"I Don’t Know What You’re Expecting But I Can Make Something Here": Epistemological Beliefs of Adult Undergraduates and the Prior Learning Assessment Portfolio Process

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“I Don’t Know What You’re Expecting But I Can Make Something Here”: Epistemological Beliefs of Adult Undergraduates and the Prior Learning Assessment Portfolio Process

A Dissertation Presented
by
Rusty Dolleman

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Human Development and Learning Specialization
“I Don’t Know What You’re Expecting But I Can Make Something Here”: Epistemological Beliefs of Adult Undergraduates and the Prior Learning Assessment Portfolio Process

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Abstract

Prior Learning Assessment (PLA) is a term for various methods by which universities accredit student experiential learning. One such method is the academic portfolio, a written reflective process in which students demonstrate that their personal or professional learning fulfills university outcomes. Proponents of academic portfolios claim that they also improve student critical thinking and problem-solving abilities. Research on traditional undergraduates suggests that differences in critical thinking and problem-solving are related to epistemological development, but little research has been done on adult undergraduate epistemologies or how student epistemology may affect PLA portfolio work. This study attempts to answer two questions: (a) To what extent are there differences between the epistemological beliefs held by adult undergraduate portfolio students as compared to adult undergraduates who take only traditional courses? (b) What are the experiences of adult portfolio undergraduates regarding tacit knowledge articulation and what impacts does this articulation have on their personal epistemologies during the portfolio process? The study follows a sequential mixed methods design, utilizing the Epistemological Beliefs Inventory (EBI) and an open-ended interview to answer the research questions. A total of 82 undergraduate students participated, all of whom were 25 of age or older. Findings suggest that successfully completing a PLA portfolio may facilitate epistemological development specifically in the areas of problem-solving and critical thinking. However, it is possible that the epistemological beliefs of those who complete portfolios may not differ substantially from those held by adult undergraduates who do not engage in portfolio work. Additionally, even students who complete portfolios successfully may find the process unclear and frustrating for reasons that may be related to their epistemological beliefs. Although more research is needed on adult epistemologies and how the PLA portfolio
process may affect them, PLA professionals should understand and consider student epistemological beliefs when developing portfolio processes and advising students.

*Keywords*: Prior Learning Assessment, academic portfolios, adult students, epistemological beliefs, epistemological development
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CHAPTER ONE: INTRODUCTION

Prior Learning Assessment (PLA) is an umbrella term used to define a set of processes employed by colleges and universities to help students who have college-level learning from work and life experience articulate that learning for academic credit. Also called Recognition of Prior Learning (RPL), Prior Learning Assessment and Recognition (PLAR), Assessment of Prior Learning (APL), and Assessment of Prior Experiential Learning (APEL), these processes include credential reviews of state, national, and industry certifications, military learning, standardized examinations such as College Board’s College-Level Examination Program (CLEP), and writing-based portfolio assessments (academic portfolios). Initially instituted to increase access to higher education in the United States during the 1960s and 1970s (Michelson & Mandell, 2004), PLA has become a standard higher education practice in many other westernized countries, including Canada, Australia, South Africa, and throughout Europe.

Engagement with PLA processes has been correlated with student success by numerous measures. American students who utilize PLA complete their degrees at higher rates and more quickly than their peers (Klein-Collins et al., 2020) Canadian research found that PLA students had higher grade averages than their peers in the same programs, as well as higher pass and graduation rates (Van Kleef & Harris, 2014).

This proposal and the ensuing dissertation will focus on a specific PLA process, the academic portfolio. PLA portfolios are generally written documents in which students align their learning with predetermined course or university outcomes. Although some traditional-age students may be able to engage in PLA portfolios, they have generally been most appropriate for adult students who will have been more likely to develop college-level learning experiences through work, the military, or self-study (Klein-Collins and Wertheim, 2013). As they often require significant effort on the student’s part, and are designed to be reflective processes, PLA
portfolios are better positioned than tests or reviews of existing credentials to demonstrate student learning, and to facilitate developmental change within students. In addition, portfolio work also tends to require more advising work on the part of the institutional representatives, and so better understanding of the learning that is developed through this process may also improve advising and teaching practices.

Many articles have been written on the developmental benefits of portfolio work. PLA researchers have claimed that portfolio work results in greater student self-knowledge and self-direction (Brown, 2002), as well as critical thinking skills (Brown et al., 2003). Proponents of PLA portfolios also claim that the reflection portfolio students engage in creates new learning (Conrad, 2008; Jimenez, 2019), and portfolios have also been cited as an example of transformative learning (Stevens et al., 2010). Lamoreaux (2005) found that portfolio students experienced change because of participating in the portfolio process in several areas, including awareness of new learning perspectives. PLA portfolio work has been linked to improved problem-solving skills among business management students who completed them in comparison with students who earned credit through the traditional classroom (LeGrow et al., 2002).

However, research has not focused on the specific aspects of portfolio work that bring about this developmental change. PLA research often cites the concept of reflection as critical to PLA portfolio work, specifically in relation to David Kolb’s (1984) Experiential Learning Model (Brown, 2002; Lamoreaux, 2005). But many PLA researchers have also problematized Kolb’s model as dualistic and operating from dominant modes of Western academic discourse (Kuk and Holst, 2018; Michelson, 2015), and contended that assessing student experiential learning is much more complicated than established models of adult learning generally
acknowledge (Cooper et al., 2017; Fenwick, 2006). Other research has found that the benefits cited by PLA proponents regarding reflection during portfolio work are either incidental or unintended on the student’s part (Peruniak & Powell, 2007).

Furthermore, whether any of the new learning created by portfolio students constitutes developmental epistemological change, in that it causes a change in how students view the creation of meaning (or their role in that creation) is unclear. Many theories of epistemological development have identified such change as a critical aspect of undergraduate education (Baxter Magolda, 1992; Belenky et al., 1997; King & Kitchener, 1992; Perry, 1994). This leaves open the possibility that students engaging in portfolio processes may not be gaining the benefits that traditional classroom students attain in this area, even as they accumulate credits by demonstrating their prior learning.

Adult students are generally considered by higher education researchers to be students aged 25 and older (National Center for Education Statistics, n.d.). Although the major models of epistemological development were developed through research on traditional-age undergraduates, students over the age of twenty-five now make up a significant proportion of undergraduate enrollment in the United States (U.S. Dept of Education, 2018). To best support adult students in their portfolio work, PLA professionals need to understand how adult students’ epistemologies may be developing through the portfolio process, and how this epistemological development may differ from those of traditional-age classroom students. However, few comparisons between developmental changes that occur through participation in a portfolio process and those that occur because of traditional classroom work have been made.

One promising way to make such comparisons may be through the concept of tacit knowledge articulation, in which learning that has been acquired without conscious awareness
can be made explicit in language (Matthew & Sternberg, 2009). Sternberg et al. (2000) define tacit knowledge as knowledge that is acquired by the learner with little support from their environment, is associated with specific uses in distinct situations, and has practical value for the learner. Tacit knowledge measures have been shown to be predictive of performance in both military domains and civilian settings such as business management (Sternberg et al., 2000). Although Polanyi’s (2015) original conception of tacit knowledge has led some theorists to conclude that it always remains inexpressible, others have maintained that it can be converted, transferred, or externalized into language that can be understood by others (Nonaka & Van Krogh, 2009; Popova-Gonci, 2013). This dissertation will use the term “tacit knowledge articulation” for this process, as this best reflects the written format of most PLA portfolio work.

Conceptions of tacit knowledge have direct and indirect applications to PLA portfolios. LeGrow (2000) established that management portfolio students performed at least as well as classroom students on the Tacit Knowledge Inventory for Managers and showed evidence of more complex organization of learning to solve problems than classroom students. Although high levels of tacit knowledge have been shown to correlate with career success and concepts of practical intelligence (Sternberg et al., 2000), the complexity of approaching solving ill-suited problems—those which have no clear answer—has been established as a factor in overall student epistemological development as well (King & Kitchener, 1994).

However, the research of LeGrow (2000) aside, PLA research has generally not attempted to utilize current theories around tacit knowledge articulation, even though these have become important currents of research in neuroscience (LeDoux, 2002), cognitive psychology (Sternberg et al., 2000), healthcare (Reinders, 2010), organizational studies (Nonaka & von Krogh, 2009), and design (Schindler, 2015). Lamoreaux (2005) found that "surfacing tacit
knowledge” was part of portfolio students’ own perceptions of their development as learners, but her study did not focus closely on this aspect of the process, and nor did it make any comparisons to classroom students. Popova-Gonci (2013) argues for the use of concept mapping to demonstrate and assess the communication of tacit knowledge in PLA portfolio work but does not tie concepts of tacit knowledge articulation to overall student epistemological development, or to student experiences of the portfolio process.

Understanding these student experiences is an important direction in future research, especially since success in the portfolio process is not a given. Often, portfolio students are told to “write what they know” (Leaker & Ostman, 2010) but since tacit knowledge is not immediately accessible, this might be an impossible task for many of them. In addition, the exhortation to “write what you know” or “write what you’ve learned” will mean different things to people with different epistemological beliefs.

For the purpose of the study that forms the basis of this dissertation, epistemological beliefs will be defined as beliefs about both the nature of knowledge as well as an individual’s capacity to know or acquire knowledge. Epistemological beliefs are tied to tacit knowledge articulation, in that our beliefs about knowledge will affect our ability to determine what tacit knowledge we may have acquired, and whether it is desirable (or even possible) to articulate it. For example, a student who sees knowledge as constructed by individual learners may need relatively little coaching from a university employee who advises students through the PLA portfolio process. On the other hand, if a student sees knowledge as granted by authorities or experts, they may have a difficult time connecting their knowledge and skills to established theories, or even believing that they “know” anything worth sharing whatsoever without coaching.
PLA research has consistently supported this point. Marienau (qtd. in Travers & Mandell, 2019) notes that the process of articulating what they know through reflection can be especially challenging for adult students, especially those who are not properly supported. Shalem & Steinberg (2006) call the portfolio process a “cat and mouse game,” in which the student tries to guess the “invisible criteria” the assessor and institution want them to fulfill but cannot state to them explicitly (p. 110). This discrepancy becomes even more problematic in situations where the PLA professional supporting the student in the portfolio process is not the same university official who will be making a final determination of credit (Travers & Harris, 2014). Having a firm understanding of a student’s personal epistemology may be helpful in providing the proper support.

The difficulties faced by portfolio students are exemplified by the two following students (the names are pseudonyms). The first, Aisha, is a Somali-American, traditional-aged student with extensive activism experience. The other, Gary, is a white man in his fifties who has spent decades as a jet engine mechanic, LEAN specialist, and process improvement manager at various manufacturing companies. Both have attempted portfolios to finish their degrees; Gary’s portfolio is a departmental requirement for his Industrial Management degree, while Aisha’s portfolio is for general elective credit that will enable her to meet the minimum number of credits required to graduate. Although their life situations and the experiences on which they are basing their respective portfolios may seem to have little in common, they share a deep difficulty in articulating their tacit knowledge. Their advisor met frequently with both, and attempted to reframe their projects in various ways, re-reading several drafts (often of the same few pages that neither of them seemed willing to venture beyond). Although they have both been extremely successful in their endeavors—Gary’s professional resume is quite impressive, and Aisha’s
accomplishments as an organizer have earned her the respect and admiration of much older activists throughout the local area—neither of them was able to explain what they have learned from these experiences, how they are able to do what they do, or how they learned to do it in the first place. Even though Aisha eventually turned in a draft that met the bare minimum requirements for her to earn credit, whether she experienced any epistemological change, or that she learned anything from completing the project was not clear.

These student experiences are not unique. The problematic and fraught nature of turning one’s experiential learning into credit has been documented by many PLA practitioners. The immediate outcome of this result is that students may not earn credit for their work. Secondary results include their potentially leaving higher education altogether and increased negative perceptions of themselves as learners (Hamer, 2010; Pokorny & Whitaker, 2014). Even students who earn credit may feel “disrespected” if they do not have a clear sense of what criteria they have met (Hamer, 2016). The possibility that PLA processes could result in negative experiences for the very learners they are supposed to be serving is disturbing to many practitioners, especially since it weakens access for groups that already occupy marginalized positions in Western higher education (Wong, 2014). Such outcomes are of course damaging for students and the communities they come from, but also for the academy, which remains ignorant of the skills, experiences, and knowledge of its students, especially those from non-Western cultures in which reflection based on current experiential learning theories may not be considered a vehicle for valuable learning (Michelson, 1997). In any case, if PLA practitioners cannot adequately pinpoint what aspects of reflection are most valuable or credit-worthy, or what kind of epistemological development is possible from PLA portfolio work, expecting students to produce demonstrations of learning that live up to these educational ideals is unfair.
Nor can PLA researchers adequately argue that portfolio students are getting the same access as traditional classroom students to the epistemological development that is a key aspect of undergraduate education, and, some argue, the health of our democratic society (Mezirow, 2000). As Michelson (2019) points out, “What we know, and why we think we know it, have always been political questions, not just epistemological ones, and they have become newly vital questions for both the world of adult education and the body politic” (p. 154). Without a full understanding of what benefits portfolio work might lend in this area, students may simply be gaining disciplinary knowledge that does not substantively change their beliefs about knowledge or their own capacities for knowledge creation. We simply do not know what portfolio students believe about the nature of knowledge, and nor do we know what connection the articulation of tacit knowledge/reflection that forms the basis of portfolio work might have with epistemological change/development.

Although some traditional-aged undergraduates do complete portfolios, most PLA research and practice has focused on adult students. Since adult students may have very different life and work experiences from traditional-age undergraduates, comparisons between these two groups will not be as useful as comparisons between adult students who complete portfolios and those who earn credits solely through traditional coursework. Even if adult students completing traditional coursework may have similar personal epistemologies than those students who are attending college directly from high school, they may undergo different patterns of developmental epistemological change through their degree progress. Understanding how adult students taking traditional coursework may differ in personal epistemological development from those who have earned significant amounts of portfolio credit is important to establishing what the epistemological effects of tacit knowledge articulation through portfolio work might be.
**Statement of the Problem**

Although PLA researchers have argued that elements of epistemological development are a result of successfully engaging in the PLA portfolio process, how such development might be connected to the articulation of tacit knowledge that is a key part of portfolio work is not clear. How epistemological development might differ between adult PLA portfolio students and those earning credit through traditional coursework is likewise unclear.

**Purpose of the Study and Research Questions**

The purpose of this study was to explore differences between adult portfolio and classroom undergraduates regarding their personal epistemologies and to understand student experiences of the articulation of tacit knowledge through the portfolio process. The study attempted to answer the following research questions:

1. To what extent are there differences between the epistemological beliefs held by adult undergraduate portfolio students as compared to adult undergraduates who take only traditional courses?
2. What are the experiences of adult portfolio undergraduates regarding tacit knowledge articulation and what impacts does this articulation have on their personal epistemologies during the portfolio process?

**Definition of Terms**

In the course of the dissertation, the following terms will be defined:

- A “PLA portfolio” will be defined as a document developed by a student who is petitioning to earn undergraduate academic credit based on learning from work or life experience.
• “PLA professional” will be defined as a university employee who is specifically tasked with advising students on how to construct a PLA portfolio, and/or evaluating the finished portfolio to make a determination of credit.

• “Reflection” will be defined using Matthew and Steinberg’s (2009) formulation of reflection as “a process of guided critical thinking that directs attention selectively to various aspects of experience, making knowledge typically acquired without conscious awareness explicit and available for examination and modification” (p. 531).

• “Tacit knowledge” will be defined as experience-based knowledge that is typically not communicated or articulated (Matthew & Steinberg, 2009).

• “Explicit knowledge” will be defined as knowledge that can be communicated in language without engaging in extensive reflection.

• “Tacit knowledge articulation” will be defined as the conversion of tacit knowledge into explicit knowledge through writing or other reflective exercises.

• Epistemological beliefs will be defined as “beliefs about both the nature of knowledge as well as an individual’s capacity to know or acquire knowledge.”

• “Epistemological development” will be defined as a qualitative change in the way students understand how they know something, their ability to acquire knowledge, and their potential role in the creation of knowledge.

This dissertation will use the gender-neutral term “they” for all participants, regardless of their choice of gender expressions and/or identities.

Delimitations of the Study
The study was delimited by focusing entirely on undergraduate students. Although some graduate programs include portfolio work, PLA processes were originally conceived as a way to provide access to undergraduate degrees to previously-marginalized groups. As most portfolio students are non-traditional students (generally considered to be over the age of twenty-five), and to control for epistemological development that may arise simply from the increased life and work experience that comes with age, only adult students were included in both groups of this sample.

Another limitation of the study was a lack of pre- and post-comparison of portfolio students. This means that the study was unable to make firm conclusions about the effect of portfolio work on epistemological beliefs purely from the quantitative data. Interviews enabled the researcher to explore changes that students attribute to the portfolio process.

**Overview of the Literature**

This study will first provide an overview of major epistemological models that have been applied to undergraduates, as well as the adult and experiential learning theories that have generally underpinned PLA research and practice. It will discuss criticisms of these theories that have been leveled by researchers in the PLA field themselves. Next it will explore theories related to the articulation of tacit knowledge and how these theories intersect with other research regarding reflection and the development of the critical judgement and problem-solving skills that have been associated with epistemological development. Finally, it will discuss new theories related to personal epistemology that have been put forth over the last three decades and explore the implications of this research for the study of epistemic beliefs in adult undergraduates.

**Overview of the Method**
This study used a sequential mixed-methods design. To answer the first research question, three groups of students were selected. The first group consisted of adult undergraduates and recent graduates who had successfully completed significant portfolio work in their current or most recent enrollment. The second group consisted of adult undergraduates who were planning to complete substantial portfolio work over the course of their degrees. The third group consisted of recent adult undergraduates who were not planning to complete portfolio work. All groups took a version of the Epistemological Beliefs Inventory (EBI) a paper-and-pencil survey designed to measure epistemic beliefs across five factors. By measuring the epistemologies of these different groups of students, the study explored whether engaging in portfolio work may be a factor in epistemic change, or if portfolio students self-select the process for reasons that may be related to pre-existing epistemological differences from classroom students.

To answer the second research question, a subsample of portfolio students was interviewed regarding their experiences during the portfolio process according to a phenomenological design. As very few studies have focused on student experiences of portfolio work and epistemological change, and only one study has identified tacit knowledge articulation as a key component of reflection in portfolio work (Lamoreaux, 2005), phenomenology’s attempt to understand a common lived experience (Creswell & Poth, 2018) is appropriate. Moustakas (1994) contends that phenomenological research requires the researcher to “arrive at a topic and question that have both social meaning and personal significance” (p. 104); understanding the epistemological change of adult portfolio students is both important from both a social perspective, and for myself as a practitioner. Also, the project should “not seek to predict or determine causal relationships” (p. 105). As the connections between tacit knowledge
articulation and epistemological development have not yet been defined or explored, there is the possibility that these connections may be weak, or non-existent. The second research question itself lends itself well to a focus on the “what” and “how” of an experience that is also characteristic of the phenomenological method (Moustakas, 1994). Phenomenology also assumes that “the reality of an object is only perceived within the meaning of the experience of an individual” (Creswell & Poth, 2018, p. 76), an attitude that reflects the research question’s focus on epistemology and the constructivist theoretical positions that generally underpin PLA portfolio work. The common features of the experience related by the participants, once understood, can lead to practices or policies that will be of benefit both to those like them, and possibly to adult undergraduates in general.

**Explanation of Participant Selection**

All participants in the study were undergraduates earning a bachelor’s degree at the research site, or a recent graduate (within the past year) from the research site. All were twenty-five years of age or older, in keeping with the general definition of “adult student” that is prevalent in higher education research.

For the larger quantitative sample, subjects were selected through convenience sampling. The survey was sent by email to all adult students currently enrolled in a portfolio development course, or who had graduated from the research site in the past year. For the smaller qualitative sample, participants were selected by indicating on the email survey that they had completed a portfolio at the research site and were interested in being interviewed.

**Description of the Research Site**

The research site was a college within a large public university system with multiple campuses (including urban, suburban, and exurban sites) within a single state in the northeastern
United States. The university has an explicit mission of serving nontraditional students at both
the undergraduate and graduate levels. It has a well-established portfolio process as well as
extensive online offerings that draw students from across the state in which it is located and
beyond. The institution’s website emphasizes its commitment to honoring learning from
experience and assessing student prior learning.

Explanation of the Selection and Development of the Instruments

Epistemological research on undergraduates was initially carried out via lengthy
interviews (Baxter Magolda, 1992; Belenky et al. 1997; King & Kitchener, 1994; Perry, 1999).
These measures were appropriate for establishing broad developmental stages of epistemological
change. However, as this study is exploring differences between types of students, larger sample
sizes are necessary. The large sample sizes would make it difficult for the researcher to conduct
the types of lengthy interviews that these models relied upon. Also, more recent epistemological
research has raised the possibility that student epistemic beliefs may be more asynchronous than
these models suggest and may include elements of how and to what extent knowledge can be
acquired (Schommer, 1990). Elements related to the acquisition of knowledge have been
specifically linked to concepts of self-regulation and overall learner efficacy (Muis, 2007). Since
these traits have been associated with engagement in PLA portfolio work, the use of an
instrument that measures these elements will provide useful data for future research in this area.

The Epistemological Beliefs Inventory (EBI) is a survey instrument that uses a Likert
scale to measure epistemic beliefs in adults (Schraw, Bendixen, & Dunkle, 2004). The EBI
includes twenty-eight questions, all of which fit into one of five categories of epistemic beliefs
developed by Schommer (1990): Certain Knowledge (whether or not absolute knowledge exists
and will eventually be known), Simple Knowledge (whether or not knowledge is made up of
discrete facts), Omniscient Authority (whether or not authorities have access to knowledge others do not), Quick Learning (whether or not learning happens quickly or not at all), and Innate Ability (whether or not the ability to acquire knowledge is given at birth).

The EBI was selected for this study for several reasons. It has been shown to be more reliable than Schommer’s (1990) original Epistemological Questionnaire on which it is based, and more faithfully measures all five factors (DeBacker et al, 2008; Schraw, Bendixen, & Dunkle, 2004). It is also shorter than the EQ, which should encourage higher completion rates. A list of items in the EBI has been included in Appendix A. Surveys were be administered anonymously, and no identifying information was viewed by the researcher, except in cases where students who were willing to be interviewed volunteered contact information.

The qualitative phase of the study used open-ended interview questions. As the relationship between tacit knowledge articulation and epistemic change, or that epistemic change can be one result of portfolio work, have not yet been established, any other kind of qualitative approach (such as grounded theory) would be premature. The qualitative phase also attempted to explore whether students experience epistemological change in a discipline-specific way, as the possibility that personal epistemologies can vary intrapersonally according to academic discipline has been supported by multiple studies (Hofer & Bendixen, 2012; Marra & Palmer, 2008). As some portfolio students may engage in intensive reflection only in the areas in which they are most likely to earn credit, establishing whether or not they experience change in the way they conceive knowledge in general, or if any change is limited only to their particular discipline was important. A list of interview questions has been included in Appendix B.

