to collaborate with a variety of their classmates to emulate working with a team of professionals was included as a rationale in Maxine’s syllabus for the microbiology class. She wanted her students, some of whom already work in health care related fields, to understand the value of a team approach to solving problems. Matilda and Maxine changed their classes over time to adjust to what they thought students should experience prior to going into work settings. The real-time change that Maxine was making at the time of her interview to accommodate for remote learning due to COVID-19 highlights how she was changing her teaching to a new modality, yet still focused on providing PBL opportunities in which students worked on problems together. They expressed a desire to learn more about PBL and resources that would assist them in continuing to provide students with enriching opportunities to understand how learned content may be applied to practical contexts and broaden the scope of their PBL activities.

The responses to the short response survey questions provided further insight into understanding what faculty members identify as needs to change their current teaching strategies and to incorporate more PBL into their teaching. Upper-level classes and graduate level classes tend to be smaller, focused on specific content, and were described as a seminar format. The faculty felt this configuration encouraged more community learning opportunities in which
problems of practice could be investigated. The faculty that used PBL in their larger 100- and 200-level classes provided insight into the challenges they faced and what additional resources they would need in order to include interdisciplinary uses of PBL in the future iterations of these classes. As adult learners, faculty must consider themselves students in learning new teaching strategies and transforming their practices via newly acquired information (Merriam et al., 2007). Faculty must turn learner to educate themselves as they consider using new pedological approaches in their classes.

In general, the survey responses indicated a willingness to consider using PBL activities, if there were more guidance on how to adapt current syllabi without sacrificing content and time. The notion that PBL makes instruction more complicated and involves a time-consuming process in adjusting existing course design are two common concerns cited in the literature (Amador et al, 2006; Duch et al., 2001). Faculty motivations to learn new strategies ties to their past experiences and the current demands of their work (Knowles, 1980). Having more information about PBL and providing faculty with examples of syllabi which include PBL, in their areas of discipline, may allow faculty to better visualize how they may successfully adjust their existing syllabi.

Changing practices requires faculty members to learn how to assess PBL learning as this differs from assessments based on multiple choice exams or essays. The need to assess student learning aligns with assessment and adjustment in the APM (Lattuca & Stark, 2009). The need to assess students for both their individual efforts and as member of a collaborative group ought to reflect the content of a class and how faculty perceive assessment. According to Amador et al. (2006):
Differences [in assessment] reflect the content, level, and size of our courses; others are consequences of personal style and choice. In PBL, however, collaborative learning is all there is and the need to evaluate individual student learning while acknowledging group performance and contributions requires constant attention. (p.101)

The combination of assessing individual and group contributions is a challenge in most group learning activities, but it may be more so in PBL when the objective is group knowledge and thought rather than determining what content individual students have acquired. Clearly, participants noted that part of their reluctance in employing PBL was knowing how to assess student learning. This rationale also aligned with the assertion that PBL may lessen the amount of time dedicated to delivering content. Although each of these faculty members are willing or have used PBL to some extent, they articulated areas in which they would need more guidance in how to efficiently design courses using PBL to effectively cover required content with adequate assessments without becoming a drain planning time.

Desire for Instructional Supports

The concept of shifting emphasis towards a PBL approach occurs at both the institutional and personal level. At the institutional level, the use of problem-solving activities is encouraged in the GENED and is part of long-standing curricula in certain programs of study, such as Physics and Data Science. Institutional support for breaking with traditional approaches of instruction, which allows for more student-driven collaborative learning opportunities, is a solid first step in the process of building faculty support for changing the dynamics of how courses are conceptualized and taught. The next step is to find ways to motivate faculty to attend workshops and engage them in meaningful dialogue about the use of PBL in their classes. Although faculty in the study expressed a willingness to attend workshops, they often did not attend the sessions
already offered. Perhaps, encouraging faculty to consider attending professional development workshops is a point from which to begin and, in time, they will decide to attend out of choice and a desire to continue to learn new approaches to instruction (Merriam et al., 2007).

The faculty interviewed and those that answered the short answer survey questions, expressed several areas in which current institutional policies and practices impact their ability to fully embrace PBL as a means of instruction. For some faculty, the issue was one of course content and objectives set by the department to align with the policies of the school of A&S. While course content and objectives may give some flexibility to faculty, there are some aspects which must reflect previous course instruction for continuity purposes.

In eight survey responses and six interviews, the dilemma of large courses, particularly, 100- and 200-level courses with up to 200 students, was mentioned. The departments who are most impacted with these large classes offer multiple sections of these classes, but they all have a maximum number of seats which is set by the institution. The faculty expressed that to be prepared to use PBL in those large classes, they would need more resources, more space, and more time to prepare and plan PBL activities for those classes. Class size can affect how PBL is organized and implemented. In smaller classes, groups may be given a problem in which student contributions and developing skills are easily observable, but in larger classes it may be overwhelming for an instructor to manage the number of groups while assessing the group as well as individual students (Amador et al., 2006). The use of a variety of instructional strategies may need to be employed when working with large classes such as bringing in additional assistance from teaching assistants or graduate students, incorporate more structure into the PBL activities to keep groups focused on the task, and use short lectures to remedy any noticed issues amongst the groups (Duch et al., 2001).
The general feeling among participants was that there is a disconnect between being encouraged to use PBL and how they can use it in their classes given the stated instructional requirements. The changes in curricula and courses reflect the current instructional practices encouraged by the administration and, to that end, adjustments to the institutional policies may be necessary to allow for future use of PBL across disciplines. Curricula changes in the wake of coronavirus have encouraged inclusion of educational technology that includes opportunities for online group work which encourages the use of active learning strategies, including PBL.

