

A Reflection Upon Capstone ePortfolio Projects and Their Alignment With Learning Theories

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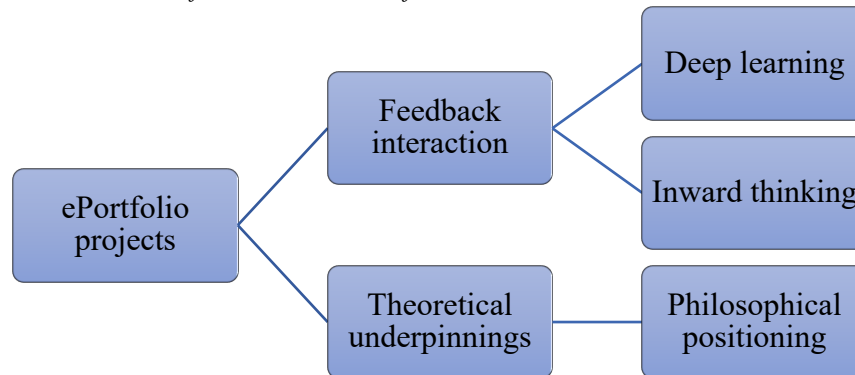
ePortfolios, initially viewed as a technology in 1990s, gathered momentum a decade later and began to position themselves as a powerful pedagogy in education. Experience over three years with five groups of intermediate-level English as a second language learners (before and during the pandemic) has cemented the notion that the core value of an ePortfolio is predicated on the ability of the students to become aware of their learning history. A blended course (with a capstone project in the fifth and final module) developed for a learning center in Canada helped make visible student engagement during peer-feedback interactions which led to critical reflection throughout the ePortfolio development process. In this paper, I (a language instructor) share direct practical experience implementing ePortfolios as a capstone project in five iterations of a blended course with five stand-alone modules. I also describe the evidence-based theoretical constructs undergirding the development of the projects and the interconnectedness with ePortfolio learning episodes in the designing, developing, and evaluating stages of the capstone project. As a robust field of inquiry and a digital transformation pedagogy, ePortfolio projects are part of a growing movement in the field of education. They are a substrate for a variety of learning behaviours among students, demonstrate alignment with some of the learning theories, and capacitate instructor and student philosophical positioning.

As a curricular and pedagogical innovation, capstone ePortfolio projects embrace authentic experiential assessment practices (Acosta & Liu, 2006; Barrett, 2007; Batson, 2018; Chen & Penny Light, 2010; Conrad & Openo, 2018; Hoven, 2014; Lorenzo & Ittelson, 2005; Pelliccione & Dixon, 2008; Penny Light et al., 2012; Smith & Tillema, 2003). As part of an open education movement, ePortfolio pedagogy is fair, interactive, and inclusive. Bates (2018) defined open education pedagogy as an approach to teaching that removes possible financial, personal, or physical barriers in a learning environment. As such, ePortfolio pedagogy is barrier-free—inclusive, interactive, and unique. Direct practical experience implementing ePortfolios as a capstone project in five iterations of a course for intermediate-level English language learners at a learning center in Canada has provided additional insights into this digital pedagogy. In a blended course of five stand-alone modules designed for English learners, the capstone ePortfolio project was the fifth module. During the course introduction and overview of the five modules, students became familiar with the idea of a capstone project in the form of an electronic portfolio (ePortfolio) as part of a final speaking assessment task. Although initially apprehensive regarding the use of technology, the students embraced the opportunity to highlight their learning in a digital project. In each of the four preceding modules, learning activities were available in the discussion forum where students posted artifacts to demonstrate their understanding of various concepts (e.g., paragraph structure). More often than not, student artifacts underwent several iterations after feedback from peers and course instructor was acknowledged and incorporated. Each learning episode consisted of activities supported by and aligned with