Researcher Sociocultural Perspective
The primary researcher examined and considered his own positioning as a higher education professional before coding. As a straight, white, able-bodied, college-educated, cisgender male, he remained aware of his own societal and institutional privilege, and that ideas and concepts emanating from perspectives similar to his have been considered normative in the fields of scientific and educational research. This was especially important to keep in mind while conducting a study related to student epistemology. Students from different cultural backgrounds may not easily fit such norms, and so he needed to be careful to not discount or dismiss valuable data simply because he was not looking for it, or because it did not fit his preconceived notions of what data is valid.

In addition, the primary researcher has spent many years working with adult learners specifically. As a result, he has many developed opinions regarding adult learning, both from theory he has encountered and from his own practice as a professional. To the extent possible, these opinions were put aside while conducting this study and acknowledged within the dissertation itself.

To counteract potential bias, the study employed member-checking. Member checking involves providing data, analysis, and conclusions to participants so they can judge whether these elements are accurate (Creswell & Poth, 2018). Member checking also encourages alternate explanations and can be another way to capture the voices of participants (Candela, 2019).
CHAPTER TWO: REVIEW OF THE LITERATURE

The second half of the 20th century saw the creation of multiple developmental models related to undergraduate epistemology. The authors of these models often based them on findings from longitudinal studies of traditional-age North American undergraduates as they progressed through college, relying on multiple interviews to construct a series of epistemological stages or positions. These models describe, in varying terms, the kinds of developmental change that higher education theory has portrayed as both the goal and the substance of an undergraduate education.

The relevance of these models to PLA portfolio work is not always direct, or obvious. As most of them were designed specifically with traditional-aged undergraduates in mind, they do not attempt to incorporate epistemological development that might arise from work, volunteer, or other life experience. The goal of this literature review is not to apply epistemological development theory to PLA portfolio processes or procedures, but to show the potential that they have for describing what PLA practitioners hope students achieve through portfolio work. Since these models chart the general trajectory of epistemological development for undergraduates, they provide a useful way of conceiving the understandings about the nature of knowledge we expect undergraduates to develop through coursework. If PLA practitioners consider portfolios to be a viable way of developing (or at least demonstrating) these very same understandings, adult students would benefit from our charting how the portfolio process intersect with these larger models.

Several of these models also share characteristics and emphases with theories related to tacit knowledge articulation and recent research on personal epistemology, both of which represent relatively unexplored frameworks through which PLA practitioners might understand
and improve the portfolio process for students. Again, it may be difficult (and not entirely useful) to attempt to determine where, exactly, these newer conceptions might fit into the overarching developmental models, and some of them were developed at least partially to address what their creators saw as deficiencies in established epistemological developmental theory. But by exploring these shared emphases and intersections, we may develop new ways of identifying how portfolio processes might allow students to develop new understandings of knowledge, as well as ways in which they might do so more effectively.

**Theories of Undergraduate Epistemological Development**

The first and perhaps most influential work to chart epistemological and intellectual development in undergraduates was William Perry’s (1999) *Forms of Ethical and Intellectual Development in the College Years*. The developmental framework of Perry’s model describes how undergraduates accommodate (or retreat from) the moral relativism characteristic of a traditional liberal arts education, in which students are forced to confront a diversity of opinion, even within technical fields. In addition to the ethical and intellectual dimensions suggested by the title, the development is epistemological, in that it “appears to extend” students’ “power to make meaning in successive confrontations with diversity” (p. 3).

Perry’s scheme is developmental “in the special sense originally derived from biology in that it consists of an orderly progress in which more complex forms are created by the differentiation and reintegration of earlier, simpler forms” (p. 48). It consists of nine positions, beginning with a Simple Dualism in which students firmly believe in right and wrong, truth and untruth, and ending with a Commitment to Relativism, in which students embrace the conception of knowledge as tentative, yet are determined to take responsibility for their choices and beliefs in an ethical and responsible way. For example, Perry reported that one student who had reached
this Commitment stated, “you have to operate within a certain set of rules, a certain set of principles, or else you’re going to lose your self-respect” (p. 179). Each position contains its own epistemological assumptions, with the first three encompassing modifications to an absolute dualism that is incompatible with even introductory college coursework. The middle three represent progressively more complex attempts to accommodate relativism, and the final three are dedicated to this reformation of a committed self in full appreciation of relativism’s implications. Most students neither start in the first position nor make it to the ninth by the end of their time at college, but movement is generally sequential and in one direction, with most students achieving some level of Commitment by the end of four years.

Perry also described “alternatives to growth,” which he characterized as “temporizing, retreat, and escape” (p. 198). Temporizing is a prolonged pause within one of the stages. Retreat is a regression in development. Escape is a settling within a middle stage accompanied by an active denial of the tensions produced by those stages. Because these alternatives exist—and because they are seductive—Perry explicitly connects epistemological growth with moral courage. The development his scheme describes is not forced upon students by the college environment; his participants report that the opportunity to develop is “up to them” (p. 56). Perry noted that even those students whose progress was stalled or who utilized these alternatives “seemed to be actively denying or fighting off within themselves awarenesses of their urge to progress. In short, they maintained their position at a cost to the integrity they were trying to conserve” (p. 59). The commitment to take on examined, critically-evaluated senses of self that acknowledge uncertainty and the legitimacy of other, similarly-examined stances thereby takes on ethical, even spiritual dimensions (p. 49).
Perry’s model is not generally referenced in PLA-related literature. Although PLA research cites the development of critical thinking skills as characteristic of engaging in PLA portfolios (Brown et al., 2003), critical thinking is generally situated as a standalone-skill in such research, rather than as part of a larger developmental epistemological framework. Also, Perry’s studies were largely conducted on the educational experiences of traditionally-aged Harvard undergraduates from the middle of the previous century (almost all of whom were men), and these experiences may be perceived as not having much in common with those of current adult students of varied socioeconomic, ethnic, and cultural backgrounds that are the focus of current PLA research.

Perry’s work did influence one model that is referenced by PLA researchers: the studies conducted on the epistemological development of girls and women by Belenky et al. (1997). Although Belenky et al. (1997) acknowledged that Perry’s scheme was important in formulating their own theory, they also argued against the completeness of his findings, noting that “nowhere is the pattern of using male experience to define the human experience seen more clearly than in models of human development” (p. 7). Maintaining the notion of development as unfolding through a series of “epistemological positions from which women know and view the world” (p.15), Belenky et al. identified five such positions:

- **Silence**, a position in which women experience themselves as mindless and voiceless and subject to the whims of external authority;
- **received knowledge**, a perspective from which women conceive of themselves as capable of receiving, even reproducing knowledge from the all-knowing external authorities but not capable of creating knowledge on their own;
- **subjective knowledge**, a perspective from which truth and knowledge are perceived of as personal, private, and subjectively known or intuited;
- **procedural knowledge**; a
position in which women are invested in learning and applying objective procedures for obtaining and communicating knowledge; and constructed knowledge, a position in which women view all knowledge as contextual, experience themselves as creators of knowledge, and value both subjective and objective strategies for knowing. (p. 15)

Each of the above positions is connected to the development of voice. Contrasting their work with what they saw as a masculine overemphasis on seeing, Belenky et al. (1997) argued that “gaining a voice” is a more appropriate way of describing the deeply personal task of knowledge creation than visual metaphors that “suggest a camera passively recording a static reality and promote the illusion that disengagement and objectification are central to the construction of knowledge” (p. 18). This connection of voice with self-knowledge is echoed in PLA portfolio research. Stevens et al. (2010) described how one participant in a study about adult students and portfolio work seemed to have moved from subjective to constructive knowing as a result of her portfolio project, the student going so far as to reference “women’s ways of knowing” in her own statements (p. 395). A similar study found that voice as a metaphor for personal authority was present in the statements of many participants as they moved away from conceptions of “right” and “wrong” and toward owning their own knowledge (Lamoreaux, 2005).

In another direct connection to PLA processes and theories, Belenky et al. (1997) advocated for educational structures that encourage women to use their own experiences as bases for knowledge. Many participants in their research named out-of-school experiences as “their most powerful learning experiences” (p. 200). Encounters with feminist theory, Belenky et al. argued, “helped the women translate their ideas from the darkness of private experience into a shared public language” (p. 203). The application of theory to experience is a major component of many PLA portfolio processes (although one that has been problematized, as will be outlined
later in this chapter), and Michelson (1996) made a more specific argument that PLA is by its nature a potential method of feminist inquiry by virtue of how it situates learner experiences. Constructed knowledge, according to Belenky et al. (1997) is not just connected to how one’s voice is situated within a professional or academic discourse, but also to “making a difference in the world” (p. 152). However, whether portfolio processes have been designed to capture or facilitate this aspect of epistemological development, or if university personnel would necessarily consider such development worthy of credit, is unclear. As we will see, many researchers working in the PLA field themselves have pointed out how the field of what is considered valid forms of experiential learning is limited by university curricula and established epistemological conventions, some of which stem directly from the very learning theories that many PLA processes are built upon.

A third epistemological development model that has arisen from research on undergraduates is King and Kitchener’s (1994) Reflective Judgement Model. Like the previous models, this is a staged model in which epistemologies become increasingly complex but is specifically focused on the skill of problem-solving. Differentiating the concept of reflective judgement from those of critical thinking in general, King and Kitchener argued that the former is based not simply on the ability to solve problems, but the epistemological position of an individual as she attempts to solve “ill-structured” problems that “cannot be described with a high degree of completeness or solved with a high degree of certainty” (p. 10). Drawing on the work of John Dewey, King and Kitchener defined the process of bringing closure to such problems as “reflective judgement” (p. 6). The Reflective Judgement model consists of seven stages, the first three of which are pre-reflective, meaning that individuals inhabiting these stages are unaware that some problems may not even have a single right answer. They may be aware
that they themselves do not have the correct answer, but external authorities on these topics either are in possession of the answer or can become so with enough time or effort. Stages four and five represent quasi-reflective thinking, in which individuals know that ill-structured problems exist, but do not know how to use evidence to bring such problems to a reasonable form of closure. In stages six and seven, the individual believes that “knowledge is not a ‘given” and that claims of knowledge must be understood in relation to context. Judgements must be grounded in data and/or logic, and “conclusions should remain open to reevaluation” (p. 60).

King and Kitchener’s (1994) work is especially relevant to PLA research, in that concepts of both reflection and critical thinking are frequently cited as both necessary components of as well as potential skills (Brown et al., 2003; Coleman et al., 2002; Conrad, 2008; Herman, 2006) developed through the portfolio process. However, King and Kitchener is not frequently cited in PLA literature. LeGrow et al (2002), for example, do not cite King and Kitchener directly, but use the terms “reflective judgement” and “ill-defined problems” (p. 4) in discussing their findings that portfolio students were more successful at developing intricate solutions to problems in a business management course than those students who completed the course in a traditional classroom format. This difference was seen even in students who had a high level of workplace experience, suggesting that college coursework is not the only experience through which epistemological development takes place.

One epistemological developmental model that specifically takes experience outside the classroom into account is Baxter Magolda’s (1992, 2001) work on “ways of knowing” (1992, p. 21). Drawing on the models previously discussed, as well as that of researchers working specifically on gender differences in experience and epistemology, Baxter Magolda conducted a longitudinal study of one hundred undergraduates at a liberal arts university in the United States.
In a subsequent study, she then followed a number of these same participants as they entered the workforce and either started, or did not start, families of their own. Baxter Magolda found that both male and female students tended to move from patterns of absolute knowing (generally equivalent to the earlier stages in Perry’s and King and Kitchener’s models, in which all knowledge is certain even if the students themselves do not “know”) through transitional knowing (accepting that some knowledge is uncertain), independent knowing (in which the perspectives of established authorities offer a range of justifiable viewpoints through which uncertainty can be mitigated), and finally, for some students, into contextual knowing, in which they are able to identify and construct their own justifiable claims to knowledge. In this final stage, instructor-student relationships are co-equal, rather than one in which the instructor dispenses knowledge in the form of absolute authority.

Baxter Magolda’s work makes two important contributions to the previous models. First, it identifies specific ways in which male and female students differ in the ways they navigate these stages. For example, in transitional knowing, women tend to prefer to collect other’s ideas and form relationships with both peers and instructors to gain exposure to all available viewpoints. Male students tend to exchange views with peers and instructors through debate and research. Both processes are valid and effective strategies for development, and comparable differences exist for the other stages as well.

The other contribution of Baxter Magolda’s model is that it incorporates learning from post-college experience. In addition to following participant development in the inter and intrapersonal dimensions, Baxter Magolda (2001) continued to chart participant epistemological growth as well. In all areas, she found that participants first tended to follow established patterns from external sources, such as parents or societal messaging. This continued following these
patterns until reaching what she terms a “crossroads” where their focus shifted from external definitions of self to internal ones (p. 40), the interconnected nature of the three dimensions propelling students into what Baxter-Magolda terms “self-authorship” (p. 116). In self-authorship, participants shifted from asking “how you know” to “how I know,” engaging in self-reflection on their beliefs, renegotiating relationships with both family and romantic partners, and focusing less on controlling external reality and more on controlling how they make meaning from reality.

Concepts of self-authorship, reflection, meaning-making, and the connection between work/life experience and epistemology are all relevant to the theory and practices of PLA portfolios. Sandberg and Kubiak (2013) argue specifically in favor of PLA processes that enable students to develop “an enhanced identification with the self,” a phrase that is similar to Baxter-Magolda’s description of self-authorship. Additionally, Baxter-Magolda’s recommendation of instructional strategies that help students develop self-authorship is echoed in current PLA discourse concerning the role of university officials advising and evaluating portfolio work. Hamer (2010) contended that “the assessor-candidate relationship is the site of negotiated meaning” (p. 111). Pokorny and Whittaker (2014), noting that even among students whose portfolios were accepted for credit, only those who experienced sufficient dialogue with their evaluators reported feeling empowered by the process, argue that the field “must move away from processes where the assessor . . . forces their epistemological authority upon the assessed” (p. 362).

As with the previous models, Baxter-Magolda’s work does not appear to be cited directly in PLA portfolio research. In general, very little attempt has been made to explore how portfolio work may fit into these models, despite the centrality of many of their concepts to portfolio
theory and practice. One reason for this may be because portfolios are often a single assignment, or series of assignments in a student’s overall academic career, and pinpointing how engaging in this process fits into epistemological development covered by the multiyear frameworks of the studies that engendered such models can be difficult. Also, except for Baxter-Magolda’s work, these models do not generally integrate work experience into their schemes, a fact that Belenky et al. (1997) acknowledged: “we realize . . . that the contributions and perspectives of working women, even those with well-established careers, are often overlooked or dismissed” (p. 12). As the demonstration of learning earned from work and life experience is central to the portfolio process, PLA researchers may not have found these models relevant.

Perhaps because of this, PLA research has tended to draw more heavily upon theories of adult and experiential learning that, although they are not developmental in nature, provide a description of the mechanisms by which students—especially adult students-- can make meaning from their experience. The next section will explore those models, and how PLA researchers have applied them to the portfolio process.

**Theories of Adult Learning and Development**

Perhaps the most important influence on how PLA portfolios are conceived of and assessed is David Kolb’s (1984) Experiential Learning Model (Brown, 2002; Harris, 2018; Pokorny & Whittaker, 2014; Whittaker et al., 2006). Drawing on the work of John Dewey and Jean Piaget, Kolb described learning as a “continuous process grounded in experience”, implying that “all learning is relearning” (p. 28). Kolb differentiates the accumulation of personal life experiences from social knowledge, contending that learning arises from a transaction between the two: “Learning is the process whereby knowledge is created through the transformation of experience” (p. 38). As will be discussed later in this chapter, this formulation has a direct
parallel with theories related to tacit knowledge articulation, especially those related to the field of organizational management (Nonaka & von Krogh, 2009). In Kolb’s view, learning cannot arise through mere personal experience; we must instead set our personal knowledge against a social or critical framework to give rise to learning:

The central idea here is that learning, and therefore knowing, requires both a grasp or figurative representation of experience and some transformation of that representation. Either the figurative grasp or operative transformation alone is not sufficient. The simple perception of experience is not sufficient for learning; something must be done with it. Similarly, transformation alone cannot represent learning, for there must be something to be to be transformed, some state or experience that is being acted upon. (p. 42)

Kolb described two forms of “grasping experience”: Apprehension, which relies on sensory input, and comprehension, in which we introduce concepts to impose order on sensation. Likewise, he defined two types of “transformation”: Intension, in which we reflect on experience, and extension, by which we act upon the basis of experience.

These ideas—either implicitly or explicitly—underpin many assumptions regarding PLA portfolio work. PLA communications commonly include warnings to students that experience alone in a particular field or position will not by itself justify the awarding of credit, and that students must be prepared to actively demonstrate their learning through the application of relevant theories to their experience and/or reflecting on that experience. In her review of student-facing PLA communications, Peters (2005) noted how these communications emphasize such warnings, both for students and university personnel who are in the position of advising them or assigning credit:
The use of the word ‘translate’ indicates that whatever the learning from experience being considered, it will have to undergo a change in form before it is accredited. ‘Identify’, ‘articulate’, and ‘demonstrate’ . . . make clear that having learnt from experience is not sufficient for . . . claiming credit, the learning will need to be processed and presented in a specific way. (p. 276)

Likewise, Leaker and Ostman (2010) cited the oft-repeated mantra “Write what you’ve learned, not what you’ve done” (p. 693) as related to PLA portfolio work, pointing out that this “conceptual relationship between experience and learning is presented in our institution’s published materials as an epistemological . . . self-evident distinction” (p. 696). As we shall see, many PLA researchers have pointed out that this distinction may not be self-evident to students. And even if it is, students may not know how to effectively bridge that gap without targeted, specific support from trained professionals.

Not all programs cite Kolb’s work specifically of course, and programs that may cite Kolb’s work in their materials may not actively employ his concepts or may do so only superficially. Hamer (2016) argued for the importance of an underlying assessment philosophy, but it is not clear that all practitioners have developed one. However, the idea that students create learning through the PLA process (as opposed to simply describing it) is a major tenet of current PLA discourse. Conrad (2008) cited Kolb and John Dewey specifically for producing models that help students “elevate their stories beyond their own immediacy to more generic levels of knowledge” (p. 143), directly echoing Kolb’s distinction between personal and social knowledge. Brown (2002) described how, prior to the portfolio process, students saw themselves “primarily as ‘doers,’ rarely analyzing how they got from place A to place B” (p. 238). These same students described the portfolio process as “helping them understand how their learning
took place due to the need to critically analyze, organize, evaluate and write about their learning from experience” (p. 238). All of these are cited as ways to reflect on experience, with the implication that learning cannot be consciously manifested without such a process.

Another, related model for adult learning that is sometimes applied to the PLA process is Jack Mezirow’s Transformation Theory (2000). Although Mezirow did not specifically cite Kolb, Transformation Theory similarly embeds adult learning within a social context. In Mezirow’s conception, “learning is understood as the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one’s experience as the guide to future action” (p. 51). Transformative learning is that through which we become aware of previously unrecognized biases and expectations and can therefore determine whether they are appropriate for framing future understandings. Recognizing and confronting these biases can be both threatening and destabilizing, which is why they are often initiated by a “disorienting dilemma” (p. 22) that is followed by a period of self-reflection that can allow for the integration of new perspectives. This process is essential not only to the adult learner’s continued growth but to democratic society overall, as transformational learning is linked to “autonomy, self-development, and self-government” (p. 28).

Several studies related to PLA portfolios have applied Mezirow’s work to the PLA process. Brown (2002) found that “participants experienced varying degrees of transformative learning through the portfolio development process” (p. 241). Stevens et al. (2010) found that portfolio writing produced transformational learning, as many respondents reported changing and broadening frames of reference. Jimenez (2019) reported the participating in the portfolio process allowed students to develop greater self-esteem and validation of learning, which he connects explicitly with Transformational Learning theory. Lamoreaux (2005) discovered that
portfolio students questioned assumptions and experienced shifts in perspective through the PLA process. However, Lamoreaux also pointed out that although Transformation Theory’s emphasis on deep qualitative change in student reflections and corresponding ethical constructions make it particularly relevant to adult development, its lack of epistemological categories or conceptions of consciousness make it more of a learning theory than a developmental model that is equipped to chart epistemological change in a systematic way. In other words, Transformation Theory can describe the change itself, but not the qualities of the pre- and post-transformation epistemologies at play. Therefore, it cannot describe what conceptions of knowledge may be most helpful or detrimental to the creation of PLA portfolios, nor what specific epistemological changes may take place as a result of them.

One model that is both developmental and applied to adults is Robert Kegan’s (1994) theories regarding Orders of Consciousness. This work influenced Baxter Magolda’s (2001) developmental framework, and has been cited in PLA-related literature as well. In Kegan’s (1994) formulation, orders of consciousness incorporate several different dimensions of one’s life in which epistemological assumptions have an impact, including work, romantic partnerships, family relationships, and schooling. The first order generally encompasses ages two through six and organizes meaning around the “independent elements” of the “momentary, the immediate,” and “the atomistic” (p. 29). The second, which evolves between the ages of seven and ten and remains the organizing principle well into one’s teens, enables us to develop and sustain our own points or view and understand that others hold different points of view. Most adults operate from the third order of consciousness, a framework that develops in adolescence and allows most of us to identify as members of various social groups and fulfill our responsibilities to those groups. This allows us to function as an ethical and productive member
of society, as it is only when we internalize a society’s values that we can be considered responsible, functioning adults.

Although he pointed out that this third order of consciousness is a “dignifiable, sophisticated and socially responsive way of organizing society,” (76 ) Kegan has identified an additional order of consciousness from which he argues modern society increasingly expects us to operate. This fourth order contains the third order, but organizes meaning and experience in a qualitatively different way. This difference is founded, as previous shifts in orders of consciousness are, on a change in what a person can take as an object and what they conceive as subject. Relationships and self-concepts the individual were subject to in the third order of consciousness are now perceived as objects; they can “have” relationships, careers, and group memberships rather than “be had” by them (p. 34):

This new whole is an ideology, an internal identity, a self-authorship that can coordinate, integrate, act upon, or invent values, beliefs, convictions, generalizations, ideals, abstractions, interpersonal loyalties, and intrapersonal selves. It is no longer authored by them, it authors them and thereby achieves a personal authority. (Kegan, 1992, p. 185)

Kegan’s research suggested that engaging in higher education can help facilitate the shift from the third to the fourth orders of consciousness, and that adult education in particular acts like a bridge in this regard, reaching into the “preexisting, ongoing, real-life world of the student’s relational field and seeks to make it part of the bridging environment” (1994, p. 294). The fact that PLA portfolios specifically enable students to discuss how their prior learning may meet university outcomes and qualify as credit-bearing makes them particularly attractive in this regard.
Although PLA researchers have not widely cited Kegan’s orders of consciousness, Lamoreaux (2005) described “seeing experience as object” (p. 142) and “questioning assumptions” (p. 143) as benefits of engaging in the portfolio process and depicts at least one participant as experiencing qualitative changes in self-concept. Lamoreaux ties these changes specifically to Kegan’s work regarding shifts in apprehending previous subjects as objects, arguing that “some of the changes experienced by participants” fit Kegan’s model. Michelson (2011) noted the extent to which notions of self-authorship underpin the andragogical models upon which PLA processes are built. However, Michelson criticized Kegan’s viewpoint as one of many that do not sufficiently account for the ways social forces affect adult narratives of past experience.