The choice to use active learning and PBL approaches rest with the individual faculty member who must consider the institutional policies and suggested practices when designing their courses. To drive the movement towards using less traditional methods of instruction, faculty expressed a desire to be part of the process by being given more time to prepare their course material and syllabi to be more inclusive of active learning and PBL activities.

Implementing PBL is a process that requires time to work on curricular changes. According to Amador et al. (2006):

The transformation should be made in stages over a couple of semesters as course design incorporates first some group activities then more giving us a chance to see how it will work and hone the skills necessary to be effective as participants (rather than purveyors) and managers (rather than masters). (p. 21)

Preparing faculty to use PBL may include several workshops over time and require follow-up conversations in which support is provided to address any issues and assist in sustaining the use of PBL.

The preparation may include: determining what may or may not work as a teaching technique for a particular class, what instructional practice is effective for student engagement,
how to adjust/align courses to allow content to be applied in practical context, how to get students to accept a change in approach, and discovering ways to make interdisciplinary connections. All the faculty interviewed stated that they felt using PBL would add complexity and dimension to their classes which would generate student interest. However, they also spoke of whether moving from a faculty-driven model to a student-centered model is appropriate for all their courses. Advocacy for a move to student-centered learning has occurred for over 25 years (Barr & Tagg, 1995), and the literature indicates that PBL succeeds in fostering student engagement and provides practical applications for learned content (Duch et al., 2001; Savery, 2006; Savin-Baden, 2003). However, faculty may not fully appreciate or understand why the shift to a student-centered model is of benefit to their students or see how providing options to present information an alternative way can encourage students to be participants in their own learning experiences (Savin-Baden, 2003).

**Summary**

Faculty participants expressed concern over student evaluations, in some cases, and the applicability of PBL in in courses leading to national examinations for entrance into competitive graduate programs, such as law or medical schools. Faculty are aware that their decisions to change course design may not be well received by some students as PBL is collaborative and may not be graded in the same manner as classes taught in using a more traditional methodology. There are many issues to address and take into consideration when faculty set out to change their courses to alternative instructional approaches. The faculty interviewed seemed to agree that in the pre-coronavirus environment that PBL could be an effective approach for their classes, but they need more encouragement and support to move toward incorporating problem-solving activities in their course designs and curricula.
The Influence of Institutional Context on Implementation of PBL

After launching a review of the GENED curriculum in 2012, an overarching objective was established to provide undergraduate students with opportunities to connect and integrate learning across disciplines as part of their academic experience. As part of the GENED, students would be encouraged to engage in learning that exceeds the boundaries of their disciplines and connects to the greater community outside of the institution (Barber, 2020). Amongst the provisions in the original document to achieve this goal was the inclusion of an active learning requirement which was approved by the faculty. The active learning requirement could be satisfied at any level of instruction and included a variety of experiences such as: laboratory work, field work, performances in dance or theater, and internships.

In March 2016, however, a faculty vote removed the active learning requirement and replaced it with a creative and performing arts proficiency requirement. The stated purpose of this requirement was to allow students to understand the artistic process by providing learning opportunities through experiences designed to challenge students to understand artistic choices and how artists communicate concepts or ideas. Any foundational level course in the fine and performing arts would qualify to meet this requirement.

The change in the active learning requirement signaled that faculty at the institution highlights the mixed feelings about the broad use of these strategies and faculty resistance to changes in teaching pedagogy. Evidence of this also appeared in the survey short answer responses and non-responses to some of the matrix queries that focused on certain active learning strategies. In four short responses, veteran faculty who had been at the institution for more than 15 years stated that they were trained in using active learning strategies but felt that they were being asked to use a “canned” or “proscribed” approach, to which they objected. These faculty
members felt that their autonomy to determine how to convey their content was being negatively impacted and that they should be the arbiters of what is best for their classes. Although there were some negative responses in the survey regarding active learning, there were also many positive and receptive responses that may indicate a shift in faculty perspective and openness to different instructional approaches, if they are not forced upon the faculty in any way. Here, the core of faculty resistance was grounded in autonomy versus an objection to using active learning strategies in general.

There exist other areas of institutional tension which may have played a role in the decision some faculty made when determining their support for the former active learning requirement versus the current creative and performing arts proficiency requirement. The active learning requirement effectuated all levels of instruction from the 100-level foundation classes, which include students from different educational backgrounds and who may not have the same disciplinary knowledge, to 400-level courses in which students must produce a final culminating product or take a national assessment for graduate programs. Faculty expressed concern over ensuring that content was covered efficiently and thoroughly to ensure their students could be successful in the next level of the course while also meeting program requirements to employ active learning strategies.

Faculty also stated that their use of active learning strategies, including PBL, would take too much time to prepare and plan which might take time away from their research agendas and goals. Of the faculty interviewed, four faculty members, representing both the natural and social sciences, mentioned that part of their hesitation to use PBL was out of concern about the time it would take to design and execute active learning experiences. The time spent on developing new curricula or syllabi would reduce time spent on research which they felt was a vital part of their
positions in the institution. Additionally, faculty expressed how their career stages and tenure statuses influenced how they design their classes. Some long-time tenured faculty felt that they had a freedom they did not in their early careers, which encouraged them to attempt new methods of instruction, while other veteran faculty felt that they could not incorporate active learning into their classes without having redesign their long established course designs.

Although the changes to the GENED removing the active learning requirement was voted into effect by the faculty, there exists a grassroots effort amongst faculty who continue to support the idea of using active learning strategies to connect content to practical, real-world applications. All of the faculty interviewed expressed interest in building active learning strategies, particularly PBL, into their classes as they felt it would engage and energize students when they can see how what they learn can be used in other classes and beyond the classroom. The faculty who were receptive to acquiring more information about how to use active learning strategies included early career and veteran faculty across A&S disciplines. There appears to be a paradigm shift in process in which faculty, who may have previously resisted the use of active learning, are beginning to better understand how their courses can connect to learning beyond departmental silos and incorporate a more interdisciplinary context to enrich student learning experiences. Central to supporting this shift are addressing the sources of resistance noted by the faculty. An area of need pointed out by faculty members was the need for professional development regarding teaching strategies. In 2019, the inception of a teaching and learning center at the site institution serves to bring together faculty from around the campus community and create a community of learners.