In fact, a significant number of PLA theorists and practitioners have problematized adult and experiential learning theories, as well as the processes upon which their assumptions have been built. Although these voices are seemingly unanimous in their continued support of PLA portfolios (and PLA in general), they have identified several ways in which established methods of portfolio instruction and assessment hinder students’ ability to create meaning rather than enhance it. The next section will discuss these criticisms and the implications they have for PLA portfolio practice.

**Criticisms of Adult and Experiential Learning Theories**

Criticisms of current PLA portfolio practice and theory are often tied to the wider societal goals of PLA regarding access and equity. As PLA originated from an egalitarian, access-oriented vision of higher education (Michelson & Mandell, 2004; Wong, 2014), these are fundamental concerns for many practitioners in the field. According to Harris (2006), “adult and experiential learning theory has been so internalized as de facto desirable in RPL that practices
are seen as unproblematic and not in need of explanation. Such a state of affairs does not allow for problematizing and improving practices so as to better meet the social goals they advance” (p. 9). Although “many PLA enthusiasts” may believe that “experience and learning from experience are ends in and of themselves, providing unproblematic and unmediated access to truth, authenticity and emancipation” (Harris, 2018, p. 80), others argue that this is simply not the case.

Kolb’s (1984) Experiential Learning theory has come under particular criticism by PLA practitioners and researchers. Kolb’s notion that reflection on prior experience is what creates knowledge—and the corresponding way mainstream PLA portfolio processes have been constructed around this notion—have been critiqued from feminist and social realist perspectives, as well as by those who argue that this framework does not acknowledge or allow for the ways non-Western cultures conceive of valid knowledge. In particular, these researchers claim, Kolb’s model, although ostensibly legitimizing experiential learning, only serves to further a dualistic distinction between an embodied self and a disembodied knower (Kuk and Holst, 2018). Michelson (2015) claimed that while Kolb’s model is seemingly simple and easy to apply, it does not accurately describe how people learn. In Michelson’s view, Kolb genders epistemology into an emotive experiential component (female), and a rational, reflective one (male). Furthermore, experience is “concrete,” while conceptualization is “abstract” (p. 89). This means that experience itself must be acted upon to be made universal, an act that is implicitly and historically to have male characteristics. But, Michelson claimed, experience is neither concrete nor universal, but instead “mediated by culture, language, and culturally overdetermined presuppositions, none of which Kolb accounts for” (p. 89).
Michelson illustrated this point by providing the example of a female supervisor who encounters sexism on the job. While experiencing the sexism, she is aware only of a physical, embodied reaction of discomfort, and it is only later that she realizes the sexist behavior of her male colleagues for what it was. Michelson pointed out that, according to Experiential Learning theory, the supervisor only “learns” something once she has adequately distanced herself from the event and reflects on it. However, Michelson argued that this reflection is not a “cognitive flash of new learning, but simply the moment in which her mental processes caught up with what her body already knew” (p. 94). Rather than assigning knowledge purely to processes of disembodied reflection, we also need to understand that learning is “a moment of emotional and physical response . . . as the product of an embodied social selfhood” (p. 94). It is not that we should not practice reflection, Michelson wrote, but that the experiences we reflect upon present themselves in the context of embodied, historical selves. Turning specifically to the PLA portfolio process, Michelson pointed out that, according to Kolb’s model, if the supervisor did not learn by reflecting on prior experience, then she did not learn anything at all. Standard portfolio practice would require that, in this example, the supervisor “represent her learning process as having happened in a particular set of steps that may well have nothing to do with how she actually experienced it” (p. 93). Although many might claim that the re-casting of experience into a more organized depiction is one of the functions of reflection, proscriptively insisting that students engage in processes that seem to not accurately reflect the reality of their lived experience may be counterproductive, or even alienating.

Not only does Experiential Learning theory circumscribe the way learning can be presented, as some researchers argued, but also the types of learning that can be demonstrated. In an earlier piece, Michelson (1996) provided another example, that of an African-American
working mother who is a delivery room nurse and a union steward. Current PLA practice based on a Kolbian model would allow her to petition for credit in nursing, labor relations, and perhaps even management, but would not “provide a vehicle for examining the knowledge enabled by her various social subjectivities” (p. 635). Michelson argued that we cannot understand the learning such an individual may have gained from her professional roles without understanding “how she has made use of her subject positions to create knowledge in interaction with the world” (p. 636). Likewise, Cooper and Harris (2016) argued that Experiential Learning theory segregates learning that can be turned into viable academic study from that which cannot, but that reflection alone is often not enough to turn even what is considered academically viable experience into learning. Noting that “Neither Kolb nor theorists of experiential learning more generally explore the nature of knowledge in any depth,” they argued that PLA “is mainly seen as a device to map one body of knowledge (e.g., working knowledge) against another (e.g., academic knowledge), rather than an exploration of the relationship between the two” (p. 45). They contended that this mapping does not happen automatically but through a “complex process that requires deliberate pedagogy” (p. 45).

Continuing with this line of argument, Cooper et al. (2017) pointed out that there is also differentiation within both academic and working knowledge. Contemporary PLA practice flattens experiential learning especially, in that experience is more differentiated and complex than the theory (and by extension, most colleges and universities) allow for, as it can “weave together different categories in diverse combinations” (p. 201). Fenwick (2006) observed that she and fellow PLA evaluators “always pretended these individual applications could be treated as isolated knowledge islands” even though “we actually know very little about the fluid and contradictory rhythms of knowledge-making amidst everyday human turmoil” (p. 285). This
divergence between commonly-accepted learning theories and actual student learning can lead to a “cat-and-mouse chase after invisible criteria” (Shalem and Steinberg, 2006, p 97), in which a student attempts to make their learning fit a framework they do not understand, or may not be applicable to their specific experience.

This divergence can be particularly problematic when considering the culturally-determined nature of knowledge. The tension between Western conceptions of legitimate learning and that valued by other populations—and the corresponding devaluation of groups who might most benefit from recognition of their experiential learning—has been documented by PLA-related research from Australia (Hamer, 2010), South Africa (Harris 1999; Osman, 2006), New Zealand (Michelson, 1997), Southeast Asia (Wong, 2014) and First Nation lands in Canada (Hill, 2004), as well as from the experiences of immigrants entering Western higher education institutions in general (Guo & Andersson, 2006; Guo & Shan, 2016; Moss, 2014). The intensive nature of the written portfolio can put this tension in sharp relief, as portfolio development can be “epistemologically, academically, and emotionally challenging” for both participants and evaluators (Osman, 2006, p. 213). In fact, the assertion that experiential learning is equivalent to academic learning that is at the heart of PLA can cause internal distress for members of some non-Western populations, especially if institutions then do not acknowledge the legitimacy of non-Western viewpoints or experiences (Wong, 2014). Not only do PLA processes rarely allow for the collective experiences of cultural and ethnic groups as a source of accreditable learning (Michelson, 1997), but in North America, especially, formalized education of aboriginal populations has portrayed the world “as a European place within which only European beliefs and values had meaning” (Hill, 2004, p. 140). In this context, Hill stressed that the PLA process is critical to allowing members of Indigenous groups to articulate “what they know” in a way
that allows them to “unlearn” the idea that their cultures have not produced anything of value to academic discourse (p. 140). However, the most effective mechanisms for doing so have been developed in consultation with (or entirely by) Indigenous people themselves, incorporating culturally-specifical outcomes and assessment.

Western biases extend to the way students are advised to write about their experiences. Michelson (2011) argued that Western narrative convention around autobiography end up constraining adult students’ self-representations. These conventions, she argued, are drawn not only from a literary tradition heavily influenced by triumphalist bildungsromans, but also from the adult learning theories that underpin PLA processes. “The literature on adult learning is filled with metaphors of self-authorship and ‘re-storying’ a life” (p. 6), Michelson wrote, citing Kegan’s (1994) self-authoring mind, Mezirow’s (2000) definition of learning as a revisitation of experience, and King and Kitchener’s (1994) emphasis on the transformation of authority and certainty as examples. Although she acknowledges that many students do reflect on experience, Michelson argued that the plots of self-empowerment and triumph over the economic and intellectual deprivation that populate many adult narratives, including those included in portfolio work, “may not be so much allowing students to discover and express a ‘true’ self” as “teaching them to invent one” (p. 5). Often, these inventions align with the expectation of the well-meaning adult educators who work within PLA programs. When students are unable to align their life stories or experiential learning with these expectations, Michelson argued, adult educators attribute this disjunction to a lack of reflection rather than exploring whether there is a mismatch between these triumphalist narrative conventions and the student’s learning. Such attitudes may be especially problematic when working with students from non-Western backgrounds, those
who may have undergone traumatic experiences, or those whose experiences simply present itself as “more and more complex as time goes by” (2013, p. 211).

Any significant divergence between contemporary PLA practice or theory and actual lived student experience can have serious consequences for students. Research has confirmed that the stakes of success or failure in engaging in PLA processes can be high. Successful use of these processes can potentially save students undergraduate coursework (Fenwick, 2006), as well as significant amounts of money (Klein-Collins et al., 2020). Failure, on the other hand, can result in students calling into question their perceptions of themselves as learners or even their social identities (Whittaker et al., 2006). This can be especially harmful for those who already find themselves situated outside the academic mainstream, as PLA processes can “become a powerful tool for the re-imposition of normative judgements. These judgements (already so familiar to many non-traditional learners) can . . . potentially compound disengagement” (Hamer, 2010, p. 106). Given that PLA is often held out as a time and money-saving proposition to vulnerable populations, rejection through PLA processes may be more demoralizing than rejection that occurs through following a more traditional curriculum (Pokorny & Whittaker, 2014), leading students to give up on an intended career or become less likely to pursue further education (Stenlund, 2012).

Although many PLA practitioners and researchers see current models of adult and experiential learning to be positive elements of the PLA portfolio process, others see them as limiting, or, in any case, not well-suited for all students. The field is also nearly unanimous in discussing the difficulties that students face in constructing portfolios, even when they do so successfully. Some students who earn credit through PLA can have a more negative view of their own competence and self-confidence as a result (Stenlund, 2012). All of this suggests that there
is room for new theories on which to base the PLA portfolio process, or, at the least new ways of looking at what students are doing when they successfully demonstrate their learning, and what internal processes they may be using to do so. The following sections will explore current research on two such frameworks: Tacit knowledge articulation, and personal epistemology.

**Tacit Knowledge Articulation**

The concept of tacit knowledge—that we have access to knowledge that we are not able to immediately access or articulate in language—has both philosophical roots and neurobiological support. Although a handful of Prior Learning Assessment practitioners and researchers have explored the concept of tacit knowledge and its possible articulation through the reflective aspects of portfolio work, explicit connections between tacit knowledge articulation and the portfolio process have not yet been fully developed.

The development of *tacit knowledge* as a concept is generally attributed to Michael Polyani (2015), whose book *Personal Knowledge* was first published in 1958. In his work Polyani argued against the idea that objective, empirically-based rationality forms the whole of the scientific endeavor. Polyani instead contended that scientists bring personal knowledge, much of which is not articulated, to their work, and that this is especially the case if that work is visionary or groundbreaking.

Polyani described tacit knowledge in both bodily and competency-related terms: “by acquiring a skill, either muscular or intellectual, we achieve an understanding which we cannot put into words” (p. 90). For Polyani, such knowledge generally remains inexpressible, even as it is operationalized:

Although the expert diagnostician, taxonomist and cotton-classer can indicate their clues and formulate their maxims, they may know many more things than they can tell,
knowing them only in practice . . . the pondering of a judgement in terms of such particulars is an ineffable process of thought. (p. 88)

For Polyani, the “ineffable” was not necessarily the domain of the mystic or divine, but simply “something that I know and can describe even less precisely than usual, or even only very vaguely.” Specifically, “the relationship of the particulars jointly forming a whole” may be ineffable, even if those particulars themselves can be articulated (p. 88).

Neuroscientific research has confirmed the fact that some learning in humans is implicit, in that it is not readily accessible by conscious processes. Other learning can be consciously recalled, and so can be labeled explicit, or declarative. The memory storage systems that maintain implicit and explicit learning are generally thought of as distinct from one another, although they both “constitute key mechanisms through which the self is formed and maintained” (LeDoux, 2002, p. 28). Although these processes may seem “innate,” experience has a “crucial role in maintaining them” (p. 117), a point that has direct application to the PLA portfolio process, which purports to draw upon students’ lived experiences in order to generate new learning, or at least to help them discover what they know, but have not yet articulated.

Research has explicitly connected these neuroscientific concepts to tacit knowledge. Stolpe and Bjorklund (2013) contended that the implicit memory system itself can be characterized as tacit knowledge. This is an important conceptual step, as it thereby ties these neurobiological processes to the specific concept in philosophy and cognitive psychology. Furthermore, while explicit memories can be recalled, they argued that implicit memories need to rely on “recognition tasks” such as “recounting a narrative” (p. 279). This argument has direct application to PLA portfolios, in that students are encouraged to write narrative descriptions of their learning from experience to generate new learning and insight.
Current research in organizational theory, cognitive psychology, healthcare, and education have also argued that tacit knowledge can be articulated, and that these articulations can be socially and personally valuable. According to this research, not only can articulating what we previously knew only on an unspoken level benefit our peers, colleagues, or the academy, but the specific reflective actions this process of articulation entails will also benefit us as professionals and as human beings in general. Although these theories, in this specific way, seem to have much in common with previously discussed conceptions of adult and experiential learning, current research in these various fields bring several new perspectives to the concept of reflection through the lens of tacit knowledge articulation. These perspectives may be applied directly to the PLA portfolio process in ways that might benefit students who may struggle when provided only with vague conceptions of what they are supposed to be doing as they “reflect upon their experience.”

Cognitive Theories of Tacit Knowledge Articulation

Research in cognitive psychology has begun to explore tacit knowledge and its articulation. The most extensive research in this area has been conducted by Robert Sternberg who has tied the concept to the role of practical intelligence in work and life success (Sternberg et al., 2000). Sternberg et al. characterized tacit knowledge as generally acquired on one’s own with little environmental support (as environmental support would imply that someone has explicitly taught the information), procedural in nature, and has practical value for the individual. People “may not know” they have this knowledge, but it still “guides behavior” by forming a set of internal procedural rules (p. 108). These three features also work together, as knowledge that is developed on one’s own is with little environmental support is more likely to be of practical value, and knowledge that is specifically and explicitly taught is generally available to wider
numbers of people than that which we develop ourselves. Finally, knowledge developed in this way is more likely to be action-oriented, as it is generally obtained through performing tasks.

Sternberg et al. (2000) also contended that tacit knowledge can be both identified and measured. Identification and measurement are achieved through scenario-based instruments that take the form of critical incidents, simulations, and situational judgement tests. A collection of scenarios for a particular field or discipline is known as a Tacit Knowledge Inventory (TCI), and TCIs have been developed for both military and civilian life, including academic psychologists, managers, salespeople, college students, and high school teachers (Elliot et al., 2011). These inventories “reflect individual differences in the ability to acquire and use practical knowledge” (Ciancolo et al., 2006).

Although PLA portfolios do not attempt to measure student learning through quantitative instruments, students often recall scenarios in which they used professionally-based critical thinking (Brown, 2003). A credit award itself is a form of identification and measurement, in that the credits are both identified as belonging to a particular field or discipline within the academy and designated with an amount that attempts to describe “how much” of this type of learning a student has demonstrated.

Cognitive psychology has also attempted to connect tacit knowledge articulation with the broader concept of reflection, another important concept in PLA portfolio work. As Matthew and Sternberg (2009) pointed out, several disciplines have noted that reflection can be an important aspect of workplace learning. However, a lack of understanding of what types of reflective exercises are most effective has hampered efforts to operationalize reflection as a strategy: “Despite the rather enthusiastic endorsement of reflection as a means to develop workplace learning, little seems to be known about the types of reflection that may lead to enhanced
learning” (p. 531). Matthew and Sternberg (2009) suggested that it may be possible to design reflective exercises based around tacit knowledge articulation to develop practical problem-solving skills, but this line of research has not been developed.

This is also the case for PLA-related literature (and adult learning theory in general), in which reflection is lionized but often not clearly defined. Reflection is depicted as “a bridge between tacit and explicit ways of knowing” (Taylor and Marienau, 2016, p. 87), but the best ways to construct this bridge may be hidden from students and practitioners alike. Although adult educators or PLA professionals may sense that reflection has value, they are not always able to support students in being reflective (Travers and Mandell, 2019). Models such as Kolb’s (1984) identify reflection as an important part of the learning cycle, but do “not help . . . to uncover the elements of reflection itself” (Boud, Keough, and Walker, 1985, p. 13). Targeted research is needed to discover and explicate what constitutes reflection within the PLA portfolio process, what role it plays in uncovering or developing student learning, and how these specific elements might be supported more fully.

**Organizational Theories of Tacit Knowledge Articulation**

Another discipline in which tacit knowledge articulation has gained the attention of researchers is that of Organizational Theory. Knowledge management, transfer, and creation have become increasingly important to organizations. Zhi et al. (2016) identified tacit knowledge as the “main resource and tool that can . . . improve core competence,” noting that measuring tacit knowledge has become one of the most important subjects within knowledge research management (p. 135). As a result, organizational theorists have attempted to describe the various ways in which tacit knowledge—especially that of experts or successful managers—can be transmitted from individuals to organizations. These theorists do not necessarily adhere to all
aspects of Polyani’s original conception of tacit knowledge (Ray, 2009), in that some organizational research now identifies tacit knowledge as that which is not “typically” reportable (Raelin, 2007, p. 499), exists along a continuum with explicit knowledge (Nonaka and von Krogh, 2009), and, most importantly for PLA portfolio purposes, as conveyable by narrative (Linde, 2001; Swap et al., 2001). Although certain forms of narrative have been problematized by PLA practitioners as discussed in the previous section, even many of these same researchers have acknowledged personal narrative to be “an effective genre for claiming learning” (Leaker and Ostman, 2010, p. 706).

For PLA practitioners, whether these authors conceive tacit knowledge in the same way as Polyani may not be as important as what the discipline of organizational management has discovered about the possibility of articulating learning that individuals have not yet been able to put into words but forms a valuable part of their expertise as professionals. If such knowledge also intersects with the university curriculum, it may very well be accreditable through the portfolio process. Nonaka and von Krogh (2009) characterize the process of tacit knowledge articulation as “knowledge conversion” (p. 635), arguing that tacit and explicit knowledge exist along a continuum, and that they are both complementary and interactive with one another. Tacit knowledge serves both a social purpose, in that it is the process by which the unwritten rules of a discipline or organization are apprehended. It also serves an innovative purpose, in that as this knowledge is gradually externalized, these practices can spur new ways of doing, being, and understanding.

Although the intersections of tacit knowledge articulation and theories related to reflection will be covered in more detail later in this chapter, organizational theory’s emphasis on the social aspects of tacit knowledge articulation demonstrate the relevance of this research to
how PLA professionals might conceive of and advise the PLA portfolio process. Reflection –
either in the workplace or in the context of an educational process -- can be employed on an
individual basis, but the fact that most professional practices entail contact with others, means
that it can also be an interactive pursuit (Raelin, 2007). Although articulating one’s tacit
knowledge is an act of personal reflection, PLA practitioners and theorists have acknowledged
the critical role that PLA evaluators and advisors play in this process (Conrad and Wardrop
2010; Hamer, 2010; Travers and Harris, 2014). Organizational theory emphasizes that tacit
knowledge benefits more than just the original “owner” of the knowledge; when the knowledge
is articulated, the entire organization benefits. If we apply this line of thinking to the PLA
portfolio process, we may be able to move beyond the notion that students are merely
demonstrating knowledge that is equivalent to an established curriculum, acknowledging that
they could be adding valuable new perspectives to the academy. Although there are some
institutions such as the Workers College in South Africa that hold bringing such alternative
knowledge into the academy as a specific goal (Cooper et al., 2017), this is not the norm for
universities, or even for most PLA departments.

This acknowledgement may be especially useful when considering the tacit knowledge of
members of traditionally underrepresented groups, whose learning may not fit established
Western conceptions of what kind of knowledge is valuable, or how valuable knowledge can be
gained. Making the PLA portfolio process more culturally responsive is another desirable
outcome that research has identified as being heavily reliant on facilitators and mentors (Wong,
2014). As Hamer (2011) points out, using PLA processes to draw in members of marginalized
groups will only work if their entire personhood is valued by the institution, including aspects of
their learning that may not be immediately recognizable within university frameworks. To look
to organizational theory to support what is generally considered a more radical vision of PLA is perhaps ironic, but the social aspects of tacit knowledge articulation as a concept potentially intersect these disciplines.

**Tacit Knowledge Articulation in Practices of Care Research**

Another field in which tacit knowledge articulation has been connected to workplace or practice-based expertise is that of human services and healthcare. Multiple authors have drawn upon the concept to explain how competent practitioners make decisions and provide care. In discussing the practice of caring for people with Intellectual Disabilities, Reinders (2010) claimed that “part of what distinguishes the good practitioner lays in the implicitness of her expertise” (p. 28). Citing Polyani’s conception of tacit knowledge and the personal, Reinders argued that the personal knowledge of expert care-givers is what helps them make good professional decisions: “Professional expertise is necessarily embodied knowledge therefore in the sense that without cultivating its personal dimension, the professional will be less capable of making adequate judgements” (p. 32). The specific context of the experience is critical, as “it is because these caregivers are engaged in particularised relationships with their clients that they are able to see and understand the emotions, state of minds, behaviours, body languages of these clients that cannot be separated from those relationships” (p. 36).

These findings recall the criticisms of experiential learning theories that have generally underpinned PLA portfolio conception and practice, in that broadly generalizing or attempting to objectively universalize this kind of learning may be counterproductive. The personal dimension of learning may be distorted by such an attempt, especially if the student has been told to package their learning as a list of easily-communicated skills or competencies. Fenwick (2006) noted this specific problem in current PLA practice when she writes that:
The first task is to shift emphasis from learning as *product* to understanding learning as a *process* . . . Adults can still be invited to recall and ‘story’ situations they consider important to their personal understandings. However, a process orientation might ask for more descriptive details about their everyday participation, probing their recollections of who/what they engaged with and how, rather than requiring them to codify these stories as abstract lists of acquired knowledge and skill. (p. 296)

Such a process might be a much better way for Michelson’s (2015) female supervisor to articulate her knowledge, for example, as her experience of sexism is both personally embodied and tied to a specific interaction with specific people.

Healthcare research is also valuable in the way it immediately connects tacit knowledge with how experts handle problems. Rykkje (2017) specifically connected “tacit care knowledge” with the ability to blend theoretical and empirical knowledge when facing difficult situations (p. 10), a direct parallel to PLA literature that identifies the purpose of portfolio work as applying theory to practice. By acknowledging or reflecting on the tacit aspects of their professional knowledge, practitioners may be able to better-solve situational dilemmas. Research in social work suggests that such reflection can be a form of quality assurance (Ryding et al., 2018). Occupational Therapy students valued conscious and deliberate self-reflective exercises as ways to expand decision-making and competence in fieldwork (Iliff et al., 2019). Similarly, research has shown the effectiveness of using videotaped sessions of medical educators engaging with patients as a way for these same educators to articulate tacit knowledge regarding their professional behavior upon later viewings, emphasizing reflection rather than recall (van Braak et al., 2018).
Although asking students how they have handled problems in their work or life experience is not necessarily an explicit aspect of all PLA portfolio processes, the above contributions of healthcare research show why this might be an especially helpful way of supporting them in articulating what they have learned. As Rice (2015) noted, “expertise is all about problems” (p. 122). Rather than being asked to talk about their learning in broad terms, or in connection to learning outcomes that may not be fully accessible to them, such a prompt might enable them to focus more specifically on areas where they demonstrated ways of thinking about or handling difficult situations that were not explicitly taught to them, or necessarily supported by their environments.

**Reflection and Problem Solving**

Reflection has been conceptually connected to the problematic since the work of John Dewey, who wrote that individual instances of reflection all begin with “a felt difficulty” and include “suggestion of possible solution” (p. 115). A more recent theory that links expertise and reflection is Donald Schon’s (1983) concept of “reflection-in-action” (p. 49). Schon’s writing focused mostly on professional knowledge, and, like Polyani, he argues that although competent practitioners of all kinds can explain some of what they do and why they do it, “in his (sic) day-to-day practice he makes innumerable judgments of quality for which he cannot state adequate criteria, and he displays skills for which he cannot state the rules and procedures” (p. 49-50). Schon called these unarticulated judgements “knowing-in-action” (p. 50), and argued that, with conscious effort, practitioners can also consciously look back at decisions they have made, or at decisions they are making in the moment, turning their thought processes toward these actions. Sometimes, such as in the case of many elite athletes or improvisational musicians, practitioners may never be able to quite explain (even to themselves) how they adjust their actions in order be
successful, but this does not mean they have not reflected on them. This ability to reflect on our tacit knowledge is what Schon claims allows practitioners to transcend patterns of practice and deal effectively with moments that diverge from the norm. To Schon, reflection-in-action is used primarily in “situations of uncertainty, instability, and uniqueness” (p. 268).

This connection of reflection with problematic situations is echoed in both cognitive psychology and developmental theory. Problematic situations formed the basis for Sternberg et al.’s (2000) Tacit Knowledge Inventories, and studies of tacit knowledge reflection training that focused on practical problems improved practical problem solving (Matthew and Sternberg, 2009). Practical problems, as defined by Sternberg et al. (2000) are those that:

- tend to unformulated, or in need of re-formulation; of personal interest; lacking in information necessary for solution, related to everyday experience; poorly-defined;
- characterized by multiple appropriate solutions, each with liabilities as well as assets; and characterized by multiple methods for picking a problem solution. (33-34)

These practical problems are contrasted with academic problems, which tend to have one solution and one way of apprehending that solution, be clearly defined, formulated by others, outside of ordinary experience, of no intrinsic interest, and complete in the information provided to solve them.

This distinction between academic and practical problems is mirrored by King and Kitchener’s (1994) distinction between what they call “well-structured” and “ill-structured” problems (p. 11). Well-structured problems are those that can be described with a high level of completeness, solved with a high degree of certainty, and which experts usually agree on the correct solution. Ill-structured problems are those that cannot be described with a high degree of completeness, resolved with a high degree of certainty, or enjoy consensus from experts
regarding a solution (in fact, experts may even disagree when the problem can count as having been “solved”). In this way, the ability to solve the types of problems that cognitive psychology has identified as important for professional expertise has been described in similar terms as the ability to solve the types of problems that developmental theorists have identified as critical to epistemological development.

This is not to say that professional expertise is necessarily linked to epistemological development. Michelson (2019) wrote about the disconnect between professional epistemologies and personal ones, noting that bridging this divide is a major challenge for adult education theory. She pointed out that although PLA practices are often quick to accredit students’ content knowledge, neither portfolio assessment nor other forms of self-reflection common to adult undergraduate instruction require students “to account for how they currently function as responsible agents of knowledge” (p. 152). But the connections between these different strands of research—one focused on studies of college students, the other on working adults—provide further evidence for the tacit knowledge articulation’s potential usefulness as a lens through which to view (and perhaps design) the PLA portfolio process, especially one that allows students to explain how they go about solving ill-structured problems in their lives and workplaces. However, only when individuals can recognize that a problem is ill-structured (or even that such problems exist in the first place) that they are are able to operationalize critical judgment. Therefore, one’s personal epistemology may have an impact on one’s ability to articulate tacit knowledge.

** Tacit Knowledge Articulation and PLA Research **

While PLA-related research routinely draws upon concepts of reflection, very few articles mention tacit knowledge articulation as a concept directly. Generally, there is...
acknowledgement that the tacit dimension of prior experiential learning makes it difficult for students to express what they know (Travers & Mandell, 2019). Jimenez (2019) concluded that portfolios allow students to construct meaning “from a tacit-knowledge reservoir” (p. 6) but did not discuss tacit knowledge articulation in detail. Popova-Gonci (2013) argued that concept maps may be a good method by which students can articulate tacit knowledge and specifically cited the work of Sternberg and his collaborators in her discussion of tacit knowledge, but likewise did not make this the major focus of the research.

There has been one PLA-related study that researched substantive connections between tacit knowledge articulation and PLA portfolios specifically. LeGrow (2000) found that undergraduates who had completed portfolios for a management course performed at least as well as classroom students on the Tacit Knowledge Inventory for Managers and showed evidence of more complex organization of learning in solving problems. From this, LeGrow surmised that learning from outside of the classroom “can achieve parity” with in-classroom learning (p. 157). Arguing that critical thinking, reflective judgement, and the ability to solve ill-structured problems “are abilities not usually taught but tacitly acquired during the course of a college career,” LeGrow concluded that portfolio students “equaled or exceeded” classroom students in these areas (p. 158).

Beyond this finding, the fact that portfolio students with a high amount of work experience outperformed classroom students with high experience seemed to suggest that creation of the portfolio itself was a factor in this difference. LeGrow (2000) tied this difference specifically to articulation of tacit knowledge:

It may not be merely reflection, but the combination of reflection and verbalization that accounts for the change in knowledge organization that is associated with APL portfolio
construction . . . participation in the APL portfolio process may bring about changes in
the attitudes and meaning-making of students with regard to their perception of problems
occurring within the domain. (161-62)

This research suggested that the act of developing the portfolio was responsible for this increased
ability, and therefore the portfolio process could potentially be integrated into classroom courses
to help experienced adult learners in general increase their skills in these areas. LeGrow noted
that techniques already used in some classrooms, such as case studies, do this to some extent,
and that “educators who teach adult learners should understand the characteristics and function
of tacit knowledge in adult learning” (p. 170).

Very few PLA-related studies seems to have picked up the thread of tacit knowledge
articulation as a concept that can be applied to portfolio work. One exception is Lamoreaux
(2005), who cited LeGrow’s study in her literature review, and identifies “surfacing tacit
knowledge” as a subcategory of reflection “where reflection was focused on bringing
subconscious knowledge to awareness . . . where it could be used” (p. 107). Lamoreaux
described how several of the adult portfolio students in her study spoke about accessing
unconscious knowledge through the writing of experiential learning essays. In her conclusion,
Lamoreaux noted the role that tacit knowledge articulation played in the process for study
participants, and positioned tacit knowledge articulation in opposition to more familiar ways of
accessing knowledge from external authorities:

It is interesting to speculate how learners’ ability to learn to access their tacit knowledge
might be affected if learners used current research as part of their articulation of their
learning from experience. (The portfolio course taken by participants in the study did not
permit research on experiential learning topics.) Would they have learned as much about
how to access their own tacit knowledge? Would there be as much of a sense of affirmation and self-confidence that they had learned from their experience? (p. 132)

Given that Lamoreaux went on to provide a lengthy citation from a participant who discussed the importance of learning how to value her own opinions and ideas, Lamoreaux’s answers to the above rhetorical questions was “probably not.”

Whether this is necessarily the case, or, if this is the case, what the critical epistemological factors might be is not clear. How tacit knowledge interacts with established knowledge is certainly an open question, but also one for which the answer might differ from student to student. While some students’ efforts to describe what they tacitly know might well be capsized by encountering more established expert voices, others may be able to successfully integrate the two. In fact, if we listen to what recent research on epistemological beliefs tells us, existing epistemological positions might determine how successfully a student can complete a portfolio at all, or even their interest in the process to begin with.

**Current Theories on Epistemological Beliefs and Personal Epistemology**

The beginning section of this chapter discussed several epistemological developmental frameworks that have been derived from working with traditional undergraduates. These frameworks have many shared characteristics. They tend to be “stage models,” in which students move from more absolutist conceptions of knowledge to progressively more relativist conceptions, finalizing (for those students who make it to this point) in commitment to a sense of firm self or belief that acknowledges the position of that commitment within a relative, uncertain world. Many of them followed students over time, and most of them were focused entirely on young adults.
However, the last few decades have seen new research regarding epistemological beliefs and their relationship with learning, both in the classroom and from experience. This section will explore recent research on personal epistemology and its relevance to the PLA portfolio process, demonstrating how students’ prior beliefs about the nature of knowledge and their abilities as knowers could potentially affect not just PLA portfolio work, but their learning in general.

**Schommer’s Epistemological Belief System**

In contrast to the stage theories presented by Perry and subsequent researchers, Schommer (1990) proposed that student epistemology could be conceptualized as a belief system composed of multiple independent dimensions. In other words, some students could have absolutist beliefs about knowledge in some regards but hold to more relativist notions about others. Although she cited Perry’s (1999) work regarding the fact that many first-year college students believe that knowledge is “simple, certain, and handed down by authority” (Schommer, 1990, p. 498), Schommer criticized Perry’s “unidimensional” approach, and argues that beliefs about knowledge are too complex to be captured by a single dimension. Duell and Schommer-Aikins (2001) pointed out that unidimensional approaches may obscure complex arrangements of personal epistemology, as patterns of development are anticipated from the earliest stages onward. Rather than assuming that beliefs in all areas develop synchronously, researchers may be able to uncover multiple patterns of belief.

Schommer (1990) also argued that Perry’s conception of epistemology is incomplete. Although she included his conceptions of authority, complexity, and certainty regarding knowledge, Schommer added beliefs about nature of intelligence derived from Carol Dweck’s work (Dweck & Leggett, 1988) and proposed that there were at least five dimensions of personal epistemology: “the structure, certainty, and source of knowledge, and the control and speed of
knowledge acquisition” (Schommer, 1990, p. 498). The structural dimension pertains to whether or not students believe that knowledge is a series of discrete, simple elements or a more complex arrangement; the certainty dimension to whether or not knowledge is certain or tentative; the source dimension to whether knowledge issues from an omniscient authority or is derived from reason, the control dimension whether the ability to learn is innate or acquired; and the speed dimension to whether knowledge must be learned quickly or not at all, or whether it can be apprehended over time.

These dimensions are generally unconscious, and do not necessarily develop synchronously (Schommer-Aikins, 2004). For example, someone may believe that knowledge is complex in its structure, yet that authorities can still know all there is to know about a subject. Likewise, someone may reject the idea that authorities hand down knowledge to others in a unidirectional way, but still believe that one is either “gifted” or not, and that large amounts of effort to learn are wasted if one does not grasp a concept immediately. As beliefs in each of these dimensions have “distinct effects on comprehension and learning” (Schommer, 1990, p. 503), an educator would need to consider where individual learners or groups of learners may be positioned among all these dimensions, rather than assuming that holding relativist ideas in one dimension means they are applying such a stance to all aspects of their learning.

This ability to examine individual aspects of student epistemology may also help educators better understand learners, and target interventions for where they are most needed. Schommer (1990) found that students who had a strong belief in the certainty of knowledge tended to distort information when encountering content material that emphasized the tentativeness of knowledge; in a case such as this, an educator may need to take extra care when assigning a task based on reading comprehension. This reinforced earlier research that had
shown that students with dualistic perspectives under Perry’s scheme were more likely to associate text mastery with fact retention, while those with relativist stances were more likely to apply standards of comprehension and application. Students who used multiple comprehension methods also earned better grades, and more complex epistemological beliefs were significant predictors of course grades even after effects of academic aptitude (such as SAT scores) had been accounted for (Ryan, 1984).

In order to capture these different dimensions, Schommer (1990) developed a quantitative instrument for measuring epistemological beliefs, a departure from previous research that has generally relied on lengthy interviews. Schommer’s original instrument, the Epistemological Questionnaire (EQ) was a 63-item paper-and-pencil survey that employed a Likert scale to determine student epistemologies for the five dimensions. Schraw, Bendixen, & Dunkle (2004) later developed a 32-question instrument, the Epistemological Beliefs Inventory (EBI). The EBI was designed to be a more efficient instrument, and more effective than the EQ in ensuring that all of the items fit into one of the five dimensions. Although concerns have been raised about measuring personal epistemologies through self-reported psychometric instruments (DeBacker et al., 2008; Hofer & Bendixen, 2012), these instruments allow for data collection at a group level that have helped to further revise the theory (Duell and Schommer-Aikins, 2001).

Schommer’s (1990) initial findings hold important considerations, especially for the PLA portfolio process. Although parental education level had an influence on participant epistemological beliefs, the greatest predictor of belief in the uncertainty of knowledge dimension was the number of college-level courses the participant had completed. Although this finding generally aligns with those of earlier developmental stage models, in which progression through one’s undergraduate career generally led to more comfort with uncertainty, it
underscores some critical questions that PLA research has not yet considered: Is demonstrating one’s professional knowledge equivalent to taking a college course in how it might provide student the opportunity to confront the uncertainty of knowledge? If it is, then how does it achieve this effect? If not, then what should those supporting PLA portfolios processes do to ensure that students (especially adults who may undertake large portfolios for a significant amount of credit) derive this crucial benefit of the undergraduate experience?

Another important aspect of current epistemological research is the finding that even students who claim to hold relativist or constructivist epistemologies may not actually practice them when confronted with challenging academic or professional situations. As the developmental stage models were developed mainly through interview, the extent participants applied the epistemological stances they verbalized in the classroom or their wider lives is not clear. A study of undergraduate social work students found that even those who were open to new forms of knowledge struggled to assimilate new knowledge with their existing epistemologies, instead continuing to believe their own views of knowledge until they were disproven by experience (Anderson-Meger, 2014). Hofer (2017) observes that educational psychology students in her undergraduate classroom not only believe a number of misunderstandings about teaching and learning, but supported those beliefs with a variety of justifications such as personal experience, authority, and testimony from others rather than basing their claims on empirical evidence.

Likewise, PLA portfolio staff may need to approach individual students differently based upon how the students’ epistemologies differ within and across these dimensions. In fact, understanding portfolio students’ epistemological beliefs may be crucial to advising them effectively. If students believe that only omniscient authorities have access to knowledge, they
may not see portfolios as a viable or legitimate avenue for earning credit to begin with (even if they take on such a project for its cost and time-saving benefits). If they believe that knowledge is simple, they may struggle to examine their own language with any degree of complexity. If they believe that learning is fast or innate, they may perceive that the multi-draft process that most portfolio writing entails as an exercise in futility. In any case, ignoring epistemological beliefs is likely to result in ineffective teaching strategies and learning outcomes; this has been documented by research in classroom learning (Anderson-Meger, 2014), and there is no reason to believe that it would not apply to PLA pedagogy as well.

Additionally, PLA advisors or evaluators themselves may need to hold certain epistemological beliefs in order to model them effectively to students. Educators cannot help students adopt more sophisticated beliefs unless they themselves hold such beliefs and that simply advocating for more complex learning may be ineffective on its own (Ravindran et al., 2005). Although many PLA theorists advocate for support and care throughout the advising process, research suggests that an emphasis on these emotional dimensions may become problematic if students transfer implicit trust in some types of authority to others (a PLA evaluator, for example), “with the same absolution of responsibility” (Gordon & Ball, 2017, p. 138). Simply providing emotional support, or even proposing to co-construct knowledge may not be adequate ways of ing the PLA process if PLA professionals don’t themselves actually believe and can actively demonstrate the ways in which knowledge can be perceived as uncertain, complex, and constructed rather than handed down.

Epistemological Beliefs and Discipline Specificity

In addition to Schommer’s work, other research has been conducted on the extent to which personal epistemology is affected by varying levels of expertise within specific
disciplines. Researchers have tried to determine whether students can display complex epistemologies in subjects with which they are more familiar, while at the same time employing simpler epistemologies in others. Marra and Palmer (2008) found that liberal arts undergraduates were more likely to describe epistemological understandings in the humanities and social sciences that were more complex than those they assigned to the sciences. However, engineering and science majors displayed the opposite pattern, exhibiting more complex understandings of knowledge in the sciences than in other areas. This may be due to a lack of exposure to multiple courses outside of their chosen disciplines, or because academic disciplines vary regarding the standard of justification (Hofer and Bendixen, 2012). Schommer’s (1990) research suggested that “exposing students to advanced knowledge, which is generally more tentative in nature, facilitates a change in their belief systems with regard to the uncertainty of knowledge” (p. 501). However, other researchers point out that domain-specific epistemologies may not be limited to academic disciplines, extending to values, morality, aesthetics, and taste (Hofer and Bendixen, 2012).

These findings are relevant to PLA practice, as adult students generally complete portfolios in areas in which they have developed expertise. But even students with experience within a particular field may not be comfortable applying theory to practice, or even perceive such connections as a beneficial or legitimate form of knowledge demonstration. Much like Anderson-Meger’s (2014) social work undergraduates, they may hold to a multiplistic stance that “you can believe what you want” (p. 78), or that relying on one’s experience is always more important than the ability to understand and apply relevant theories derived from academic study. In fact, Anderson-Meger found that, for some students, practical experience in their field could be a hindrance to developing research-based epistemologies if they placed more value on hands-
on learning or experiential activities. For example, students who placed high values on caring and relationships did not always adopt other sources of knowledge to practice social work effectively. Many of these students acknowledged that facts and theories were important, but that they were best used simply to support previously-held beliefs in order to gain funding.

Some students who attempt to apply theory to their own practice as professionals in PLA portfolios might hold similar attitudes. To such students, facts and theories might be important, but only to the extent in that demonstrating they can apply them can help them earn credit. If a portfolio process expects that students would then be able to discuss their learning from experience in terms of theoretical material, PLA advisors need to be aware that there may be epistemological stances that come directly out of those experiences themselves that make this task difficult, feel superficial, or even be perceived as invalidating the student’s learning in some way. For example, a student may have had a particular experience that stands out to them, either because it involved intense emotions, or because it represented a major incident in their personal or professional growth. If they perceive that the way they successfully handled this situation as running counter to an important theory in their field, they may choose to discount that entire theory, or tend to dismiss theories as a potential basis for practice in general. As there is a particular vein of PLA research that valorizes the importance of students developing their own voices and legitimizing their own knowledge (Lamoreaux, 2005; Stevens et al. 2010), research on epistemology suggests professionals working with students attempting PLA portfolios may need to be careful that such an emphasis does not end up reinforcing student tendencies to reinforce their own epistemological biases toward personal experience or multiplistic views of knowledge.

*Epistemological Beliefs and Self-Regulation*
PLA portfolios are often self-directed projects that require self-discipline on the part of the students to successfully complete them. Also, students need to be aware of what strategies are working successfully for them, and when they need to adopt new strategies to demonstrate their learning. PLA theorists have made claims that engaging in PLA portfolios help to develop self-knowledge in adult students, including their own self-direction in learning activities (Brown, 2002). But such theories do not always consider research suggesting that students may need to hold certain epistemologies to engage self-regulation effectively.

Models of self-regulated learning propose that students set goals and plans for learning, monitor the processes that represent metacognitive awareness of learning, activate processes to control and regulate their learning, and finally reflect on what learning was achieved (Muis, 2007). *Cognitive engagement* refers to the amount of effort and types of processing strategies a student is willing to adopt for the purpose of learning. For example, a student may realize that they are having trouble understanding a particular section of text, and so raise questions about that section at their next class meeting or seek out their instructor for a one-on-one conversation. Not all students are equally likely to take such steps, however. A study of preservice teachers found that students who maintained naïve beliefs about authority were less likely to engage meaningfully with material, and that those who believed that knowledge was simple were more likely to report engaging in shallow strategies for cognitive engagement (Ravindran et al., 2005). Muis (2007) argued that there is a reciprocal relationship between self-regulated learning and epistemic belief, and that strategy training is important for developing both self-regulation and the more complex epistemological beliefs that “cause students . . . to be more constructivist” (p. 184). Specifically, “students may need to become aware of the types of beliefs they hold about knowledge and learning” (p. 187). As PLA research has not generally discussed prior beliefs
about knowledge held by portfolio students, PLA programs or departments seem unlikely to include explicit exercises or instruction designed to help students understand their own epistemological beliefs.

This seems an especially critical point given how important these beliefs can be in determining whether students have the kinds of skills needed to construct knowledge. Dahl et al. (2005) found that students with epistemological views of knowledge as fixed were less likely “to connect their prior knowledge with new knowledge that is to be learned” (p. 269). These findings suggested that not all students will be equally prepared to generate new learning through a PLA portfolio, or to even view such a process as valid. Whether such students tend to “weed themselves out” of the portfolio process by choosing not to pursue one, or if large numbers of such students may attempt portfolios only to find them frustrating or illegitimate regardless if they earn credit or not is not clear. Neither outcome is likely to produce the kinds of epistemological development that developmental theorists have posited as the goal of an undergraduate education, and so more research is needed into what pre-existing epistemological beliefs students attempting PLA portfolios bring with them into the process.

**Epistemological Beliefs and Critical Thinking**

The ability to think and reflect critically has been demonstrated as a defining aspect of epistemological development, especially in terms of ill-structured problems (King & Kitchener, 1994). PLA portfolios have been cited as a potential driver in developing critical thinking skills (Brown et al., 2003) and the results of a study of undergraduate business students who completed portfolios suggested that they had “a propensity to draw upon their past histories in a way that enriches problem-solving” (LeGrow et al., 2002). Whether this is a result of portfolio work, or if
students with such propensities are more likely to engage in portfolios, or to what extent epistemological belief plays in the success of such attempts is not clear.