A groundswell of faculty support to establish a center occurred over a number of years. The mission of the teaching and learning center is to provide faculty, staff, and students from
across disciplines to collaborate as they learn about a variety of diverse approaches to instruction and learning while also exploring new technology which allows for the sharing of multi-generational and multi-disciplinary perspectives to enhance curricula and course design. The teaching and learning center develops programs and learning opportunities for a broad audience and provides professional development programs for faculty, resources on teaching approaches, and support for using online learning platforms. The center is in a unique position to connect faculty across disciplines who seek to learn how to create problem-solving learning experiences in their classes. The center is likewise situated to provide specifically designed professional development that is tailored to address the needs of each department. The possibility exists in the teaching and learning center to create two threads for PBL professional development opportunities, one that is generic and one that is discipline specific. Here, faculty would have a sense of the broad uses of PBL and have a more nuanced perspective of how they can adapt their existing syllabi to incorporate PBL learning experiences.

Although providing faculty access to professional development opportunities is important, middle and upper-level administrators have a supporting role in the process as well. Administrators at various levels from department chair, dean, to the provost can offer encouragement and support to faculty. For example, the provost may modify existing criteria used in faculty evaluations, promotions, and tenure review to acknowledge a faculty members participation in professional development workshops which may as an incentive to continue their learning processes. The deans of schools can motivate department heads to engage with faculty to discuss the importance of using problem-solving in their classes. Department heads may also be encouraged to contact the teaching and learning center for assistance and, perhaps, participate in professional development opportunities as time allows. The reality is there are competing
demands for time at the administrative and instructional levels. However, the opportunities to
grow and learn should not just be for students, but for administrators and faculty as well.

**Implications for Policy, Practice, and Future Research**

As the use of PBL and other forms of active learning are being encouraged for use in
college instruction, the need to review and revise curricula presents challenges for faculty. The
challenges may affect not only teaching practices, but administrative decisions and future policy
changes as well. Lattuca and Stark (2009) asserted several claims about institutional mechanisms
for curriculum design frameworks:

> By definition, both “academic plans” and “curriculum design” imply deliberate decisions
> about desired relationships among students, students, purposes, and processes.
> Consequently, the process of creating the plan involves more than getting a few people
> with different views to compromise; it involves consideration of many influences and
> circumstances. (p. 19)

The process of adapting curricula across disciplines to incorporate active learning strategies and,
by extension PBL, may require that new processes be developed to conceive and implement new
curricula designs. For example, a data science class may have students from a variety of majors
who have their individual motivations for taking the class and the design of the course may need
to be adapted to meet the needs of those in the class from semester to semester. Furthermore,
administration, faculty, and instructional staff may need training to understand how to adapt their
existing curricula to meet not only the needs of their areas of discipline, but to build bridges to
interdisciplinary connections between disciplines. Lattuca and Stark (2009) addressed this issue
as well:

> Current processes are bound to assumptions about teaching and learning and thus limit
> the ability to create effective academic plans. … The important associations among
educational purposes, instructional purposes, and change processes; the strong impact of the disciplines on each of these; and the influences of forces both external and internal to the university. (p. 20)

Implementing substantial changes to curricula across disciplines may be complicated and involve multiple stakeholders: administrators who wish to promote changes to better meet the needs of students; faculty and instructional staff whose job is to provide students with relevant content related to a specific discipline; parents who have expectations for the learning process as it impacts their children’s futures; students who may voice their opinions about their educational needs; and, finally, the potential employers, graduate school admissions decision makers, and community members who look to the university to ensure that students learn what is needed to become productive members of academic and non-academic communities.

Administrators may seek to influence how teaching is evaluated as a means to motivate changes to more active learning strategies in classroom teaching (including PBL). Further, administrators can push for the inclusion of language in promotion and tenure requirements that places an emphasis on teaching (Cox et al., 2011; Wiek et al., 2014). Likewise, the dean of A&S can signal to department chairs the importance of supporting faculty in pedagogies that support active learning. The teaching studio on campus can work with departmental leaders and faculty to provide a range of professional development to support faculty in their teaching efforts and can seek to differentiate this training by discipline. Faculty and institutional leaders working together can engage in a strategic and inclusive process that supports developing curricula that reflects the desired changes, while also meeting the educational needs of students.
Other institutions have sought to encourage faculty to adapt their curricula and programs of study to implement new instructional practices while creating an environment for faculty growth. For example, in 1997 the University of Delaware created the Institute for Transforming University Education to provide A&S faculty with access to resources and professional development opportunities in which student-centered and active learning approaches, especially PBL are the focus. Another example of how universities may support the implementation of PBL, and other active learning approaches is found at the University of Rhode Island’s Office of Advancement of Teaching & Learning. Faculty are offered a wide range of resources on evidence-based instructional practices which includes: PBL, syllabus writing resources including exemplar syllabi across disciplines, and high impact teaching seminars which cover a broad range of topics including the implementation of PBL in a variety of courses. Further, at the University of Virginia, the Center for Teaching Excellence provides faculty with a variety of resources and professional development opportunities which include a teaching consultation program for faculty who wish to have their classes observed for evaluative purposes, a student-faculty partnership program in which students and faculty work together courses and curricula, and workshops on engaging in innovative instructional practices. These institutional examples can provide a model for the teaching and learning center to support faculty development in active learning and PBL.