Research suggests that there are multiple dimensions of personal epistemology that are relevant to students’ critical thinking abilities. Schommer’s (1990) original study found that students with strong beliefs in the certainty of knowledge who encountered tentative information tended to distort this information in order to maintain consistency with these beliefs. Additionally, the more students believe that learning is “fixed,” the fewer strategies they employ to think critically about new information. (Dahl et al., 2005) Likewise, a study of “educationally disadvantaged” adult undergraduates suggested that critical thinking may require not only learning, but also sufficient epistemological development (Oullette-Schramm, 2015). Bendixen et al. (1998) found that measuring epistemic beliefs using the EBI made a unique contribution to moral reasoning, concluding that “the relative sophistication of one’s epistemic world view may impose a developmental constraint on one’s moral reasoning” (p. 197). Beliefs in quick learning or omniscient authority may forestall sustained engagement with an ill-devised ethical or moral problem or serve as a roadblock to the development of one’s own personal moral standards. If we do not believe that an ethical dilemma or complicated situation can be solved without the intervention of an expert authority, or if we do not believe that such problems are worth spending extra time considering to find a satisfactory solution, we may defer to others or choose a quick and unsatisfactory solution instead.

Turning back to PLA portfolio practice, Michelson (2019) pointed out that there “is both a conceptual disconnect and a pedagogical gap” between standard practice in the field and critical self-reflection. PLA often provides credit for content knowledge, she argued, rather than asking students to “grapple with their epistemological integrity” (p. 152). While students may be
asked to demonstrate critical thinking in their discipline or domain, they may not be asked to
demonstrate consistency across disciplines, domains, or dimensions. For example, a student
earning portfolio credit for business management may be able to describe the relevant ethical
considerations in deciding whether to fire an underperforming employee who is struggling with
personal or family hardships but will not generally be asked to connect learning in this area with
larger ethical questions intersecting with the social or political sciences, or with the social or
political fabric of the modern world in general. Current research in epistemological belief
suggests that if this conceptual gap is to be bridged and the proper supports provided, more
research needs to be conducted on portfolio students’ epistemologies and how these might affect
their existing critical thinking skill.

**Cultural Dimensions of Epistemological Belief**

Finally, research suggests that cultural background may affect epistemological belief.
Schommer-Aikins (2004) acknowledged that different cultures may emphasize relationships with
authority or knowledge in ways that influence their epistemologies. In a review of the existing
literature, Hofer and Bendixen (2012) found significant evidence that personal epistemology is
affected by culture, although they determined that more investigation was needed into the
mechanisms that drive these effects.

The potential impacts of Western-based assumptions of learning that underpin PLA work
have been well-documented (Hamer, 2010; Michelson, 1997; Wong, 2014). Much of this
research has focused on ontological dimensions of learning rather than differences in
epistemologies, but Western constructivist assumptions about knowledge and learning that are
exemplified by Schommer’s (1990) model and subsequent research may not be shared or
presented in the same ways by people of all cultural backgrounds. Although cultural background
is not a part of the study presented in this dissertation, this is an important area of future research given the wide range of backgrounds students bring to the PLA portfolio process and their college learning in general. Also, since the epistemologies of adult undergraduates are not well-understood in general, this study’s focus on the overall characteristics of adult learners may provide a starting point for future studies that explore the effect of cultural background on adult undergraduate epistemology.

Conclusion

Many of the theories that underpin undergraduate and experiential learning models are decades old. That does not mean they are no longer useful or accurate, and they may be appropriate lenses through which to view many aspects of adult undergraduate education. However, PLA practitioners themselves have noted the problems with the application of these theories to portfolio work, and that significant numbers of students either fail to complete portfolios or are frustrated by the process. As a field, we need to try something new.

Although models for traditional undergraduate epistemological development are well-established, little is known about the epistemologies of adult undergraduates, or how the PLA portfolio process might affect epistemological development. Adult undergraduates completing portfolio work may not fit developmental epistemological models that have been established by research on traditional undergraduates. Schommer’s (1990) conception of multi-dimensional epistemologies that do not always advance in concert may be a promising way of conceptualizing the epistemologies of students who have extensive experience in certain fields, but who lack the broader exposure to relativism of a full undergraduate education. Such an approach is consistent with findings that professional knowledge in one area does not always prepare students to develop constructivist or consistent epistemologies overall (Anderson-
The application of multidimensional epistemological models to PLA portfolio work will be a novel—and needed—contribution to the fields of PLA research and adult education in general.

At the same time, experiential learning theories generally applied to the PLA portfolio process may not necessarily describe the ways in which engaging in PLA portfolios may facilitate epistemological development. Sternberg et al.’s (2000) definition of tacit knowledge articulation may be a way of conceptualizing what students are doing when they “write what they know,” in that they are often describing knowledge they have gained with little support that helps them solve specific, practical problems of personal or professional value to them. LeGrow (2000) used conceptions of tacit knowledge articulation to demonstrate that PLA portfolio students displayed more complex problem-solving attempts than comparable classroom students. Lamoreaux (2005) drew on tacit knowledge and problem-solving in her study, which found that subconscious knowledge could be brought to awareness through reflection, “where it could be used” (p. 107). This study’s specific focus on tacit knowledge articulation will continue this promising line of research into specific mechanisms that may facilitate epistemological development for PLA portfolio students.
CHAPTER THREE: METHOD

This study was a mixed-methods design that included both an online survey and interviews with individual participants. The research site was a large public university in the northeastern United States with a large population of and significant commitment to adult undergraduates. It has a well-established PLA portfolio process and several campuses throughout the state, as well as a significant online presence. The study design followed a convergent parallel model, in that the researcher collected quantitative and qualitative data at roughly the same time, and then analyzed each separately before merging findings from both elements in the interpretation of the final results (Creswell, 2014).

Quantitative Method

The purpose of the quantitative portion of the study was to determine to what extent differences exist between the epistemological beliefs held by adult undergraduates who have completed PLA portfolios as compared to adult undergraduates who plan to take only traditional portfolio courses, as well as to adult undergraduates who plan to use the portfolio process but have not done so yet. The instrument used to measure participants’ epistemological beliefs was the Epistemological Beliefs Inventory, first developed by Bendixen, Schraw and Dunkle (1998). This instrument was developed to measure the epistemic dimensions described by Schommer (1990) and was first tested on undergraduates enrolled in an undergraduate psychology class. The EBI was purposefully constructed to be shorter and more reliable than Schommer’s (1990) original instrument, the Epistemological Questionnaire (EQ). An additional goal was to create an instrument in which all items fit unambiguously into one of the five dimensions Schommer (1990) described (Schraw, Bendixen, & Dunkle, 2004).
The version of the EBI used in this survey is a 32-question Likert scale survey that measures respondent beliefs across five factors: Certain Knowledge (eight items), Simple Knowledge (seven items), Innate Ability (seven items), Omniscient Authority (five items), and Quick Learning (five items). A higher score in any of these factors indicates a less sophisticated belief according to developmental models, in that it represents a greater likelihood to believe that knowledge is certain, simple, available primarily to experts, and gained in a quick-or-not-at-all fashion, as well as the belief that the ability to learn is acquired at birth. Initial analysis of results from this instrument showed that it yielded these five factors and had better test-retest validity than the EQ (Schraw, Bendixen, & Dunkle, 2004). A copy of the EBI can be found in Appendix A.

Participants

All participants in this survey were twenty-five years of age or older. All were current students of the institution or had graduated within the past year. Participants were divided into three groups: Those who had completed a PLA portfolio \( n = 27 \), those who had not completed but were planning on completing a PLA portfolio \( n = 29 \), and those who were not planning on completing a PLA portfolio \( n = 26 \). The total number of survey participants was 82. Out of these eight-two responses, there were four skipped questions in total; these responses were included in the final analysis of results.

Data Analyses

Data analyses consisted of first finding the mean scores for the entire sample on each individual question, as well as for each of the five factors. Additionally, mean scores were calculated for all three groups on the five factors.
As there were three groups whose means needed to be compared, an analysis of variance (ANOVA) was used to determine if there were significant differences between group scores (Salkind, 2017). SPSS software was used to perform a series of one-way ANOVA tests. First, one-way ANOVA tests were performed to determine significant differences between means for each group on each individual question of the EBI. Second, a one-way ANOVA was performed to determine significant differences between means for group for each of the five factors of the EBI. An ANOVA was also performed to determine if there were a significant difference between means for the entire sample regarding each of the five factors. When significant differences were found, various post-hoc analyses were performed to determine the pairwise source of the difference.

Finally, the thirty-two questions on the EBI underwent a bivariant correlation against one another to determine any relationships between individual questions, both for the entire sample and the three groups. An exploratory factor analysis was performed to determine any underlying factors not captured by the instruments’ design for all three groups.

**Qualitative Method**

The purpose of the qualitative portion of the study was to discover the experiences of adult portfolio undergraduates regarding tacit knowledge articulation and what impacts tacit knowledge articulation has on their personal epistemologies during the portfolio process. The instrument used to discover these experiences was a semi-structured online interview over Zoom. Interviews were recorded and transcribed verbatim by the researcher. A copy of the interview questions can be found in Appendix B. Interviews lasted between half-an-hour and an hour.

**Participants**
Interview participants were recruited from the initial survey. Participants who indicated they were willing to participate in a follow-up interview were contacted, and their prior completion of a PLA portfolio at the research site was verified. All participants signed a separate consent form for the interview and informed of their right to discontinue participation before responding to any interview questions.

Four participants were interviewed. The only demographic information collected about participants was verification that all were at least twenty-five years of age. None of the interview participants were known to the researcher prior to the contact regarding the interview.

Data Analysis

Interview data were analyzed according to a phenomenological model. The phenomenological method was selected because its goal is to describe “the common meaning for several individuals of their lived experiences of a concept or phenomenon” (Creswell & Poth, 2018, p. 75). In this case, the phenomenon is participant experience of tacit knowledge articulation and impacts this articulation had on their personal beliefs about knowledge. Questions of adult undergraduate epistemology and PLA portfolios are “rooted in autobiographical meanings and values” for the researcher, and also involve “social meanings and significance” (Moustakas, 1994, p. 103), also consistent with a phenomenological approach. In this case, the primary researcher for this study advised adult undergraduates who are attempting to complete PLA portfolios, and the question of how tacit knowledge articulation affects adult epistemology has significance not only for higher education, but also for adults’ professional lives and abilities to function as citizens in a democratic society.

Interview data was analyzed according to the phenomenological model described by Colaizzi (1978). Interview protocols were read and significant phrases related to the research
question were extracted. The researcher then formulated meanings for each significant statement, and then aggregated the collected meanings into themes. Themes were checked against the original protocols to validate them, and to determine if they completely described the relevant content of the protocols. Exhaustive descriptions of each theme were developed, and these results were then presented to participants to determine if the research findings were credible and valid as a form of member checking (Creswell & Poth, 2018). All interview respondents were sent the results pertaining to their interview data by email and invited to respond regarding the accuracy of how their contributions were portrayed, as well as any important aspects of their experience they felt were not depicted in the results. None of the interview participants chose to participate in the member-checking process.

Another important aspect of phenomenology is that of Epoche, in which the researcher engages in “disciplined and systematic efforts to set aside prejudgments regarding the phenomenon” (Moustakas, 1994, p. 22). As a PLA professional, it was necessary for the primary researcher for this study to acknowledge his beliefs and prior conceptions of students’ experiences related to tacit knowledge articulation, and to attempt to set those aside. The primary researcher needed to acknowledge his own attachment to the concept that some epistemological beliefs are more desirable than others, that the PLA process itself is beneficial to students, and that undergraduate degrees are desirable for both their socioeconomic benefits and their emphasis on developing epistemological complexity. The primary researcher also needed to suspend his suspicion that many portfolio processes are confusing to students, and that what students are asked to do through these processes are ill-defined.
CHAPTER FOUR: RESULTS

Quantitative Results

The quantitative portion of the study was designed to answer the research question “To what extent are there differences between the epistemological beliefs held by adult undergraduate portfolio students as compared to adult undergraduates who take only traditional courses?” The instrument selected to answer this question was the Epistemological Beliefs Inventory (EBI), which was delivered in the form of an online survey. The EBI is designed to measure the sophistication on five epistemic dimensions: Certain knowledge (whether absolute knowledge exists and can be gained), simple knowledge (whether knowledge consists of discrete facts), omniscient authority (whether authorities have access to or can gain access to knowledge that others cannot), quick learning (whether learning is gained in a quickly or not-at-all), and innate ability (whether the ability to learn is acquired at birth). The EBI uses a five-point Likert scale ranging from Strongly Agree to Strongly Disagree, with higher-scored responses representing beliefs that knowledge is certain, simple, available primarily to experts, and gained in a quick-or-not-at-all fashion, as well as the belief that the ability to learn is acquired at birth.

The EBI was sent to 1,218 recipients. There were 82 responses to the EBI, a response rate of 6.7%. Responses were generally spread evenly between the three groups, with 27 reporting having completed a PLA portfolio, 29 reporting they were planning on completing a PLA portfolio, and 26 reporting they did not plan on completing a PLA portfolio. The Completed group included a response that skipped one question, the Planning group responses included two skipped questions, and the Not Planning group responses included one skipped question. Only one question (#7 - “Parents should teach their children all there is to know about life” from the
Omniscient Authority factor)– was skipped by multiple respondents. Incomplete surveys were included in the analysis of the results. SPSS software was used for all statistical analyses.

**Descriptive Statistics**

Means were calculated for the entire group on all five factors of the EBI: Certain Knowledge (CK), Simple Knowledge (SK), Omniscient Authority (OA), Quick Learning (QL), and Innate Ability (IA). Means were also calculated for the three groups of participants: Those who had completed a PLA portfolio, those who were planning to complete a portfolio, and those who were not planning to complete a portfolio. Results are displayed in Table 1, below. As discussed in Chapter Three, a higher mean indicates a less sophisticated belief according to developmental models, in that it represents a greater likelihood to believe that knowledge is certain, simple, available primarily to experts, and gained in a quick-or-not-at-all fashion, as well as the belief that the ability to learn is acquired at birth.

**Table 1**

*Means and Standard Deviations for EBI Factors by Participant Group*

<table>
<thead>
<tr>
<th>Participants</th>
<th>Overall</th>
<th>CK</th>
<th>SK</th>
<th>OA</th>
<th>QL</th>
<th>IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 82)</td>
<td>M = 2.53</td>
<td>M = 2.18</td>
<td>M = 2.74</td>
<td>M = 3.03</td>
<td>M = 1.79</td>
<td>M = 2.72</td>
</tr>
<tr>
<td></td>
<td>SD = .37</td>
<td>SD = .55</td>
<td>SD = .58</td>
<td>SD = .64</td>
<td>SD = .53</td>
<td>SD = .68</td>
</tr>
<tr>
<td>Completed portfolio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 27)</td>
<td>M = 2.48</td>
<td>M = 2.13</td>
<td>M = 2.66</td>
<td>M = 2.99</td>
<td>M = 1.71</td>
<td>M = 2.70</td>
</tr>
<tr>
<td></td>
<td>SD = .35</td>
<td>SD = .56</td>
<td>SD = .48</td>
<td>SD = .67</td>
<td>SD = .53</td>
<td>SD = .67</td>
</tr>
<tr>
<td>Planning to complete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 29)</td>
<td>M = 2.61</td>
<td>M = 2.22</td>
<td>M = 2.86</td>
<td>M = 3.09</td>
<td>M = 1.89</td>
<td>M = 2.82</td>
</tr>
<tr>
<td></td>
<td>SD = .32</td>
<td>SD = .46</td>
<td>SD = .53</td>
<td>SD = .63</td>
<td>SD = .56</td>
<td>SD = .62</td>
</tr>
</tbody>
</table>
As an entire group, participants had the lowest mean in the Quick Learning category, which means they tended to agree least with statements that learning must happen quickly or not at all, suggesting that they believe that learning takes time. The mean for the Quick Learning category for the entire group sample was 1.79 (SD = .53). The sample scored highest in the Omniscient Authority category, which means they tended to agree most with statements that knowledge is accessible only to experts, as represented by the group sample mean of 3.03 in the Omniscient Authority category (SD = .64). Since a higher mean means greater agreement with such statements, it represents a less sophisticated epistemology as defined by the creators of the instrument (Bendixen, Schraw, & Dunkle, 1998) and by developmental models.

Differences between total group means between the five dimensions were tested for significance with a one-way analysis of variance (ANOVA). The ANOVA results indicated a significant difference among the total group means in all five categories at a .032 level. To find the source of this difference, post-hoc tests were conducted. Although the Bonferonni post-hoc test does not require the overall F value to be significant, it was selected as the initial post-hoc test due to the nature of the test being conservative test by dividing the familywise error rate (.05) by the number of comparisons, thereby keeping the possibility of Type 1 error low (Howell, 2014). Since the Bonferonni post-hoc test did not find a significant difference between any combinations of pairs, a Tukey Honest Significant Difference (HSD) test was employed, as this test is also designed to hold the familywise error rate at .05. The HSD test found that the

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not planning to complete</td>
<td>2.49</td>
<td>.44</td>
</tr>
<tr>
<td></td>
<td>2.20</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>2.68</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>3.01</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>1.75</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>2.61</td>
<td>.75</td>
</tr>
<tr>
<td>(n = 26)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
difference between the Quick Learning and Omniscient Authority groups was significant at the .046 level, with an effect size of 2.11.

An effect size of 2.11 is quite large (Salkind, 2017), as the difference between means was more than two standard deviations. In addition, each group’s QL score was its lowest score among any of the five dimensions, and its OA score was the highest. The within-group differences between QL and OA were all significant at $p < .001$, with effect sizes of 2 or higher.

These findings suggest that while this sample of adult undergraduates tends to reject beliefs that one can acquire knowledge quickly or not at all, they may still believe that knowledge is acquired from all-knowing experts or authorities. Whether this means they believe that one can become an expert over time is not clear, but the extent to which adult students hold such beliefs should be a major area of concern for those who advise PLA portfolios or design portfolio processes. PLA portfolios are designed to allow students to demonstrate how their own knowledge gained from experience fulfills university outcomes for credit, and the belief that knowledge resides within experts may mean that students are not well-prepared to complete this task successfully if they do not view themselves as experts. It could also signal that portfolio students may rely on PLA advisors to be the “expert” on how to demonstrate their learning, a possibility that will be explored further in the discussion.

Another important finding is the pattern established among the groups. For the total survey, the Completed group had the lowest overall mean ($M = 2.48, SD = .35$), the Not Planning group was virtually identical ($M = 2.49, SD = .44$), and the Planning group had the highest overall mean ($M = 2.61, SD = .32$). This means the Completed and Not Planning groups displayed more sophisticated epistemologies than those who were planning to complete portfolios, in that they were less likely to believe that:
knowledge is certain
knowledge is simple
knowledge is obtained from expert authorities
learning must happen quickly
the ability to learn is innate

An analysis of variance test was performed on these total group means as well, and these differences were found to be not statistically significant. The effect size between the Planning group and the Completed group was small ($d = .39$) and the effect size between the Planning group and the Not Planning group was also small ($d = .31$). The relative position of groups was generally repeated for individual factors. For all factors, the Planning group had the least sophisticated epistemology. For four of the five factors the Not Planning group fell in the middle, and the Completed group had the most sophisticated epistemology. However, for the Innate Ability factor, the Not Planning group had the most sophisticated epistemology. Although these differences were also not statistically significant, this consistent pattern may be surprising to many as it may suggest that completing a portfolio may not necessarily result in more sophisticated epistemologies than completing traditional coursework. The implications of this finding will be discussed more fully in the next chapter.

**Individual Question ANOVAs**

Results were analyzed using a one-way ANOVA to compare means from the responses across all three groups for each of the thirty-two individual questions on the EBI. Three questions reported a significant difference at the .05 level across the three groups, as provided in Table 2 below:
Table 2

*Group means and standard deviations for EBI questions with significant differences as determined by ANOVA*

<table>
<thead>
<tr>
<th>Group</th>
<th>Q8 IA&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Q9 QL&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Q19 CK&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$(p = .049)$</td>
<td>$(p = .044)$</td>
<td>$(p = .049)$</td>
</tr>
<tr>
<td>Completed portfolio</td>
<td>$M = 2.44$</td>
<td>$M = 1.96$</td>
<td>$M = 1.26$</td>
</tr>
<tr>
<td>(n = 27)</td>
<td>$SD = 1.22$</td>
<td>$SD = .90$</td>
<td>$SD = .59$</td>
</tr>
<tr>
<td>Planning to complete</td>
<td>$M = 3.10$</td>
<td>$M = 2.72$</td>
<td>$M = 1.72$</td>
</tr>
<tr>
<td>(n = 29)</td>
<td>$SD = 1.37$</td>
<td>$SD = 1.36$</td>
<td>$SD = .80$</td>
</tr>
<tr>
<td>Not planning to complete</td>
<td>$M = 2.27$</td>
<td>$M = 2.62$</td>
<td>$M = 1.69$</td>
</tr>
<tr>
<td>(n = 26)</td>
<td>$SD = 1.34$</td>
<td>$SD = 1.27$</td>
<td>$SD = .88$</td>
</tr>
</tbody>
</table>

<sup>a</sup> Really smart students do not have to work as hard to do well in school.

<sup>b</sup> If a person tries too hard to understand a problem, he or she will most likely end up being confused.

<sup>c</sup> If two people are arguing about something, at least one of them must be wrong.

A Bonferonni post-hoc test failed to find which of the pairs was responsible for the difference. However, as a significant difference had been found, and there were only three pairs to analyze, a Fisher’s Least Significant Difference (LSD) test was appropriate (Howell, 2014). The LSD test found significant differences between pairs for each question.

**Q8 IA: Really smart students do not have to work as hard to do well in school.** The Fisher LSD test found a significant difference $(p = .021)$ between the Planning group ($M = 3.10$, $SD = 1.37$) and the Not Planning group ($M = 2.27$, $SD = 1.34$). The effect size was medium ($d = .61$). Although definite conclusions from this data cannot be drawn, the finding suggests that
students planning on complete a PLA portfolio are more likely than those who have no such plans to believe that “really smart students do not have to work as hard to do well in school” which could be of interest to PLA researchers and practitioners. Portfolios themselves often require multiple revisions, and the possibility that the very students who seem most attracted to the process might be especially inclined to believe that intelligence can be measured by the amount of work needed to succeed is troubling. Such students may require specific interventions by PLA staff, as students who are initially unsuccessful at meeting portfolio requirements could be especially prone to forming a poor self-image as a student, and/or potentially abandoning the portfolio effort.

**Q9 QL: If a person tries too hard to understand a problem, he or she will most likely end up being confused.** The Fisher LSD test found a significant difference ($p = .02$) between the Completed group ($M = 1.96, SD = .90$) and the Planning group ($M = 2.72, SD = 1.36$). The effect size is medium ($d = .66$). The Fisher LSD test also found a significant difference ($p = .05$) between the Completed group ($M = 1.96, SD = .90$) and the Not Planning group ($M = 2.62, SD = 1.27$). This effect size was also medium ($d = .59$).