The site institution continues to adjust the GENED requirements at the undergraduate level to encourage faculty to use a variety of instructional practices. In 2013, the GENED curriculum required courses in creative and performing arts or natural science lab-based classes specifically mentioning active learning as a desired practice for student learning. However, in
2015, that language was removed from the GENED requirements for the incoming class in 2016. As previously mentioned, the active learning requirement was replaced with a creative and performing arts proficiency requirement, which was updated again in 2019. The language shifted away from the use of active learning to experience-based learning, which links active learning to specific experiences aligned within the discipline. “A key element of experience-based learning … is that learners analyze their experience by reflecting, evaluating and reconstructing it (sometimes individually, sometimes collectively, sometimes both) in order to draw meaning from it in the light of prior experience” (Anderson et al., 1995, p. 1). Although these learning experiences may involve active learning strategies, they also include a broader range of options to what constitutes learning experiences, including PBL opportunities linked to problems encountered in prior or current experience. The changes to the requirements effect faculty members and their approaches to teaching.

**Implications for Faculty**

This study investigated the use of PBL by faculty and how they determined if and how to include PBL in their classes, as well as what resources and supports, they thought were necessary PBL to implement across A&S disciplines. The findings of the study revealed four areas of specific implications for practice: faculty choices, departmental silos, opportunities for professional development, and inclusion of PBL used in K-12 instruction. Each of these areas may affect faculty use of PBL, which requires a holistic consideration of the research findings of this study. Lattuca and Stark (2009) describe faculty involvement in course planning in this way, “At the course level, curriculum planning is usually the task of a single individual. Colleagueship appears to be important in course planning, even when faculty members teach alone. Congenial colleagues can stimulate new thoughts and provide support and reassurance” (p. 125). The
decision to use a new framework for course and curricula is not always easy for faculty as there are many moving parts to consider. The objective is to ensure students learn course material and develop the skills needed to advance to the next level of instruction.

Faculty autonomy differ from institution to institution and within departments within institutions. The method of course delivery may vary as well. Lattuca and Stark (2009) identified what they call contextual filters to describe the influences, internal and external, that may affect faculty decisions to make changes in the design of courses and programs. The contextual filters, content, context, and form that when taken together, allows for a better understanding of the drivers and mechanisms influencing the choice to use alternative instructional approaches such as PBL. The contextual filters incorporate the eight elements of APM (purpose, content, sequence, learners, instructional processes, instructional resources, evaluation, and adjustment) that can consolidate into three broad categories (content, context, and form) to assist in identifying how faculty plan and design their courses. The three contextual filters were used to identify the implications if, how, and why faculty choose or do not choose to incorporate PBL into their classes.

Faculty Choices and Content

Faculty at the institution are semi-autonomous and are able to determine what instructional strategies are appropriate for their classes, while also being mindful of the GENED requirements. To this end, faculty must find a balance between addressing student skill development, meeting course required content, and satisfying the GENED requirements for each level of instruction as appropriate to the course being taught. The choice to implement PBL is in the hands of the individual faculty member and what they deem appropriate for their classes and the choice may be influenced by how they were taught, the content they feel is critical for
students, and if they feel a shift in instructional approach is needed in their classes to enhance student learning.

The first filter, content, is predicated on the instructor’s background, beliefs on the purpose of education, learning experiences, and their views of their academic disciplines. As adult learners, faculty members’ prior experience may influence what they view as central content to cover as well as methods of instruction (Merriam et al., 2007). In this case, content refers to the knowledge and skills learned in a class. According to Lattuca and Stark (2009),

Their own background, scholarly preparation, teaching experience, and beliefs about educational purpose influenced their course planning. Instructions’ beliefs about the purpose of education are closely related to their field. …The goal of transmitting concept knowledge about a specific academic field tends to provide the initial framework for specifying outcomes in course planning. (pp. 120-121)

Having a sense of how faculty members view content based on their individual backgrounds and understanding of their respective fields can influence the offering of professional development to better support faculty in the implementing PBL in their classes. Some of the faculty participants noted that their discipline was primed to use PBL as instructors sought to support student learning in how to apply theory in practice (e.g., physics, studio art).

As the findings highlighted, in general, the younger faculty with less than 10 years of teaching experience indicated that they had learned about PBL at some point in their own educational experiences. For example, Manuel (Psy/TT/M/1) and Maxine (K/NTE/F/5) both learned about PBL in their graduate school programs focused on teaching collegiate courses. This type of programming could be offered in campus based professional development sessions too.
Survey results highlight links with use of PBL and certain disciplines. For example, faculty teaching laboratory-based classes, such as art and art history, natural sciences, psychology, and kinesiology, mentioned using PBL more often than other disciplines. Often these class consist of discipline specific material and skill development that faculty know are relevant in the profession. It may be possible to bridge gaps in understanding about PBL and build interdisciplinary connections if professional development opportunities focus on specific disciplinary content needs and then bring together faculty across disciplines to assist each other in the process of implementing PBL using successful practices.

**Contextual Influences on Faculty Choice**

Faculty members have more to consider than the content of their classes as there are many conditions, internal and external, which may influence the decision to switch instructional methodologies. Lattuca and Stark (2009) describe a range of contextual issues that faculty may face when determining if and how to adjust their classes. These contextual issues include: program goals, student characteristics, student goals, literature on teaching and learning, advice available on campus, facilities, and external influences. The context category includes the elements of learners and instructional resources. It is a challenge for faculty to sift through the layers as they begin the process of altering their course designs in any effort to meet the full range of institutional expectations and to meet student needs.

The decision to plan courses differently using alternative instructional approaches, like PBL, are affected by program requirements and institutional curricula goals. For example, those faculty teaching 300- and 400-level classes have to align the goals of their academic programs with the stated GENED goals for that level of instruction. As Lattuca and Stark (2009) assert:
Although there are numerous potential contextual influences on course planning internal unit-level influences (within the program) and institutional influences originating outside the program but within the college or University affect course planning most. …The strength of many contextual influences varies by academic field. (p. 124)

For example, access to laboratories and technical equipment may be more important for faculty in mathematics, applied sciences, data science, and the natural sciences. Similarly, use of library resources for media production and research may be of greater importance to those teaching English, government, history, and the creative and performing arts. The use of facilities and resources available to assist faculty in meeting specific academic program and student goals are contextual factors that may determine how faculty view PBL as an instructional approach.

For some faculty the decision to implement PBL was also connected to the level of course instruction. As previously mentioned, the GENED sets forth instructional guidelines for each level of undergraduate instruction, which includes the use of problem-solving learning at the 400 level as a culmination of the scaffolding of academic skills acquired in the proceeding levels of instruction. Faculty who teach 400-level courses indicated that incorporating PBL into their instruction was important and allowed for the development of assignments in which students demonstrate their acquisition of academic material and skills throughout their programs of study. Building in requirements in the GENED course levels provides contexts more conducive for PBL. Upper level GENED courses that have smaller class sizes or particular experience-based requirements also lend themselves to a context that supports use of PBL.

Faculty interviews and short answer survey responses indicated varying levels of success when implanting PBL into their 100-300-level classes. Faculty, who have more training, teaching experience, smaller class sizes, and greater access to instructional resources, spoke of
how they have successfully used PBL, whereas faculty teaching large classes expressed a need for more training in how to use PBL in these contexts. As the institution as whole continues to develop and shape curricula in which faculty are encouraged to use alternative teaching approach like PBL, the perspectives of faculty, across departments and programs of study, may provide information from which to build a variety of training opportunities in the use of PBL. Perhaps with greater awareness and understanding PBL more faculty will be willing to use PBL across levels of instruction in the future.

Course Decisions and Class Format Choices

Faculty make decisions on how to arrange their classes based on departments, institutional, and personal objectives. The determination of how to design a course and implement an alternative instructional approach, such as PBL, is largely left to the individual faculty member, unless it includes curricula developed at the departmental level. For example, the Physics department specifically refers to the use of PBL in certain courses such as astronomy, quantum mechanics, and engineering principles. Although the GENED does not enumerate how a class is to be designed, it is understood that faculty will present syllabi to clearly describe the class objectives, grading procedures, purpose of the class, work products, and the methodology of instruction.

The planning of courses, in general, can be a complicated process as one addresses how to ensure that students learning needs are met, while meeting departmental and institutional expectations. Lattuca and Stark (2009) describe the contextual filter of form as “form incorporates the various decisions made in planning a course. It translates the interaction of content and context into actual events. …The four dimensions are: arranging content, selecting instructional processes, describing the plan, and evaluating the plan” (p. 125). The decision on
how to plan a course emerges based on how the faculty member views the educational goals of a course and the requirements for preparing students for their academic field. Course content is usually determined first and is, generally, based upon existing departmental and institutional requirements. Once the course content is determined it is not atypical for the sequence of a course to be established to effectively scaffold the learning of course content in a manner appropriate to the prior knowledge of students in the class.

Faculty interviewed and surveyed commented that course content in their academic fields are the determinants when they consider whether to use PBL in their classes. The notion that PBL is a better fit for some academic field or courses was common amongst the study participants. The notion that PBL is a planned approach, therefore does not offer a natural extension of course content and form was mentioned by other faculty members as well. An implication of this finding is that professional development will need to address how PBL may be incorporated as part of an overall course design for specific disciplines or programs of study. The adaptability of PBL to be tailored to present content regardless of subject may help skeptical faculty visualize how they may be able to use PBL, even if it occurs on a periodic basis, in their classes.

The concept of developing skills aligned with course content and sequencing of information seems to be an area of understanding amongst the faculty participants. However, it is in determining if PBL is considered appropriate for a course that most challenges instructional faculty. Faculty members need exposure to the concept of PBL before they can understand its benefits in their academic fields. As adult learners, they need to see a connection between use of PBL and their work as instructional faculty (Amador et al., 2006).
In looking across the data with the use of the contextual filters, there are areas of concern amongst faculty that may be addressed with information and professional development to assist them in planning course using PBL. The form a class takes may have many variations and be based on individual faculty preferences, departmental practices, and institutional policies. The challenge in balancing departmental expectations, the needs of students, and institutional education requirements is faced by faculty across disciplines and levels of instruction. It appears that with support and training, faculty may be more likely to step out of familiar instructional approaches and be open to designing courses and curricula which allow for the use of alternative active learning approaches and PBL experiences.

**Implications for Policy and Structure**

Problem-solving in student learning is part of a shift in the direction of the GENED at the site institution. The GENED policy appears to be an evolving process as it has changed since the initial focus on an active learning requirement that started, was then removed, and replaced with a problem-solving component in upper-level classes. It is likely that the current stated policy may change again as educational priorities shift to address future needs.

For faculty this means keeping abreast of the changes and determining how to balance instruction with the objectives stated in the GENED. Although compliance with the GENED is not closely monitored, several faculty participants felt that they needed to demonstrate that they attempted, successfully or not, to include problem-solving activities in their classes. Faculty resistance to changing teaching practices was evident in the study, and similar to that in other institutions (Brownell & Tanner, 2012). How institutional academic leaders implement policies related to priorities in teaching requires attention to faculty career stage, faculty tenure status, and disciplinary degree requirements. The structures in place at the site institution also have a
bearing on implementation of policy. For example, despite the espoused value of teaching and attention to GENED, tenure and promotion policies give the most weight to research and publication efforts. Institutional policies about how to achieve tenure or continuing contract status vary, but it was generally felt that, at the site institution, it is important to demonstrate that one is following the stated instructional approaches presented in the GENED.