These results indicate that students who had completed portfolios were less likely to believe trying hard to solve problems will make one confused than students from either of the other two groups. This finding suggests that successfully engaging in the portfolio process does result in more sophisticated beliefs about problem-solving. Beliefs about the solvability of problems have not been previously studied regarding the PLA portfolio process. Although previous PLA research (LeGrow et al., 2002) found that problem-solving ability was increased through the completion of portfolios, increased belief in the solvability of problems suggests that portfolios can be an effective method for increased epistemological sophistication that other
developmental theorists (Perry, 1999; Baxter Magolda, 1992) have attributed to completion of traditional college coursework and curricula. Although the mechanism by which this development is facilitated is unclear, these findings suggest that engaging in portfolios have some of the effects that proponents have suggested. They also suggest that problem-solving is an area that should be studied more extensively regarding PLA portfolios.

**Q19 CK: If two people are arguing about something, at least one of them must be wrong.** The Fisher LSD test found a significant difference \( (p = .026) \) between the Completed group \( (M = 1.26, SD = .59) \) and the Planning group \( (M = 1.72, SD = .80) \). The effect size was medium \( (d = .65) \). It also found a significant difference \( (p = .043) \) between the Completed group \( (M = 1.26, SD = .59) \) and the Not Planning group \( (M = 1.69, SD = .88) \). The effect size was also medium \( (d = .57) \). As with the previous question, the finding that students who have successfully completed portfolios are less likely to believe that that one side must always be wrong in argument than either of the other two groups also lends support to the contention of PLA proponents who argue that the process helps build critical thinking and more sophisticated epistemologies overall.

Although the overall means between the Completed and Not Planning groups were similar for all questions, the findings on these two questions suggest that completing portfolios does increase sophistication in the areas of problem solving and critical thinking. This is an important finding that supports the use of PLA portfolios in facilitating the epistemological development of adult undergraduates.

**Factor Analysis**

Finally, an attempt was made to determine whether the original EBI factors were descriptive of this sample of adult undergraduates, or if a new pattern of factors might emerge.
This analysis was especially important because the EBI was originally developed through and for use with traditional undergraduates (Bendixen, Schraw, & Dunkle, 1998). As adult undergraduate epistemologies have not been studied, they may display different patterns that have not yet been uncovered.

An exploratory factor analysis with a varimax rotation of results was performed on all thirty-two questions of the EBI for all three groups, as well as for the overall sample. Individual items were loaded into only one factor. The rotation failed to converge for the full group, suggesting that the EBI’s five factors were not adequately captured by this group, raising the question of whether the EBI is an appropriate instrument by which to measure the epistemologies of adult undergraduates. It is not clear that the way the authors of the survey have defined epistemological sophistication is an effective or accurate way of conceptualizing the epistemological beliefs of this population, which may have very different life and learning experiences than the traditional-aged undergraduates on which the EBI was initially developed.

Factor analyses of the three groups did reveal patterns of factors that were somewhat consistent with the original EBI factors, although the factors were expressed differently for each group. This suggests that each of the three groups is distinct regarding which questions accounted for the most variability within each group. Table 2 below shows the factor loadings for all three groups with an initial Eigenvalue higher than two (scree plots for all three groups suggested that Eigenvalues over two made up the fifty to sixty-five percent of the variance for each group).
Table 3

*Factor Analysis Results by Participant Group (Eigenvalues > 2)*

<table>
<thead>
<tr>
<th>Participant Group</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td>Q10 SK</td>
<td>Q17 IA</td>
<td>Q9 QL</td>
<td>Q2 rCK</td>
<td>Q1 SK</td>
<td>Q23 CK</td>
</tr>
<tr>
<td></td>
<td>Q18 SK</td>
<td>Q27 OA</td>
<td>Q31 rCK</td>
<td>Q6 rCK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q20 rOA</td>
<td>Q26 IA</td>
<td>Q23 CK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q13 SK</td>
<td>Q5 IA</td>
<td>Q30 rSK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4 OA</td>
<td>Q28 OA</td>
<td>Q12 IA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning to</td>
<td>Q4 OA</td>
<td>Q26 IA</td>
<td>Q18 SK</td>
<td>Q31 rCK</td>
<td>Q1 SK</td>
<td>Q25 CK</td>
</tr>
<tr>
<td>Complete</td>
<td>Q6 rCK</td>
<td>Q15 IA</td>
<td>Q29 QL</td>
<td>Q10 SK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q7 OA</td>
<td>Q5 IA</td>
<td>Q23 CK</td>
<td>Q8 IA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3 QL</td>
<td>Q24 rSK</td>
<td>Q28 OA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Q16 QL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Planning to</td>
<td>Q29 QL</td>
<td>Q12 IA</td>
<td>Q1 SK</td>
<td>Q11 SK</td>
<td>Q9 QL</td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>Q31 rCK</td>
<td>Q5 IA</td>
<td>Q7 OA</td>
<td>Q10 SK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q19 CK</td>
<td>Q21 QL</td>
<td>Q17 IA</td>
<td>Q13 SK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q18 SK</td>
<td>Q16 QL</td>
<td>Q15 IA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q25 CK</td>
<td></td>
<td>Q14 rCK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q20 rOA</td>
<td></td>
<td>Q3 QL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q28 OA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Several patterns (and one distinct non-pattern) emerge from these results.

**Pattern #1: Innate Ability’s importance to all groups.** The Innate Ability dimension measures the extent to which participants believe that the ability to learn is acquired at birth. All
three groups have clusters of Innate Ability questions in the second factor. This finding suggests that questions about whether the ability to gain knowledge is innate were important in accounting for variance within all three groups. It also suggests that the Innate Ability dimension as originally constructed by the creators of the EBI seems to cohere for this sample. This is consistent with other research that has found that the Innate Ability dimension is the most stable of the EBI’s dimensions (Debacker et al., 2008).

Whether or not the ability to learn is innate or not is directly tied to questions about whether the ability to learn can be improved, and to what extent it can be improved. Although a significant amount of research has been done on the consequences of whether one holds a fixed view of intelligence or a “growth mindset”—most of which has built upon research and ideas pioneered by Carol Dweck (Dweck and Leggett, 1988)—very little research has been done on growth/fixed mindsets in adult undergraduates. There is likelihood that adult undergraduates with work experience (many of whom may be returning to college after an aborted previous attempt) may have very different beliefs about whether one’s intellectual capabilities are fixed than traditional undergraduates, to say nothing of the primary and secondary school children who have served as the basis of many studies on fixed/growth mindsets (Han & Stieha, 2020). In fact, choosing to attempt an undergraduate degree as an adult may be evidence of epistemological belief that the ability to learn is neither innate nor fixed, especially for those who were not successful the first time around; if one believes the ability to learn is innate and cannot be improved, one may be less likely to attempt a degree a second time. Since many portfolio students are returning to undergraduate study after many years away, to what extent previous negative experiences may impact their current epistemological beliefs, as well as how any
intervening work or life experiences may be mitigating those effects may be especially important to determine.

**Pattern #2: Epistemological similarities and differences between Completed and Not Planning groups.** Another discernable pattern from the factor analysis is that the Completed and Not Planning groups both have clusters of Simple Knowledge and Certain Knowledge accounting for high percentages of variance. This finding underscores the previous findings regarding the epistemological similarities of these two groups. However, the placement of these clusters is reversed within these groups themselves: The Completed group has a cluster of SK questions in its first factor, while the Not Planning group has a similar cluster in its fourth factor. The Not Planning group features a cluster of CK questions in its first factor, while the Completed group shows a corresponding grouping in its third and fourth factors.

This finding is especially relevant considering how similarly these two groups performed on the five EBI dimensions, as well as their overall scores. Even if the two groups share epistemological similarity, it appears that the Completed group’s variance is more explained by questions of whether knowledge is simple, while the Not Planning group’s variance is more explained by questions of whether knowledge is certain. As the next chapter will explore, there is some evidence that a stance that knowledge is simple may be more important for those who have completed portfolios that require them to align their learning from experience to academic frameworks. This may be especially true for students who are asked to integrate theories or conceptual models with their learning from experience, as this process will require them to connect their learning in ways that may make beliefs that knowledge is composed of separate, discrete elements more difficult to sustain.
Although the Not Planning group may include a wide range of motivations for not pursuing a portfolio, determining why questions of whether knowledge is certain would be especially important to this group is more difficult. One possibility is that traditional coursework offers a particular type of epistemological certainty that a portfolio process does not. This interpretation is tentatively supported by the descriptive statistics, as the difference in CK means between the Not Planning (2.20) and Completed groups (2.13) is greater than the differences between these two groups for any other dimension. If elements of the portfolio process help students gain epistemological sophistication in this area, those elements should be identified so that PLA practitioners can understand how to best support students in navigating any potential challenges posed by these elements.

The Planning group contains no such clustering of either EBI factor, supporting the previous results that it is relatively dissimilar to the Completed and Not Planning groups in terms of epistemological beliefs.

**Pattern #3: Omniscient Authority questions in first factor.** A third pattern is the prevalence of Omniscient Authority questions in the first factor for each group. As shown in Table 3 above, each group has two OA questions in its first factor. As the OA factor was characterized by the least sophisticated epistemologies for all three groups, questions about external sources of knowledge seem especially important in the context of a PLA portfolio process that positions the learner as attempting to demonstrate his or her own expertise as “credit-worthy.” As discussed above, students who see knowledge as externally-located may struggle to demonstrate how their own learning is credit-worthy, or may see PLA advisors as knowledge-giving experts whose role it is to determine whether the learning they have demonstrated is “right” or “wrong.” As one of the goals of the portfolio process is to ostensibly
develop students’ beliefs that they themselves can be constructors of knowledge, PLA practitioners must consider adult undergraduates’ pre-existing beliefs in this area when developing processes and when advising individual students.

**Non-Pattern: The “planning to complete” group.** The Planning group is the most difficult to characterize in terms of factor analysis. Aside from the OA and IA patterns it shares with the other two groups, the factor analysis did not yield any additional clusters of original EBI factors. In fact, it seems to be mostly characterized by how little the original factors cohere in its groupings. For example, the Planning group’s third factor includes questions from four of the five original instrument factors, displayed in Table Four below with their respective mean scores and standard deviations:

**Table 4**

*Questions Loading Into Planning to Complete Group’s Third Factor*

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q18 SK - Things are simpler than most professors would have you believe.</td>
<td>$M = 2.69$</td>
<td>$SD = .96$</td>
</tr>
<tr>
<td>Q29 QL - Working on a problem with no quick solution is a waste of time.</td>
<td>$M = 1.31$</td>
<td>$SD = .47$</td>
</tr>
<tr>
<td>Q23 CK - The moral rules I live by apply to everyone.</td>
<td>$M = 2.17$</td>
<td>$SD = .92$</td>
</tr>
<tr>
<td>Q28 OA - People who question authority are troublemakers.</td>
<td>$M = 1.96$</td>
<td>$SD = .86$</td>
</tr>
<tr>
<td>Q16 QL - If you don’t learn something quickly, you will never learn it.</td>
<td>$M = 1.31$</td>
<td>$SD = .56$</td>
</tr>
</tbody>
</table>
Although these questions do not seem to have any immediate connection to one another, the group means for all five are below the Planning group’s overall means for the respective EBI factors. In other words, the Planning group was less likely to agree with these statements than they were with other statements belonging to those factors. At the same time, these questions accounted for a substantial amount of variance within this group, suggesting that how students answer them may be helpful in differentiating between students who may have epistemological beliefs that will be helpful for them in navigating the portfolio process successfully, and those whose beliefs may constitute a challenge to completion. If epistemological belief plays a role in whether a student can develop a credit-worthy portfolio—or how much they benefit epistemologically from the process—then understanding how students planning to complete portfolios answer the above questions may help PLA practitioners better equip them to navigate the process successfully.

**Summary**

Taken as a whole, the quantitative data suggests several differences in epistemological beliefs held by adult undergraduates who are and who are not pursuing PLA portfolios. All these potential differences should be important to those who support PLA portfolio work, and those who work with adult undergraduates in general. First, adult undergraduates from all groups seem less likely to believe that learning must happen quickly, but more likely to believe that knowledge is handed down by external authorities. This finding is especially relevant given the emphasis the PLA portfolio process places on student learning and expertise. If students believe that learning must be gained from external sources, they may be less equipped to articulate their own knowledge from experience, or utilize university supports in effective ways. Second,
although these findings were not statistically significant, there is a possibility that adult undergraduates who have completed portfolios and those who are not planning to attempt portfolios at all are more epistemologically similar as groups than either are to those who are planning to complete portfolios. This finding is potentially surprising to PLA professionals and researchers and bears further investigation. However, differences between groups on some individual EBI questions lend support to the idea that completing portfolios does increase epistemological development in the areas of problem solving and critical thinking, especially considering the statistical significance associated with these differences. Finally, although factor analysis suggests that the EBI itself may have weaknesses as an instrument for measuring adult students’ epistemological beliefs, the survey’s results suggest that adult undergraduates planning to complete portfolios may hold epistemological beliefs that need to be understood and accounted for by PLA practitioners for these students to successfully navigate the process.

**Qualitative Results**

The qualitative section of the study was designed to answer the research question “What are the experiences of adult portfolio undergraduates regarding tacit knowledge articulation and what impacts does this articulation have on their personal epistemologies during the portfolio process?” The instrument selected to answer this question was a semi-structured interview (Appendix B). Interview data was analyzed following a phenomenological design adapted from Colaizzi (1978) in which significant statements were extracted. The lead researcher then derived formulated meanings from these significant statements and organized these formulated statements into distinct themes.

There were four participants in the interviews. Although the number of responses was small, this group provided rich data in the form of 89 significant statements. These significant
statements were consolidated into 74 formulated meanings. This consolidation represents instances where two or more participants made statements that were so similar that they resulted in a single formulated meaning. There were fifteen such instances. These meanings were organized into five distinct themes, as seen in Table 4 below.

**Table 5**

*Number of significant statements and formulated meanings by theme*

<table>
<thead>
<tr>
<th>Theme</th>
<th>No. of Significant Statements</th>
<th>No. of Formulated Meanings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of learning/knowledge</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Challenges in articulating knowledge</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>Strategies for articulating knowledge</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Effects of the portfolio process</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Institutional supports and processes</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

**Theme 1: The Nature of Learning/Knowledge**

The nature of learning and knowledge was presented as something that can achieve a stable, unchanging status within oneself. “Once you know it, you know it,” one participant said, added that what they knew, they now knew they would “never forget.” Since learning comes from life experience, being an adult student entails an increased level of self-knowledge. This knowledge can be presented in discrete levels or stages to demonstrate it to an external reviewer, although one participant also discussed the presentation of their experiential learning as a creative act. The ability to construct such a process to meet the goal of earning credit, according to this participant, is part of what makes one a “self-learner.” In describing their thinking about
what the portfolio process was asking them to do, this participant reported: “I’m pretty good at just saying “Well, I don’t know what you’re expecting but I can make something here.”

Participants drew a distinction between experiential learning and the academic act, characterizing the latter as “putting words on something.” However, interactions with external evaluators can be validating, and sometimes add new insights to their own knowledge they expressed in their portfolios. This validation of their knowledge was particularly important given the fact that experiential learning, by its very nature, does not generally involve an external authority. One participant noted that “Part of self-learning without many mentors means that you don’t have someone mirroring and reflecting back to you understandings beyond your own,” and that their final evaluator had been able to “identify additional things that I didn’t identify and ask questions about things I had written that I wouldn’t have thought to ask.”

Theme 2: Challenges in Articulating Knowledge

For most participants, completing academic portfolios presents many challenges. Some of these challenges seem intrinsic to the process of presenting ones’ learning for external evaluation, although portfolio work can be as much about earning credit as articulating knowledge. The portfolio process is one in which students need to “prove” their knowledge, which causes anxiety regarding whether one’s experiential learning is the kind of learning the institution is looking for. Multiple participants noted that one specific challenge originated from the perception that they were likely to be more knowledgeable in their immediate field than their evaluators; however, one participant noted that even though they felt their knowledge was college-level, they were unsure if their writing ability would be “up to snuff.”

Alternately, one participant reported that the portfolio presented no challenge to their confidence and that they did not encounter any external difficulties in completing it. They
explained that they did not feel intimidated by the process, explaining “it was just what they required, and that’s what I did.” The main challenge for this participant was internal, in that they were asked to have clarity about their own expectations of their education.

Some challenges other participants reported were conceptual. Portfolios ask students to “name the what” of their learning, an unfamiliar task that can be difficult in the beginning. Comparisons to other college courses can be made, but as one participant pointed out, what if no such courses exist in their area of expertise? There is an individual aspect of each person’s learning which forces each student to ask, “What does the goal look like for me?”

However, some of the greatest challenges are not necessarily intrinsic to the process of articulating knowledge but are related to institutional navigation and the clarity of the instructions portfolio students receive. The institution itself seems unclear in what is looking for in a portfolio, requiring students to “pick stuff out” of their prior experience in a way that seems arbitrary, and the institution’s definition of what constitutes college-level learning can seem too broad. One student described how the very traits that they identify with success—their ability to deliver what is desired—was frustrated by this lack of clarity in both the process and the overall goal of the portfolio:

I was very frustrated . . . they weren’t clear as to what the process was. I had spoken to people either who had done it, or mentors who had some idea about it, but there was nobody that I could talk to, to say “Okay, so what exactly do you want?” Because I’m very analytical. I want to give you exactly what you’re asking for. I want to be clear. And I want to understand the process. And there was nobody to do that. So I kind of had to figure it out as I went. (Participant 1)
Another participant characterized the institution as seeming to intentionally withhold what it was looking for from the student, saying “I feel like it’s just ‘Hey write what you’ve learned. But you need to do it in a certain way. But we can’t tell you what that way is.” To this participant, there was a feeling of “making up the process,” which was not necessarily an entirely positive experience.

This lack of clarity can lead students to question whether the institution is actually interested in their knowledge, and to even consider giving up on the portfolio process altogether. As adult learners and professionals, participants had less time and an energy to navigate these processes than the institution seemed to assume they had. For one participant, the lack of clear communication from administrators was a sign that the institution was not interested in their knowledge:

So it was really like the administrators that oversee the process that kept kicking it back, and in my mind they aren’t the ones to kick it back because they don’t have the knowledge so they don’t even know what they’re reading. They don’t know, and I’m not sure that they cared what they were reading. You know what I mean? Like if I was that person I would be trying to understand what it is or ask some questions instead of kicking it back without any comments or feedback or something so that was really frustrating.

(Participant 1)

Eventually, the process devolved into what seemed like a battle of wills, where the participant was compelled to force the institution to provide the feedback necessary for them to complete:

It had got to a point, I was so frustrated that I was like “Oh my God, should I take a class? Should I have taken a class?” But I had already spent half the semester trying to develop these PLAs and get them approved that it was too late. Even my mentor was like
“Alright, why don’t you register for this class.” And I kind of thought about it. But then . . . I went to sleep that night and I woke up and I emailed him and I said “I’m not doing that. I’m doing this PLA. They’re going to have to tell me what’s missing, and I’ll do it.”

(Participant 1)

Because of the small number of interviews, it is unclear to what extent this experience is shared among portfolio students. Although not every participant reported this level of frustration with the process, even one who described the portfolio process as a “wonderful opportunity” that they “loved” described the lack of clarity in the process as their main challenge, and something the institution could improve upon.

**Theme 3: Strategies for Articulating Knowledge**

In the face of these challenges, students employ several strategies for articulating their knowledge. All participants identified their pre-existing strengths, either as writers or as professionals. In preparing to write, one participant identified their own strengths as the content of an imaginary college course, envisioning their portfolio as “the top things I would then teach, these are the top things I would have wanted to learn.” Focusing on what is valuable to the student themselves helps to provide the clarity necessary to succeed. Another participant characterized the portfolio as “writing down information” and explained that they approached it as a statement of who they were and what they hoped to gain from their education at the institution.

Portfolios can also be a description of how knowledge has been built experientially. One strategy is to explain how work in their professional area is performed, how that work has changed due to developments in their field or to external events, and how their learning has changed in response to those developments: “I talked about how I had to manage operations of a
homeless shelter while dealing with the pandemic, because it had changed so much. So I compared what it was before COVID and the measures we had to take once COVID hit.”

However, when participants envision their portfolios, they perceive that it is important to provide context for their learning, structure, and detail. One student described the PLA process as being “on the hot seat,” especially since they were aware that their evaluator might not have the same level of knowledge as they do in their field:

You’ve got to describe it in a certain way to get the credit by somebody else who’s reading it who doesn’t know anything about what I do. It’s sort of anxiety-provoking to be like “How do I structure all of this information?” and not only that but including enough information to make it worth it and not throwing in every minute detail that didn’t necessarily have an impact on what the reader was going to get. (Participant 3)

In order to provide the right balance of structure and detail, some students envision their portfolios as “how-to” documents, where they are walking their evaluators through the process of exactly how their work is performed. “I felt like I had to bring the person into where I was,” one participant explained. “Like I wanted somebody to read my PLA and be able to do the work, like to literally say ‘Okay, this is what that looks like.” However, another participant reported approaching their portfolio specifically not as a “how-to” document, but as a way to communicate the value of their knowledge.

**Theme 4: Effects of the Portfolio Process**

Although the portfolio process challenges adult students’ confidence, it can also build confidence if credit is earned. In some cases, this confidence stems directly from the comparison of one’s experiential learning to what is taught both in and out of academia, as the portfolio allows students to systematically make those comparisons. One participant who works in a craft
field noted that this was not an exercise that generally happens with experiential learning, but that it can be a valuable way to build confidence in one’s knowledge:

> Being able to sit and take the time – because I never would have otherwise – of comparing different education, academic programs – again it’s going to be between colleges and crafts guilds – and actually doing a side-by-side comparison of my knowledge in those gave me a lot more confidence of understanding where my knowledge is. The depth of my knowledge in areas. That are actually really crucial to me. But I had taken them for granted and yet also it helps to know how they stand up to the academic rigor of expectations at really great schools. (Participant 4)

The same participant reported that the portfolio allowed them to also understand where the “gaps” in their knowledge lay, a process that helped to verify what knowledge they did have. They explained that “as an adult without a college education, there’s always this weird thing of . . . ‘Well, that’s not where I’m at, that’s not what I accomplished.’ And so it does help to put more . . . confidence in the learning I’ve got. And then also open for me the holes that I didn’t know that I had at the same time.”