The frequent mention of student evaluations in the study implies that institutional leaders should focus attention on the evaluation of teaching as they seek to incorporate more active learning strategies into courses. Non-tenured faculty felt that if they did not use problem-solving in their classes, lower or upper levels, that it might be noticed by senior faculty or the heads of their departments, and this might negatively influence their teaching status. How student evaluations are used for renewal of contracts and as part tenure review process influences how faculty engage in changing their teaching practices. Faculty felt that if students thought that PBL activities added to their learning experiences it might benefit their reviews, but if the PBL experience was not successful and enough student provided a negative evaluations that it might make it more difficult to maintain their status at the institution.

Institutional policies on assessment of student learning is another implication emerging from this research. In encouraging the use of PBL, it may become necessary to consider how faculty grade assignments, examinations, quizzes, and other class products. The institution has a grading policy for graduate and undergraduate classes that is listed in the academic catalog for each graduate school or undergraduate program within the A&S. The grading policy includes information about how grades are determined, the point scale for letter grades, pass/ fail grading requirements, and the grade review process when contenting a grade. Because of the collaborative aspect of PBL, it is important for the institution to provide development
opportunities for faculty members to understand how to assess student learning when PBL is used. Finally, institutional policies for tenure, promotion, and renewal of non-tenure eligible contracts should provide credit for participating in professional development opportunities. Some form of recognition for investing in professional development would signal to faculty the importance the institution places on this work.

**Future Research**

PBL is an active learning approach in which courses are designed around problems that reflect realistic circumstances and contexts related to an area of study to give students opportunities to discover the practical applications of learned content. Although the institution has encouraged the use of problem-solving as an instructional approach vis-a-vis the GENED at the upper-class levels, the regular practice of implementing this approach by all faculty, across all disciplines, remains unclear at this time. Longitudinal research on the use of PBL will be beneficial as faculty are further encouraged to redesign and rethink their instruction methods to incorporate practical applications for course content.

The challenge for faculty, across A&S disciplines, is to create or find questions that are appropriate to the course and level of student understanding of course content. In this regard, future research on the resources and additional training to design courses using PBL that faculty find most effective would help. Knowing more about the areas for professional development that best eliminate faculty resistance to using PBL would be useful. It is also important to understand more about the type of professional development most accessed. For example, research on virtual versus face-to-face sessions would be useful, as would understanding how faculty value general versus disciplinary targeted sessions.
Future research could also address interdisciplinary efforts to use PBL. How do faculty members co-teach a topic with a problem-centered project that brings together multiple perspectives? Often, capstone classes are viewed as the place in which PBL is easiest to employ. Studying how PBL works in large class settings would therefore be useful.

Another area of potential research involves investigating the use of PBL in professional schools and in other institutional types (e.g., community colleges, research universities). As well, understanding more about the disciplinary use of PBL could serve as an area of future research. This research highlighted how some disciplines were primed to use PBL, whereas other faculty participants noted that their disciplinary content requirements made it difficult to give up class time. Understanding if targeted disciplinary professional development resulted in changes in faculty perspective would extend this line of inquiry as well.

Conclusion

The implementation of PBL is complex. Overall, faculty were curious and open to the concept of using a PBL approach in their classes. They want to learn how it may be implemented, why PBL matters, and what benefits their students may derive from PBL. As adult learners, faculty motivations to learn about PBL and to try it in their classes varied based on career stage, tenure status, and discipline. Faculty concerns about the efficacy and practicability of PBL need to be addressed in such a way that they feel course requirements are being met and that students are learning needed content. This study found that although problem-solving language were added to the GENED curriculum, faculty participants feel they needed to know how to tailor their courses to meet the needs of their disciplinary content using PBL. Likewise, faculty resistance was evident for those teaching foundational classes, which may be larger classes. Professional development in which specific disciplinary content and making
interdisciplinary connections between disciplines may encourage faculty to adapt curricula beyond the current boundaries of their course designs. This study concluded that faculty participants desired greater professional development in the use of PBL and improved access to resources germane to specific fields of study. Differences in use of PBL emerged based on discipline, faculty career stage, and tenure status. Faculty using PBL saw its potential as an effective method to meet the needs of students as they pursue further study or enter the workforce. Tensions were evident based on institutional policies for tenure that preference research above teaching, challenges in navigating interdisciplinary work, priorities based on career stage and tenure status, and a general resistance by faculty to changing teaching strategies. Yet, the culture of the institution highlights how faculty value teaching and working with students. Thus, multiple levers for change exist that can encourage and support expanded use of PBL and other active learning strategies at the site institution.

PBL is an approach which has a long history in higher education, but is just now coming to the forefront as an approach which offers faculty the opportunity to provide students with engaging and thought provoking activities which allow them to be better prepared to enter graduate programs or the workforce. The faculty participants using PBL in this study noted the value of collaborative learning for students and the ties to real-world problem solving. Even though the use of problem-solving at the upper levels of instruction was outlined in the GENED policy at the site institution, there is a need to close the informational gaps faculty may have about PBL and how to successfully implement it in their classes. More research is needed to address specific departmental concerns, determine what resources are needed to support the use of PBL, and discover the motivations for faculty involvement to attend training sessions beyond the need to comply with existing policy.
# Appendix A