Multiple participants noted that the portfolio process had helped them to recognize that their skills were transferable and helped them understand the nature of the skills they had gained from the prior experience to begin with. In the words of one participant, the portfolio allows students to “take themselves out of the process” of their experience and “take a 30,000 foot view of what you’ve done and why you’ve done it and what skills you’ve gained.” In some cases, these skills were employed in multiple careers, and the portfolio process helped students see the similarities between these situations, even they had previously seemed disconnected from one another:
But then when I did the PLA, I realized that much of my experience helped me be successful at what I do now, because when I was doing garment manufacturing and production I had to think about each step. I had to think about where the garment was from conception to completion. And when I work with the clients, it’s the same thing. I have to work with them from where they are to self-sufficiency. And whatever that looks like in between, I need to make that happen. And it was the same way in garment production. (Participant 1)

The same participant noted that it was only because of the portfolio process that they considered how their previous career had informed their ability to be successful in their current one, partially because they had intentionally changed careers to pursue something more meaningful to them:

Because if I never had to write the PLA, I would not have probably looked at it comprehensively at all, because I had moved away from it. I had so resented the career that I didn’t even want to look at it. So I’m just trying to create this new career and this new life and didn’t want to look at what I had done. And it was one of the mentors at (research site) who said, “Well why are you doing PLAs about the work you do now? The work you used to do made such a difference also.” And I was like “Hmmm . . .” I didn’t look at it that way. (Participant 1)

In this way, the portfolio process provides an opportunity for students to understand how one’s prior learning has been integrated into their current professional lives, unlocking knowledge that they were unaware that they can share.

The portfolio process also provides moments of recognition about how previously-encountered theories were applied in practice, and how they might be applied in the future. One participant who worked in the healthcare field described how they worked on a project that had
incorporated a model called a “fishbone,” which was designed to help them see barriers to patient care in a sequential way. The portfolio process later enabled them to understand why this model was used, even if it felt superfluous in the moment, and how they might use it in other situations:

I do think I did learn why the systems are important and the way that we learn them and there were points where it felt like just niggly details that were unimportant and then it was like an Aha moment of like “Oh, now I see why we did it that way.” . . . I think when I took myself out of the actual process of doing the fishbone because it was part of the project but having to identify what the learning point was in that really helped me to go “Oh, you know this felt like it was just a redundancy of naming barriers to transplant but actually drawing it out in this way for someone who is more of a visual learner . . .” It also was done in a group so there were barriers that I knew nothing about that someone else on the team could say “Oh yeah, and this.” And so I think stepping out of the actual process, when I was doing the work I was trying to figure out how to overcome the barrier as opposed to giving me the skill to understand what that particular process was doing for us. (Participant 3)

The same participant noted that they have found themselves applying this reflective mindset in other situations, just in “smaller chunks.”

Not only does the portfolio process allow students to better understand their own learning, but also how that learning can be communicated to an external audience, especially one that is using an academic frame of reference. The portfolio itself can be thought of as a form of credentialing, and a way for students to communicate their knowledge and skills that puts them on an equal footing with those who earned degrees in a traditional way:
Now I feel more able to communicate with others what it is I’ve done in my past. Again, I don’t have a degree from RISD, which is a very easy and quick communication to somebody. That’s all that you need to say, you know? “I have a textile degree from RISD.” Without that, going through the PLA process has helped to give me the verbiage to communicate what my background is on a way that’s more easily understood by people who are communicating in that academic world that usually will simply be able to give the proof of degree. (Participant 4)

Even if the portfolio is not used as a form of credentialing, the skills one gains in learning how to present to a specific audience can carry over into one’s professional life in a more general way. As one participant noted, “I learned that it was essential to have excellent communication skills and that means the following: It means you have to know who you’re talking to, you know? Whatever the specifics are of that thing.”

Participants were not in agreement over whether having engaged in the portfolio process would cause them to approach future learning situations in a different way. Some participants reported that the portfolio provided them with ways to address the gaps in their knowledge the process had uncovered, or a greater appreciation for and ability to gain the most from new learning situations in general. One participant explained how the portfolio process had helped make them a more intentional learner:

I think, looking back, so much of the knowledge I have now, it wasn’t sought in a specific, intentional way. It spans a 25 – year period that some of it very much was but there a lot of things I find valuable now that they really weren’t intentionally sought. And so now I feel like I can make that process much faster, still through the discovery process, but also through knowing what I’m seeking at the time and setting intention and
goals and then specifically bringing in the resources, bringing in the people, and bringing in the time and materials to get there. (Participant 4)

Similarly, another participant reported that the portfolio process provided a sense of self-agency for their future coursework: “For me yes, I think it really created a structure that’s very helpful to know what you’re going to do and why you’re doing it rather than ‘Okay, go register for something.’” For this participant, the creation of the portfolio caused a change in their overall educational plan, and they noted that the process of having to articulate and refine their thoughts was something they might use in the future.

To really sit down and force me into saying, you know it’s like a company writing a mission statement, you know? It really is a process. You really have to sit down and analyze and dissect what it is that who you are, in a sense. And it seems similar to me, it’s like my mission statement. This is what I’m going to do. And if you think of it as a funnel, it really funnels you down, right down to the basics there. So I would probably attempt to use that structure again. It’s helpful that it’s forced, that it’s a requirement. I do think from a higher education standard, no matter what age you’re at, it’s a very good exercise. (Participant 2)

However, more than one participant responded that they did not feel that they would approach subsequent classes or other learning situations any differently than before they had constructed their portfolios. For one of these participants, the value of the portfolio lay not in changing their conceptions of knowing or learning, but in affirming the knowledge that they did possess, as well as its value:

No. I know what I know. But what I did discover was how comprehensive it was, let’s say. Like I realized “Oh my goodness, that was just something I did, but that made a
difference. Or that had a huge impact.” That’s what I got. I realized how much it contributed to the process or the space, you know. (Participant 1)

For this participant, the portfolio process also had the effect of making experiential and classroom learning even more distinct from one another. This did not devalue either form of learning, but did affirm the differences that this student saw in those forms: “I think that the things that I experienced . . . I could never be taught in a classroom. I’ll never be taught that in a classroom. That is on the ground running, and you know, that’s a different valuable level of learning.” Additionally, one participant drew a stark distinction between writing academic papers and writing a portfolio, explaining that “One doesn’t even have to do anything with the other.”

In general, the portfolio process did not seem to resolve questions of what college-level learning is or looks like. One participant, reflecting on the fact that the experience they based their portfolio on was particularly intensive, stated that “I’m not sure that living your life and doing things, maybe there’s other college-level learning, but it’s hard for me to think of other things in that way, I guess.” Likewise, another participant, in commenting on some the sample materials she had viewed in preparing to write the portfolio, expressed a similar lack of certainty on why some of them would be considered appropriate for university credit:

Some of the examples are like business communication. And then the example PLAs include emails written. Which, I guess maybe is something if a kid’s coming out of high school and doesn’t how to professionally communicate, that is a skill set that should be taught. But it’s a really weird thing to say “I know how to write an email.” You know? Some of the things that it looks like are given out as credit doesn’t seem like things that should be a question. But that’s probably why I’m also kind of missing it. (Participant 4)
In these cases, the participants made value judgements based upon their own professional and personal experiences, as the standards they have determined for their own learning seem to exceed those the institution used to define learning as credit-worthy.

**Theme 5: Institutional Supports and Processes**

Students report feeling like it was up to them to determine how to succeed on their portfolios. Even though all participants characterized PLA staff advising them on their portfolios as helpful and well-meaning, the help they provided was more in understanding the portfolio and university processes, rather than in supporting the student’s articulation of their knowledge itself. As one participant put it, “They couldn’t help me. They just critiqued. They just gave me feedback.”

Even if PLA staff are not helpful in supporting the articulation of knowledge, the understanding they provide is substantial and significant. At the research site, PLA staff who coach students through the portfolio process are known as mentors. Mentors serve as connectors to other parts of the university, provide needed resources, provide help understanding administrative processes and defining what learning might serve as an acceptable basis for a portfolio. They can also help students learn how to structure their writing, especially in the early stages of the process.

Good mentors were defined by all participants as those who were accessible in their communication, and direct in their instructions. One participant who had switched mentors explained that “I started out with one advisor and it was not a good match. I felt like I needed somebody to say ‘here’s how things are structured, here’s what you need to do.’” Their subsequent mentor was more effective, the student felt, because of their accessibility and their understanding of the challenges adult students face in negotiating university processes:
She was just really responsive to emails. She seemed to understand what I was asking. She was just very accessible. So I could say back to her “So here’s what I think you’re saying I need, is that correct?” She’s just been really accessible and approachable and has answered me really quickly. I think she gets that I’m a little bit insecure about the choices I’m making and so she knows that I need to say “Here’s what I think I want to do, is that okay?” And she answers me right away . . . she’s just been really supportive, which I really needed as somebody who had never been part of a bachelor’s degree specifically. You know I went to community college when I was 18 in 1982, you know? It’s a long time away. (Participant 3)

Although some of the help mentors provide is around “nuts and bolts,” such as citation rules, students also perceive them as valuable resources that function with the student in a collaborative way. Mentors seem to do this most effectively when they express belief in the students’ knowledge and skill sets, as in the following example:

What I found was that I had a mentor and I had a professor that were like my resources. They knew that I had certain knowledge and experience and they really believed in me, and they kept pushing like “You need to speak to this person, you need to speak to that person . . . Even if I had to re-send my question three times or send an email four times, at least I had somebody who believed in me and believed in the knowledge that I had and we just kept plugging along until the process was complete. (Participant 1)

Participants especially valued having a good mentor because having a good mentor was not seen as a universal experience for all students completing PLA portfolios. One participant who reported having a collaborative relationship with their mentor commented that “from what I understand from other people [the mentor] was wonderful” and that “Maybe I got lucky.”
Another participant who felt strongly that they had a very effective mentor characterized the support the mentor had provided for them “through a lot of conversation” as something should be more readily available for all portfolio students: “I see that other students aren’t having the same type of ‘this is what you need to do’... it could be so much better and more accessible for those of us who are still working, still trying to go back to school.”

Although not all institutions do so, the research site arranges for the final portfolio evaluator to meet with the students at the end of the process. Interactions with the final portfolio evaluator are also important, and – in the cases of the students interviewed for this study – positive and validating. Evaluators not only affirm that student learning is valuable through their credit determination, but also in how they approach their interviews with students. For one participant who had experienced a lot of frustration with the administrative side of the portfolio process, having her work finally reach someone who seemed to value her knowledge was a relief: “Once it got to the person who was assigned to evaluate it, by the time we connected, she was so happy to meet me because she could read how knowledgeable I was.”

Evaluators also provided new ways to look at student learning, both within the portfolio and potential areas for future exploration. One participant reported their evaluator as telling them “Oh you’ve got much more than you even realize,” and multiple participants earned more credit than they had additionally applied for based on these evaluations. One participant identified their evaluator as someone they wanted to maintain contact with as a resource for future learning in their area.

Regarding other institutional supports, multiple participants identified examples of previous successful portfolios as particularly useful. Only one participant had taken an online portfolio workshop, which they identified as helpful in understanding the overall goal of the
portfolio, even if the process itself remained nebulous. For others, these supports were not necessary.

**Summary**

The experiences of adult portfolio undergraduates regarding tacit knowledge articulation and its effects on their personal epistemologies are varied. On one hand, there is evidence that the articulation of tacit knowledge through the portfolio process does help develop students’ epistemologies. All participants reported the portfolio process as useful, although the nature of the benefit ranged from validation of one’s existing learning to an appreciation for how theoretical material can be usefully applied across contexts to a greater understanding of how future learning might be constructed. Whether this range of responses is due to divergent processes employed by different PLA staff at the same institution or the characteristics of the participants themselves is unclear. However, epistemological change does not seem to be a stated goal of the process, or at least not one that is emphasized to students. Those advising the process were reported as being most helpful for navigating university processes and getting started structuring the portfolio rather than as reliable guides for how to articulate knowledge.

Additionally, the challenges that students describe in navigating the portfolio process should be concerning to PLA practitioners. Even participants who were generally positive about their experience describe the lack of clarity regarding the portfolio as a significant barrier to their completion, and one participant who eventually succeeded contemplated abandoning the portfolio due to their frustration with university administrative processes. The strategies that students utilized to overcome these challenges, such as creating their own process, focused on the elements of their learning that were most valuable to them, and emphasizing their strengths, may in fact be those that provide the most benefit to student learning in the future and those that
institutions of higher learning hope that all undergraduates develop. But the fact that these strategies were perceived as necessitated by a lack of clarity and direction that seemed almost intentional from the students’ perspective may unnecessarily deter some students and leave even those who complete successfully to question both the process and its value to their future learning. Although participant experiences of final evaluation were all positive—and in at least one case, a significant part of the learning that accompanied the portfolio process—students who give up on their portfolios will not gain the benefits of such evaluations. One drawback of this study is that it did not involve gathering qualitative data from students who began portfolios without completing them, as such experiences seem important to understanding the depth and scope of the challenges that face portfolio students. The small number of interviews also leaves open the possibility that the interviews did not capture the full range of experiences even for those students who do complete portfolios.

The final chapter will explore ways in which we can understand this study’s quantitative and qualitative data in context of one another, as well as of prior research into epistemological development and PLA portfolios specifically. Implications for adult undergraduate education and PLA processes will be discussed, and directions for future research into these areas explored.
CHAPTER FIVE: DISCUSSION

At the end of chapter two, the following central ideas were distilled from the existing body of research regarding PLA portfolios, epistemological development, and tacit knowledge articulation:

- Adult undergraduates completing portfolio work may not necessarily fit developmental epistemological models that have been established by research on traditional undergraduates.
- At the same time, experiential learning theories generally applied to the PLA portfolio process may not necessarily describe the kinds of epistemological development that engaging in portfolios themselves may facilitate.
- Tacit knowledge articulation may be a way of conceptualizing what students are doing when they “write what they know” and this could have implications for how we might understand changes in epistemology for these students.
- Recent research on epistemological beliefs may provide a useful way of understanding both adult students’ epistemologies overall, and how these epistemological beliefs may change through engaging in the portfolio process.

The major findings of the quantitative portion of this study are that a) adult undergraduates from all groups were least likely to reject ideas that learning must be quickly to happen at all, but most likely to accept a view that knowledge is handed down by external authorities, b) adult undergraduates who completed portfolios and those who were not planning to attempt portfolios may be more epistemologically similar than either group is to those who are planning to complete portfolios, c) there is evidence that completing portfolios may increase epistemological sophistication in the areas of critical thinking and problem-solving, and d) adult undergraduates
planning to complete portfolios may hold a wide range of epistemological beliefs that may need to be understood and accounted for by PLA practitioners for these students to successfully navigate the process.

The major findings of the qualitative portion of the study are that d) there is evidence that the articulation of tacit knowledge through the portfolio process does help develop adult undergraduate epistemologies e) participants report that PLA staff advising the process are helpful for navigating university processes and structuring the portfolio, but need to be more reliable guides for how to articulate knowledge, and f) even participants who are generally positive about their experience describe a lack of clarity in the portfolio process as a significant barrier to completion.

As this chapter will discuss, the qualitative findings of this study generally underscore previous research on adult student experiences of the portfolio process. Although the concept of tacit knowledge articulation may not be explicitly employed at the research site or at similar institutions, interview data from this study adds nuance to earlier findings. On the other hand, the quantitative data runs counter to some commonly held conceptions of portfolio work. As such, the limitations of this study must be acknowledged before discussing these findings.

Limitations

Data was collected at a single institution, and participants self-selected for both the survey and the interview. The study captured the viewpoints only of those students most willing to share their epistemologies and portfolio experiences, potentially excluding important perspectives, especially from students who may have had negative experiences. Interview data was purposefully collected only from students who had successfully completed the portfolio
process, meaning that the qualitative portion of the study excluded experiences and perceptions of students who did not earn, or have not yet earned, credit.

Sample sizes for this study were small. The survey generated eighty-two responses. Although the sample was spread equally among the three targeted groups, a greater response rate may have yielded more robust statistical data. The qualitative portion was especially small; only four survey respondents were interviewed. Although there is significant overlap between reported participant experiences, additional interviews may have yielded different responses, especially if they had included students who were still participating in or had dropped out of the portfolio process. Since the study did not include those who had not completed or did not plan to complete portfolios, we know very little about the circumstances and factors that led to their decisions not to pursue or not to engage in this process.

Statistical analysis revealed that the Epistemological Beliefs Inventory (EBI) may have limitations as an instrument for measuring the epistemologies of adult undergraduates. Factor analysis failed to replicate the five original factors of the instrument (Certain Knowledge, Simple Knowledge, Omniscient Authority, Quick Learning, and Innate Ability). This suggests that the way survey authors have defined the components of epistemological belief may not be an accurate conception of adult epistemology. The EBI was created and tested on groups of traditional undergraduates, eighty-eight percent of whom were under the age of 22 (Bendixen, Schraw, & Dunkle, 2004). The greater life experience of undergraduates over 25 could mean that this population is epistemologically dissimilar from younger undergraduates not just in their degree of epistemological sophistication, but in how their epistemologies are constructed or develop.
Other research has suggested that the EBI may not be a consistent instrument even for traditional undergraduates. Debacker et al. (2008) found that the EBI, while performing better than some similarly constructed instruments for measuring epistemological beliefs, demonstrated lower-than-desirable internal consistency through factor analysis. Their research suggests that the Innate Ability and Quick Learning factors may be the most durable constructs from the EBI and other, related instruments, although they note that there is some debate regarding whether beliefs about learning are epistemological in nature.

This study did not collect demographical data outside of age. Therefore, it did not address questions of how gender, culture, or other elements of participant’s identities may affect their epistemologies or experiences in the portfolio process. As there is extensive research regarding how personal epistemology is affected by both gender (Belenky et al., 1997) and culture (Hofer & Bendixen, 2012), important elements of participant epistemology and experience in the portfolio process may not be uncovered by this study.

**Corroboration of Previous Studies**

EBI results indicated that the participants who had completed portfolios were, as a group, the most epistemologically sophisticated of the sample. This supports earlier findings that students derive epistemological benefits from engaging in the portfolio process. Brown (2002) writes that portfolios “enhance their abilities to engage in further self-directed learning projects” (p. 230) and impart “a greater role appreciation in the role of reflection in recognizing learning.” Brown (2003) found evidence for “the fostering of critical thinking skills through portfolio development” (p. 17). LeGrow (2002) found that students who had completed portfolios outperformed students who took traditional courses at problem-solving. Although the EBI data is complicated by other findings that will be discussed later in this chapter, it does suggest that
students who have completed portfolios have relatively complex epistemologies as compared to those who are planning to complete the process.

Interview data supports previous PLA research in several areas. Lamoreaux (2005) found that portfolio participants reported changes in themselves and in their self-views as learners, as did most of the interview participants in this study. Jimenez (2019) found that students experienced new learning as part of their portfolios particularly through the process of reflection and suggested that some of this learning may be transferable. This echoes the experience of participants in this study who reported that they have found or envision themselves using the reflective skills gained in this study in other contexts.

Interview data supports Sternberg et al. (2000) regarding conceptions of tacit knowledge articulation. Tacit knowledge was gained through professional experiences directly from the environment with little support from external sources; this concept is evidenced by one participant, who reported that “part of self-learning without many mentors means that you don’t have someone mirroring and reflecting back to you understandings beyond your own.” The tacit knowledge was often procedural, as evident with the participant who described how the portfolio process helped them to understand the skills they had employed working in the garment industry were similar to those by which they help homeless clients become successful self-advocates. Interview participants also reported that the portfolio process itself may help them solve difficult problems in the future through the application of relevant theories or models, as in the case of the healthcare worker describing their understanding of how the “fishbone” concept might be used in future collaborations. In this way, the portfolio process could be an example of what Matthew and Sternberg (2009) term a “reflection intervention” that can “make tacit knowledge explicit . . . and make it available for reflection” (p. 532). As the purpose of such interventions is to improve
practical problem-solving ability, it seems the portfolio process can serve such a purpose, at least for some students.

Participants in this study also identified the importance of mentors in advising and explaining the portfolio process, as well as the clear direction that “good” mentors provided. The relationship between the quality of the PLA experience and the abilities, characteristics, and philosophies of the institutional employees who interact directly with students is well-established (Hamer 2010; Travers & Harris, 2014). Conrad and Wardrop (2010) found that mentors can help students “find the relationship between the learning and the ‘target’” and “present their learning in appropriate language” (p. 11), both of which are reflected in participant reports that their mentors helped them structure their writing and identify acceptable experiential bases for their portfolios.

Unfortunately, this study also supports previous findings that the portfolio process can be unnecessarily confusing and off-putting to students, even those who complete it successfully (Pokorny, 2013). Although one participant identified the lack of clarity with the administrative arm of the process, another participant identified the portfolio task itself as unclear and confusing: “I feel like it’s just ‘Hey write what you’ve learned. But you need to do it in a certain way. But we can’t tell you what that way is.’” This statement strongly reflects Shalem and Steinberg’s (2006) description of the portfolio process as a “cat-and-mouse chase after invisible criteria” (p.97).

**New Findings and Implications for PLA Practice**

The major contribution of this study to PLA research is its attempt to discover what effect the portfolio process may have on adult undergraduate epistemology. Although some studies (Jimenez, 209; Lamoreaux, 2005; Stevens et al., 2010) have explored the student experience of
portfolios and their perceptions of change, no quantitative studies have been done on portfolio student epistemologies, and there is very little research on adult undergraduate epistemologies in general. In many cases, the findings from this study call conventional thinking on the benefits of PLA portfolios into question and can help inform the PLA portfolio practice. Interview data, although more in line with previous PLA-related research, also provides insight into the survey results and their implications.

**Quick Learning and Omniscient Authority**

Both for the entire sample and each individual group, the EBI found that all groups were most likely to disagree with statements that learning must happen quickly if it is to happen at all, but most likely to agree with statements that knowledge is handed down by external authorities. Differences between the total group means for these two factors were found to be significant using the Tukey HSD post-hoc test, and the effect size for this difference was large.

That adult undergraduates overall tend to disagree with the idea that learning must happen quickly is encouraging. Such an attitude might hinder the development of a “mastery-oriented pattern” (Dweck & Leggett, 1988) of learning that encourages the seeking and completion of challenging (p. 256). This pattern is generally associated with a “growth mindset,” a self-concept that encourages the belief that intellectual ability is malleable and can be enhanced by practice. Alternately, a “fixed mindset” is a self-concept in which ability is innate and fixed, and cannot be changed (Dweck, 2006). If one believes that one must learn quickly, then situations in which learning is slow to develop may be viewed as insurmountable challenges, discouraging any further engagement. As discussed in the previous chapter, the fact that adult students, who are often returning to higher education after an initial unfinished attempt (and at least two of the interview participants indicated this was the case for them), enrolling at
universities can itself be seen as evidence of a growth mindset, as the belief that they now have the abilities needed to be successful may indicate a stance that ability is malleable. Further evidence of the importance of this stance may be seen in the fact that the Innate Ability factor seems to cohere for all three surveyed groups, which supports previous research that found the IA category was the most durable among the factors (Debacker et al., 2008).