## Research and Survey Alignment Crosswalk

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Research Question 1A</th>
<th>Research Question 1B</th>
<th>Research Question 2</th>
<th>Literature for all Survey Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>demographic</td>
<td></td>
<td></td>
<td>Learners: Student Characteristics and Needs. (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>2</td>
<td>demographic</td>
<td></td>
<td></td>
<td>Instructional Activities: Learning Activities (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>3</td>
<td>demographic</td>
<td></td>
<td></td>
<td>Instructional Resources: Materials and Settings. (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Critical thinking to analyze and solve complex problems with practical applications. (Duch et al, 2001)</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Find, evaluate, and utilize task appropriate resources. (Duch et al, 2001)</td>
</tr>
<tr>
<td>7</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Learners work collaboratively (Duch et al, 2001)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>X</td>
<td>Demonstration, both verbal and written, of different means of communication using learners’ skills. (Duch et al, 2001)</td>
</tr>
<tr>
<td>9</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Use of content knowledge and skills to show learned connections. (Duch et al, 2001).</td>
</tr>
</tbody>
</table>
Appendix B

Letter of Request

Dear Arts & Sciences heads of departments,

My name is Alexis Harvey and I am a PhD candidate in the Higher Education Administration program at William & Mary. For my dissertation, I am conducting research on the use of problem-based learning (PBL) in the Arts & Sciences at William & Mary. I am requesting that you take the attached survey in your role as a faculty member, and that you share the survey link with the members of your respective departments using your faculty listserv. The survey may be taken by any individual who teaches a course in your department, including tenure/tenured track faculty, graduate assistants, adjuncts, clinical faculty, etc.

The survey will take approximately 15-20 minutes to take and will provide data which may be useful to understanding if, how, and why problem-based learning is used. Any information provided will be anonymous and confidential. There will be an opportunity for interested faculty to be interviewed after completion of the survey. The interviews will last no more than 30 minutes. Faculty members who agree to the interview request, will be provided with specific questions prior to the interview. A request will be made for those participating in the interviews to bring with them a copy of their syllabi and any other documents they feel would be helpful to providing context for their use of PBL in their courses.

Thank you for assisting me in this endeavor. If you would like further information, please contact me at aiharvey@email.wm.edu or my dissertation advisor, Pamela eddy at pamela.eddy@wm.edu.

Sincerely,

Alexis Harvey
Appendix C

2020 Faculty Survey on Problem-Based Learning

This survey will take approximately 15-20 minutes to complete (You may save the survey and return to complete.)

Consent  This research project is aimed at understanding the existing perceptions of Arts & Sciences faculty on the use of problem-based learning (PBL) in classroom instruction. Increasingly, active learning teaching strategies are advocated for instruction to help improve student learning outcomes. What remains unknown is the prevalence of PBL at W&M. Your participation and views are critical in this research as I look to document the scope of problem-based use in A&S, and to learn the ways in which this teaching strategy is used. This data will be used for my dissertation research, and may result in subsequent publications.

You will provide your consent for this survey by checking the box "yes" below. This designation and the completion of the survey means that you have consented to the use of this data for the research project. The survey will take approximately 15-20 minutes to complete.

Your name and identification will not be linked to the data responses. If there are any identifiable characteristics that might unmask your identity, results will be aggregated or reported out generically. For instance, "a faculty member noted...." Your responses will be held in strict confidence and no comments will be attributed to you by name.

Your consent also recognizes that your participation is voluntary and that you can withdraw participation in this study at any time or decline to answer any question. Any artifacts provided may become part of the permanent research files unless otherwise requested.

If you have any questions or concerns about your privacy and participation in this study, please contact the College of William & Mary Institutional Review Board Protection of Human Subjects Committee. (E-mail: consent@wm.edu Phone: 1-855-800-7187). You may also contact me at aiharvey@email.wm.edu, or my dissertation chair, Pamela L. Eddy at pamela.eddy@wm.edu.

☐ Yes, I grant my consent to participate in this survey (1)

☐ No, I do not grant my consent to participate in this survey (2)

Q1 For which department or program do you teach?

________________________________________________________________
Q2 As you prepare your responses, consider the courses you taught in the Fall 2019 semester. List your classes.

__________________________________________________________________________

Q3 How long have you taught at this institution?

__________________________________________________________________________

Q4 What is your role on campus? Check your current status

- Tenured/tenure track faculty (Full professor/Associate professor/Assistant professor) (1)
- Clinical staff/full-time instructor/NTE (2)
- Adjunct faculty/part-time instructor/graduate instructor (3)

Q5 Using the following definition of Problem-based learning (PBL), please indicate how frequently you have used the following strategies in your courses. Definition: PBL is an instructional approach that uses specific academic content and collaboration among learners to address realistic problems. Students engage in the development of knowledge and skills through the process of problem-solving as part of a learning experience. Learners apply content learned in any class as it relates to constructing an answer to the problem. PBL is used to connect related knowledge to a professional field (i.e. medicine, law, or educational leadership) OR PBL can demonstrate knowledge of what content helps in solving problems. The instructor should consider what knowledge the learners need to acquire, what types of problems will demonstrate the learned content, and which PBL activities would be appropriate to meet the objectives of the program or course in which PBL will be implemented.
Q20 Given the definition above, I use PBL

- Often (1)
- Sometimes (2)
- Rarely (3)
- Never (4)

Q6 How did you first learn about Problem-based learning?

________________________________________________________________
________________________________________________________________

Q7 What, if any training, did you have to support using PBL in your classes? Please list

________________________________________________________________
________________________________________________________________

Q8 If you use PBL in any capacity, please describe how you use it in your classes?

________________________________________________________________
________________________________________________________________

Q9 If you do not use PBL in your classes, what instructional resources would you need to effectively implement PBL in your classes?

________________________________________________________________
________________________________________________________________

Q21 If you use PBL, how has your use of this strategy changed over time?

________________________________________________________________
Q11 If you use PBL, please describe how you assess student learning when using this strategy.
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Q12 What concerns do you have, if any, in the implementation and use of PBL in your classes?
________________________________________________________________________

Q13 Please indicate how often you use the following teaching strategies in your teaching. Consider a typical class.