Most studies on growth vs. fixed mindsets have been done on primary or secondary students, or traditional-age undergraduates. In general, students with growth mindsets have been found to be more academically successful (McCabe et al., 2020), although studies have not often followed undergraduates past their first years (Limeri et al., 2020). Human Resource and Organizational research has found that growth mindsets are associated with a range of positive outcomes for both individuals and organizations, and that interventions can be designed to enhance growth mindsets within organizations (Han and Stieha, 2020). However, research suggests that for any interventions to be successful, instructors or facilitators must also hold growth mindsets (Han and Steiha, 2020). This echoes previous research showing that educators must be able to model and demonstrate epistemological complexity for students themselves to construct more sophisticated epistemologies (Fazey & Fazey, 2001; Ravindran et al., 2005).

Although this study suggests that adult undergraduates may hold some beliefs consistent with “growth mindsets,” PLA practitioners should attempt to understand portfolio students’ individual epistemologies to best support them in the process, and model such beliefs themselves. Undergraduate mindsets themselves can shift due to student performance, especially when encountering challenging content (Limeri et al., 2020). As portfolios can pose significant challenges to many students, PLA practitioners need to be aware to what extent portfolio students—even if they initially come to the process with beliefs we associate with growth
mindsets—may reassess such beliefs if they encounter confusing or unclear directions on how to successfully create a portfolio or fail to earn credit. One interview participant noted how the administrative aspect of the portfolio was so frustrating that they almost gave up on the process, perceiving that the institution “didn’t care” about their learning enough to ask questions or give constructive feedback. Although this participant later had a positive interaction with their evaluator and ended up earning credit, the prospect of a process that is meant to enhance student self-concept and development having the opposite effect should be sobering for those of us who work in this field.

Evaluator relationships are also relevant to fact that, out of the five factors, students of all groups were least likely to reject statements that indicated knowledge is handed down by external authorities. Engaging in a process that requires them to “prove” that their knowledge is worthy of college credit may increase such beliefs. In fact, there is evidence that adult students may be more prone to viewing knowledge as externally generated than younger students. Research on first-year undergraduates showed that those who were older than 22 may need more reassurance and confidence-building than younger students and showed a stronger need to “demonstrate ability” (Fazey and Fazey, 2001). One interview participant identified their long time away from higher education as a source of anxiety, and that the portfolio process itself contributed to that anxiety, at least temporarily.

Such anxiety is understandable, especially considering the power that the evaluator holds for determining if the knowledge demonstrated is worthy of credit and meets academy standards. Hamer (2010) points out that unsuccessful portfolio could potentially undermine the student’s self-worth and construct “an inadequate, unprofessional, invalid self” (p. 105). Although research on self-efficacy (Bandura, 1977) and loci of control (Rotter, 1966) both indicate that
students who perceive themselves as having the power to affect their own destinies will tend to be more successful, a process in which students must present their learning from their professional and personal experience for evaluation may be potentially disempowering. The process may be especially fraught for students who are not strong writers, the fact that they cannot articulate their knowledge in writing could be perceived as invalidating the knowledge itself. If this is the case, these students have two choices: either see themselves as deficient, or to see the process itself as unfair or not relevant. As Fazey and Fazey (2001) write, “accepting responsibility for failure is not always healthy” (p. 358). The fact that all the interview participants earned credit (often more than they asked for) and reported positive interactions with evaluators should not detract from the possibility that many students may be having quite different experiences that need to be explored and understood.

**Epistemological Similarities Between Completed and Not Planning Groups**

The EBI found that students who had completed portfolios were most epistemologically similar to those who were not planning to attempt portfolios at all. Not only were these two groups’ overall scores extremely similar, but their scores on all five EBI factors were also similar, and in some cases almost identical. These findings were not statistically significant, but still worthy of further exploration. Since we know very little about adult undergraduate epistemologies to begin with, understanding how different credit pathways (portfolio or traditional coursework) affect students epistemologically, and what students are attracted to both options to begin with, is important in understanding how adult undergraduates develop epistemologically over the course of completing their degrees.

One explanation for these results is that students self-select for the portfolio process based on pre-existing beliefs and abilities and are not deriving the benefits reported from the
process itself. Peruniak and Powell (2007), while arguing that the PLA process does impart significant benefits outside of the awarding of credit, characterize it as a “crucial selection device” that most benefits “adult students who are probably already disposed toward academic success” (p. 100). Another possibility is that the portfolio process may help refine or develop certain academic skills but does not change student perceptions around the nature of knowledge. Interview participants in the qualitative portion of the study—all of whom successfully completed portfolios—identified themselves as either strong writers or as “self-learners,” supporting the idea that they may have been already in possession of many important academic traits, including the ability to reflect on experience or think critically about their own learning. Participants were split between those who claimed that the portfolio process did not change their attitudes about knowledge and those who indicated it gave rise to a better understanding of how one learns. In some cases, individual participants gave conflicting reports on this issue: For example, one respondent claimed that the portfolio process would not cause them to approach new learning situations differently, but also reported that it had made the learning process both “much faster” through “setting intentions and goals.”

Finally, the fact that both the Completed and Not Planning groups were more epistemologically sophisticated than the Planning group—although these differences were not statistically significant—raises a third possibility, which is that students who choose traditional coursework are, as a group, more epistemologically sophisticated than those who engage in portfolios, and that it is only by engaging in the portfolio process that the latter group “catches up” to the former. As portfolio students have been found to be more academically successful than traditional classroom students (Van Kleef, 2014) and to be better at solving certain types of problems (LeGrow, 2000), this possibility seems relatively unlikely. To what extent the
Completed group had also taken traditional coursework is also unclear, and so it may not be possible to disentangle the effects of the portfolio process from other academic experiences, to say nothing of external factors related to work or life experience.

Factor analysis did reveal a difference between the completed and planning groups. For the Completed group, questions related to whether knowledge is simple explained more variance, while more of the Not Planning group’s variance was explained by questions related to whether ‘knowledge is certain’. For the Completed group, an explanation for the importance of the Simple Knowledge factor might be that an important aspect of some portfolios is learning how to connect theories to prior experience. The belief that knowledge is complex may be more important for students who have been required to align their learning from experience to academic or other theories in their portfolios, as this may make it more difficult to perceive knowledge as composed of separate, discrete elements. One interview participant explained that the portfolio enabled them to see why the conceptual model of the “fishbone” was useful not only for the specific experience they based their portfolio on, but also for future ones.

On the other hand, previous research has shown that undergraduates in a human service field often view research and theory as extraneous and less important than their own personal experiences and beliefs (Anderson-Meager, 2014). This may be reflected in another participant’s contention that the portfolio process showed them that “I know what I know” and that one learns things through experience that can “never” be learned in a traditional course. If the portfolio process itself can produce these dissimilar results—a greater propensity to apply theory on the one hand, and a more emphasized division between personal and academic knowledge on the other—PLA practitioners will need to ensure that students, regardless of their personal epistemologies, are gaining the tools that relevant theories provide and how to employ them in
future learning situations. It is unclear what specific elements of the portfolio process might encourage epistemological development in this area; these elements should be identified so PLA professionals can intentionally communicate their purpose to portfolio students.

*Planning Group is Not Easy to Characterize*

The group of survey participants who plan to complete portfolios was characterized by two traits. First, they had the highest overall mean and highest mean for each individual EBI factor, indicating a less sophisticated epistemology than either the Completed or Not Planning group. Additionally, their factor analysis did not yield any of the original EBI factors outside of the Innate Ability factor that cohered for all three groups. That adult students planning to complete the portfolio process might hold less epistemologically sophisticated beliefs than those planning to complete only traditional coursework may be surprising to many PLA practitioners. There are multiple possible explanations for this finding, each of which requires exploration.

One possible explanation is that the Planning group is epistemologically diverse, containing both those with more sophisticated beliefs and those with less sophisticated beliefs. In this case, a lack of epistemological sophistication may be a factor in whether students are able to successfully complete the portfolio process, and so this group could include students who will not end up completing the process successfully. Further research is needed to determine what aspects of the portfolio process should be adjusted or emphasized to support students’ epistemological development in these areas. For example, students who show a propensity for the belief that knowledge is innate or that learning must happen quickly may be especially at risk for dropping out of the portfolio process. Likewise, students who believe that knowledge is simple may struggle to incorporate relevant theories in discussing their learning from experience. Factor analysis identified five specific EBI questions (Q18 SK, Q19 QL, Q23 CK, Q28 OA, and
Q16 QL) that loaded into this group’s third factor, suggesting that these questions accounted for a significant amount of variance for this group. Additionally, the group’s mean scores were lower than the group’s overall score for the original EBI factors to which the questions belonged. This may mean that students who answer these questions in particular ways represent those among this group who might be more likely to succeed on their portfolios. Requiring prospective portfolio students to take short surveys based around these or similar questions might help PLA staff identify student epistemological beliefs and any potential challenges these beliefs may pose to successfully completing a portfolio.

Alternately, students attracted to the portfolio process may in fact be those with less sophisticated beliefs. In this case, only by completing the process would a student develop more sophisticated beliefs. Portfolios are often advertised to students as a way for them to save money and earn credits more quickly, and so students are not necessarily choosing to undertake the process to develop epistemological sophistication. Exploring the different motivations held by this group may help us understand how their various epistemological beliefs affect their chances of developing successful portfolios. Although the LeGrow (2000) study suggests that portfolio students demonstrate increased problem-solving ability within a specific discipline, we do not know if this ability is a result of the portfolio process, or a characteristic that portfolio students bring with them. Although the latter suggests greater epistemological sophistication, we do not fully understand the connection between problem-solving ability and performance on a measure like the EBI.

In any case, this possibility raises two critical questions: What specific aspects of the portfolio process might be responsible for epistemological development, and what about the portfolio process might attract students with less sophisticated beliefs? Although attracting only
students with certain pre-existing beliefs should not be a goal of institutions offering PLA portfolio processes, answering these questions would allow PLA practitioners to emphasize the aspects of the process that will most support overall adult undergraduate development, both in how the process is advertised and implemented. Many adult students engage in portfolio work mainly to earn credit cheaply and quickly, reporting that any new learning gained is mostly incidental (Peruniak and Powell, 2007). Without denying the very real advantages of PLA for degree completion, it may be possible to signal to students more overtly the development and problem-solving skills they may gain from a portfolio.

A final possibility is that some part of the portfolio process could itself trigger an initial shift away from epistemological sophistication. Engaging in the process could cause students to gravitate toward less sophisticated beliefs than they held before beginning the process. This possibility assumes that at least some of the students in the Planning group had begun the portfolio at the time of taking the survey; exactly where Planning students were in the portfolio process at the time of the survey is unclear, but some of them may have been well along in the process, or had at least engaged in some initial portfolio planning.

Developmental stage models do allow for epistemological “retreat” (Perry, 1999). Although such regressions are often temporary for traditional-age students, they can sometimes be permanent, especially for students who have not previously met with academic success. We do not know enough about adult undergraduate epistemologies to understand what effect such a retreat might have on their overall development, or if all students who retreat during a portfolio process will necessarily shift back toward a trajectory of epistemological development. Nor do we know what aspects of a PLA portfolio might cause such a retreat, or what elements may help to make such a retreat a temporary part of the process. For interview participants in this study, it
is unclear if statements such as “I know what I know” and “what I learned I could never be taught” represent a kind of epistemological retreat into what Belenky et al. (1997) term “subjective knowing,” or affirmation of one’s own expert knowledge and experience, the shifting from “how one knows” to “how I know” that Baxter Magolda (2001) considers a crucial aspect of adult development (p. 119).

None of these possibilities have been thoroughly researched. Since they are not mutually exclusive, and since even individual students who are planning to complete a portfolio could have multiple factors influencing their epistemology, all of them warrant further exploration if PLA portfolio processes are to be accessible and meaningful for the wide array of adult students who attempt to use them. The Completed group has, for better or worse, finished with the process and the Not Planning group will most likely never engage with it. In this sense, those students who are planning to complete portfolios but have not yet done so are the only group whom PLA professionals are able to help. Whether epistemological retreat occurs or not, it is not difficult to imagine that a disappointing portfolio evaluation or acute struggles with the process—attended by feelings that “they couldn’t help me” and “they didn’t care,” as one interview participant reported—might have very high stakes for adult learners who are subjecting their professional and personal selves for review by an external authority. Porkorny (2013) describes the experience for two such students this way:

The two students had found the process confusing, alienating, and disempowering. The relationships they had with their tutors were monologic in nature and they struggled with this form of addressivity throughout the process. They also struggled on their own to interpret the learning outcomes in a way they found meaningful. There was no sense of agency for the students as they tried to fit their experiential knowledge into conventional
academic frameworks. Their interviews are dominated by discussions about the requirement to include the literature, conventional theory, and propositional knowledge. They both expressed a real sense of frustration that the evidence they could have included from the workplace was not considered a part of the process of meaning-making and remained invisible throughout the process. (p. 531)

**Recommendations for Future Research and Practice**

Thankfully, the above quote does not represent the experiences reported in this study. In fact, from one perspective, the interview participants in this study were model portfolio students who had exactly the experience for which many of us in the field would hope. They encountered uncertainty about what college-level knowledge is, relied on their mentors for advice on how to begin, and then found a way to create a process by which they not only earned credit, but also learned things about themselves and their prior experience. However, the fact that interview participants in this study all had positive outcomes should be viewed with caution. At least two of them, to varying degrees, found the process unclear and frustrating. Their mentors “couldn’t help” them, and the keys to success seemed intentionally withheld. Although it is unrealistic to expect that students feel absolutely no anxiety about demonstrating their prior learning, we should keep in mind that the interview participants represent those who were not only successful in their portfolios, but also willing to talk about them afterward.

If we want portfolio students to develop a tolerance for ambiguity during the process, then this should be clearly communicated. Expectations should be clear, and feedback on why a portfolio is not ready for evaluation should be detailed and actionable. Rather than feeling like they need to invent a process—although the ability to do so is certainly desirable, even admirable—students who have developed the ability to “give you what you want” should not go
through the process feeling like “what we want” is being intentionally withheld in the name of some higher, unspoken goal. If there are things we want students to learn through the process, they should be named and made explicit. We should not expect students to have them already, or to develop them incidentally.

In addition, we must gain a greater understanding of the epistemologies individual adult learners bring with them to the portfolio process, and how these change through engagement with the process itself. There is no study that has definitively shown that the process itself produces any change in problem-solving ability, or epistemological development, and it remains entirely possible that the positive benefits of PLA (increased academic success and higher rates of degree completion among them) are simply a matter of better-prepared self-selecting themselves for the process. As current research also shows that students from underrepresented populations have lower rates of uptake for all types of PLA (Klein-Collins et al., 2020), we also cannot ignore the fact that many of these better-prepared students may also have advantages in access to institutional resources, or to higher education overall.

To the end of better discovering adult undergraduate epistemologies and how the portfolio process may affect those beliefs, future studies might follow a specific cohort of students as they engage in the portfolio process. The EBI may not be the ideal instrument to do this, as factor analysis revealed that the instrument factors did not cohere, especially for the Planning group. However a few key survey questions, in combination with interviews, could be used to measure student epistemologies at specific points within that process to see how participant beliefs may be developing in response to the process itself. The inclusion of students who never ended up taking up the portfolio would be a useful comparison to explore the extent to which epistemological development through the portfolio process may or may not be parallel
to that which is facilitated by traditional coursework within the adult undergraduate population. At the least, studies similar to this one might include interviews of students from all three groups. Understanding why students with similar epistemological profiles (such as those demonstrated by the “completed” and “not planning” groups in this study) may or may not choose to engage with the portfolio process would provide important insights into the types of benefits students envision the process as offering, and to what extent they see themselves as in a position to take advantage of these benefits.

Additionally, concepts of tacit knowledge articulation can be employed to develop specific interventions within the portfolio process to see what effects these interventions have on problem-solving ability or overall epistemological development. Results from individual EBI questions do provide strong evidence that engaging in the portfolio process may facilitate epistemological sophistication in problem-solving and critical thinking, as posited by previous PLA-related research. Although there is tension between these results and the lack of difference in overall group means between the Completed and Not Planning groups, the fact that the individual question results are statistically significant seems to outweigh the findings of similarities between these groups. As a pre/post design was beyond the scope of this study, discovering the actual mechanisms by which portfolio students might benefit from these interventions would be integral to designing more effective portfolio processes that go beyond awarding deserved credit, but also deliver consistently on the promise of new learning that PLA proponents extol.

Final recommendations emerging from this study are as follows:

1. To understand better how engaging in portfolios affect adult epistemological beliefs, PLA researchers should employ cohort models that measure or describe
epistemological beliefs at various points in the portfolio process, including those of students who do not successfully complete.

2. PLA researchers should also employ specific interventions based on theories of tacit knowledge articulation within the portfolio process to see if these influence epistemological belief or portfolio completion. Specifically, students can be asked how they attempt to solve “ill-defined” or “practical” problems based on their learning from their experience, as well as what learning they have derived from those problem-solving attempts.

3. PLA practitioners should devise ways of understanding the epistemologies of adult students who are planning to engage in the portfolio process to better advise them to successful completion. This study suggests that particular types of questions may be important for understanding what kind of support students may need through the portfolio process:

   a. Questions about how students view their own ability to develop knowledge, as opposed to gaining it from experts.

   b. Questions about how useful students feel it would be to relate academic theories or concepts directly to their experiential learning.

   c. The three specific EBI questions identified as containing significant differences between groups:

      i. Really smart students do not have to work as hard to do well in school.

      ii. If a person tries too hard to understand a problem, he or she will most likely end up being confused.
iii. If two people are arguing about something, at least one of them must be wrong.

d. The five specific EBI questions making up the Planning group’s third factor as identified by exploratory factor analysis:
   
   i. Things are simpler than most professors would have you believe.
   
   ii. Working on a problem with no quick solution is a waste of time.
   
   iii. The moral rules I live by apply to everyone.
   
   iv. People who question authority are troublemakers.
   
   v. If you don’t learn something quickly, you will.

4. Institutions should strive to make portfolio processes clear and explicit regarding the new learning and skills students will develop through engaging in them. Rather than advertising PLA portfolios solely as a way to earn credit less expensively, universities should also present them as tools for epistemological development.

Conclusion

This study supports the contention that tacit knowledge articulation is the mechanism by which new learning is developed through the PLA portfolio process. It also suggests that problem-solving may be of particular importance to epistemological development. One promising direction for PLA practice appears to be the use of ill-structured problems, either as part of the prompts that portfolio students respond to, or as a way for them to conceive of the type of learning they are attempting to articulate through the portfolio process. Rather than employing broad concepts of “reflecting on past experience,” or “writing what you know,” PLA practitioners can instead ask students to engage in a specific type of reflection: thinking about
how they solve ill-structured or practical problems in their areas of expertise, and what they have learned from those experiences.

However, simply asking students about ill-structured problems will not be enough. Many of them may not even believe that such problems exist or will have trouble articulating how they have attempted to solve them. To support students in this task effectively, we need to learn more about what adult undergraduates at our institutions believe about knowledge, and themselves as knowers. The fact that very little research has been done on adult epistemologies means that we are prone to treating all portfolio students as if they are operating from the same sets of assumptions about knowledge, even though their ages, experiences, and exposure to constructivist or relativist concepts may vary wildly. Since even students with extensive workplace experience do not generally complete their entire degrees through the portfolio process, understanding these beliefs will help us support these students throughout their time at our institutions, both while they are engaging with PLA and in the traditional classroom.

Understanding and supporting those students who struggle to complete portfolios—or who don’t complete them at all—is especially important. If these experiences increase the likelihood of epistemological retreat or the reinforcement of negative self-concepts, we should plan for these possibilities and work to mitigate their effects. Otherwise, we risk further alienating those who may have had previous negative experiences with higher education, especially since the PLA process often comes with implicit promises that the institution respects and honors the very learning that these students then come to find is not acceptable for credit. The above recommendations offer steps for learning which specific aspects of the portfolio process might be challenging for these learners. In this way, we can ensure these vulnerable students are able to successfully complete their degrees and achieve both the benefits of
engaging in PLA portfolio work and the more expansive goals of undergraduate education the degree itself is meant to signify.
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Appendix A: Epistemological Beliefs Inventory

1. It bothers me when instructors do not tell students the answers to complicated questions.  
   **SK**

2. Truth means different things to different people. **CK-reverse**

3. Students who learn quickly are the most successful. **QL**

4. People should always obey the law. **OA**

5. Some people will never be smart no matter how hard they work. **IA**

6. Absolute moral truth does not exist. **CK-reverse**

7. Parents should teach their children all there is to know about life. **OA**

8. Really smart students do not have to work as hard to do well in school. **IA**

9. If a person tries too hard to understand a problem, he or she will most likely end up being  
   confused. **QL**

10. Too many theories just complicate things. **SK**

11. The best ideas are often the most simple. **SK**

12. People can not do too much about how smart they are. **IA**

13. Instructors should focus on facts instead of theories. **SK**

14. I like teachers who present several competing theories and let their students decide which  
   is best. **CK-reverse**

15. How well you do in school depends on how smart you are. **IA**

16. If you don’t learn something quickly, you will never learn it. **QL**

17. Some people just have a knack for learning and others do not. **IA**

18. Things are simpler than most professors would have you believe. **SK**

19. If two people are arguing about something, at least one of them must be wrong. **CK**
20. Children should be allowed to question their parents’ authority. OA - reverse
21. If you haven’t understood a chapter the first time through, going back over it will not help. QL
22. Science is easy to understand because it contains so many facts. CK
23. The moral rules I live by apply to everyone. CK
24. The more you know about a topic, the more there is to know. SK – reverse
25. What is true today will be true tomorrow. CK
26. Smart people are born that way. IA
27. When someone in authority tells me what to do, I usually do it. OA
28. People who question authority are troublemakers. OA
29. Working on a problem with no quick solution is a waste of time. QL
30. You can study something for years and still not understand it. SK - reverse
31. Sometimes there are no right answers to life’s big problems. CK - reverse
32. Some people are born with special gifts and talents. IA
Appendix B: Interview Questions

1. PLA portfolio students are often asked to “write what they know” or “write what they’ve learned.” What did you learn about “what you knew” that you didn’t realize before you began the portfolio process?

2. What was the biggest challenge you faced in articulating “what you knew”?

3. How did you go about communicating this knowledge in writing?

4. What was the most helpful part of the PLA process in articulating this knowledge?

5. Did you take an online portfolio class or an in-person workshop? If so, would you say it was effective in helping you articulate your knowledge?

6. Did you work specifically with a faculty mentor or other staff member? If so, were they effective in helping you articulate your knowledge?

7. Did articulating this knowledge through the portfolio change any of your perceptions about what it means “to know” something? If so, how?

8. Did articulating this knowledge change any of your perceptions about how you, personally, as a learner can “know” something? If so, how?

9. Has completing this portfolio changed the way you have approached your other coursework, or other learning situations in general? If so, how?

10. If you do feel change in your perceptions about knowing and learning, do you mostly perceive this in the subjects most related to the portfolio? Or has this change extended to other subjects or areas you are engaged with?

11. Is there anything you wrote about in this portfolio that you didn’t realize you knew before you began the portfolio process?