<table>
<thead>
<tr>
<th>Teaching Strategies</th>
<th>Nearly every session (1)</th>
<th>Weekly (2)</th>
<th>Several time a term (3)</th>
<th>Once or twice a term (4)</th>
<th>Never (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional lecture (1)</td>
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<tr>
<td>Cooperative strategies such as debates, 30 second speeches, cooperative exams, and jigsaws. (2)</td>
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<tr>
<td>Collaborative strategies such as case studies, simulations, small group discussions, think-pair-share (3)</td>
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<td>Instructor-student interaction strategies such as Socratic method questions and whole class instruction (4)</td>
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<tr>
<td>Metacognitive strategies such as knowledge</td>
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<tr>
<td>Surveys, reflective journals, and reflective essays. (5)</td>
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<tr>
<td>---------------------------------------------------------</td>
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<tr>
<td>Problemsolving strategies which engage students by applying content to practical contexts and situations. (6)</td>
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<tr>
<td>Application of course content to current events/contexts (7)</td>
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<tr>
<td>Interdisciplinary connections between course materials or content (8)</td>
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<tr>
<td>Make connections to course content and careers (9)</td>
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<tr>
<td>Students are given opportunities to use content skills outside of the classroom (non-homework related tasks). (10)</td>
<td></td>
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<tr>
<td>Students produce content/materials for use in community sharing or use (service learning) (11)</td>
<td></td>
<td></td>
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<tr>
<td>Consider and incorporate</td>
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</tbody>
</table>
Q15 In the Fall 2019 semester, I taught the following format(s). Check all that apply:

☐ Face to face courses (1)

☐ Online courses (2)

☐ Hybrid courses (3)

Q16 Identify any COLL courses you have taught in Fall 2019?

☐ COLL 100 (1)

☐ COLL 150 (2)

☐ COLL 200 (3)
Q17 Please identify your gender:

- Male (1)
- Female (2)
- Other (3)
- Prefer not to answer (4)

Q22 Select individual interviews will be conducted with faculty volunteers in February, 2020. Please write your name and contact information below if you are interested in participating in this stage of the research study. Your name and contact information will be disconnected from your survey responses to maintain anonymity.

________________________________________________________________
________________________________________________________________
Appendix D

Interview Protocol Questions

1- Why have you used or not used PBL in your classes?

2- What resources, supports, or learning experiences would you need to encourage you to use or continue to use PBL?

3- How has PBL benefited or could benefit your students?
### Appendix E

#### List of Priori Codes

<table>
<thead>
<tr>
<th>Purpose (P)</th>
<th>Purposes: knowledge, skills, and attitudes to be learned (Lattuca &amp; Stark 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content (©)</td>
<td>Content: Subject Matter for Learning (Lattuca &amp; Stark (2009))</td>
</tr>
<tr>
<td>Learners (L)</td>
<td>Learners: Student Characteristics and Needs. (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>Sequence (S)</td>
<td>Sequence&quot; Curricular Arrangement (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>Instructional Resources (IR)</td>
<td>Instructional Resources: Materials and Settings. (Lattuca &amp; Stark, 2009)</td>
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<tr>
<td>Instructional Processes (IP)</td>
<td>Instructional Processes: Learning Activities (Lattuca &amp; Stark, 2009)</td>
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<tr>
<td>Assessment (A)</td>
<td>Assessment: Evaluating Plans And Outcomes. (Lattuca &amp; Stark, 2009)</td>
</tr>
<tr>
<td>Adjustment (AD)</td>
<td>Adjustment: Improving Plans (Lattuca &amp; Stark, 2009)</td>
</tr>
</tbody>
</table>
Appendix F

Research Participation Consent Form

WHAT DO WE HOPE TO LEARN FROM YOU?

This investigation, entitled, “It’s All About the Climb: Problem-Based Learning in the Arts & Science”, is designed to explore the use of problem-based learning in Arts & Sciences courses in all programs of instruction.

WHY IS YOUR PARTICIPATION IMPORTANT TO US

Studying your perception about the use of this teaching approach will help us to hone the strategies they may form the basis of future professional development in the integration of problem-based learning in Arts & sciences courses. It will also help us better understand what barriers and challenges may exist in using this approach to instruction and how it may already be used in your pedagogical practice.

WHAT WE REQUEST FROM YOU?

We ask that you take the survey attached to the email forwarded to you from your head of department. The survey will not take more than 15 minutes to complete.

ADDITIONAL INFORMATION

Please know that:

- The confidentiality of your identifying information will be protected.
- The survey responses will be used for the purposes of this study and will not be shared with administration.
- Your participation in this study is completely voluntary.

HOW YOU CAN CONTACT US

If you have questions or concerns about this study, please contact Alexis Harvey (aiharvey@email.wm.edu) at The College of William & Mary. If you have additional questions regarding your rights as a study participant, or are dissatisfied with any aspect of this study, please contact the IRB reviewer at EDIRC-L@wm.edu.
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Vita

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Education

William & Mary

Doctor of Philosophy (Ph.D.), Higher Education Administration

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Master of Arts (MA), Teaching English to Speakers of Other Languages

Work History

William & Mary

Circulation and Research Assistant, Earl G. Swem Library, June 2018-June 2020

Instructor, Center for Gifted education, Summer 2017

Faculty graduate Assistant, August 2011-May 2011

Jamestown-Yorktown Foundation

Historical Interpreter, May 2012-June 2018

Fredericksburg City Schools

Building-wide coordinator and teacher, English as a Seconds Language program, August 2007-June 2011

New York City Department of Education (multiple sites)

Building wide coordinator, Literacy programs, August 2004-June 2006

Teacher, English as a Second Language, August 1995-June 2006