course competencies (Canadian Language Benchmarks, 2012), resources to connect with prior knowledge and substantiate assertions, interaction with peers and instructor to guide the learning process, and creation of artifacts to show evidence of growth. After the completion of the four modules, students chose artifacts in some of the competencies in each of the four language skill areas—listening, speaking, reading, writing—to include in their capstone ePortfolio projects in the final module. These projects, a substrate for feedback interaction, deep learning, inward thinking, and theoretical underpinnings, capacitate instructor and student philosophical positioning (Figure 1). In online environments, they act as “an enabler for increasing meaningful personal contact” (Feldstein & Hill, 2016, p. 26) and a place to reflect on learning to date (Barrett & Richter, 2018; Barrett, 2004; Batson, 2018; Chen & Patel, 2017; Eynon & Gambino, 2017, 2016; Eynon et al., 2014; Farrell, 2019; Hood, 2017; Hoven, 2020; Kuh, 2008; Penny Light et al., 2012; Stolins, 2017; Watson et al., 2016) as well as interact with instructor, peers, and course content (Moore, 1989).

During the project development, covert and overt behaviors are both experienced and articulated, thus providing further intuitive understanding of this innovative pedagogy. These observable actions demonstrate that the core value of ePortfolios is predicated on the ability of the students to become aware of their learning history resulting from purposeful feedback that leads to inward thinking and further learning. By posting various iterations of artifacts in the forum (e.g., drafts to show understanding of types of paragraph structure), students document their learning history which later underpins their reflection during the creation of their projects.

Figure 1
ePortfolio as a Substrate for Covert and Overt Behaviors



Reflexivity

It was during my master's studies at Central Michigan University (CMU) in the early-2010s that I underwent my first ePortfolio experience. The creation of the project compelled me to revisit the content of every course and the requirement for each assignment (what), evaluate the artifacts created in various formats (how), and reflect on the choices I made based on the knowledge available to me during each learning experience (why). I also began to question the implication of the new knowledge (what if?) for me not only as a graduate student but also as a person and as a professional. It was at this point in my learning journey that I realized that a more meaningful learning experience could be available in my practice if my students (i.e., a group of language learners and a group of college educators at the time) learned to create an ePortfolio project to present to their peers at the end of the course. I was also reminded of the educational principles of Bloom et al. (1956) and chose to further study ePortfolio pedagogy (knowledge acquisition) before introducing capstone projects in my practice (knowledge application).

Project Description

Since I had undergone an ePortfolio development process and was familiar with the creation of the product, I chose to implement capstone projects as the final task in an 8-week course I developed for college educators in the certificate of adult education (CAE) and in a 5-month program for students of English as a second language (ESL) at the same educational institution in Canada. What became salient at the time was that, during the initial stages of these projects, the feelings experienced by the college educators in the CAE program differed from the ones shared by the ESL

students. There were mixed emotions regarding the use of technology to learn among the CAE participants in a course that was first offered in-person and then via eTV with its final offerings being entirely online (even before the pandemic).

Modules for College Educators

The eight stand-alone modules developed for college educators were part of the final course in a 33-credit diploma program. The final assessment task was an in-person presentation of the first two pages of their learning ePortfolio—an introductory page and another with artifacts to show understanding and possible application of the learning theories in their practice.

Modules for Language Learners

The five stand-alone modules for ESL students were developed for teaching and learning that could be offered as blended or entirely at a distance. Unlike the cohort of college educators, this group of students chose to embrace the new course modality (blended), as it comprised innovative ways to show knowledge production. The first 5-month course (one module per month) for ESL students was offered in the spring of 2018 with subsequent ones in the fall and spring thereafter. The fifth and final offering of the course was in the spring of 2020 when the pandemic started. The experience of the 20 language learners pivoting from blended to entirely online learning on March 13, 2020 was smooth in terms of modality since the students were already comfortable with their online platform (technology). In this 5-month originally blended course, the sessions were online two out of 5 days a week; as such, the students were used to interacting and submitting learning activities openly via the discussion forum. However, the day a paradigm shift of seismic

proportion presented itself in the middle of the academic semester, the students had not yet been introduced to the web-conferencing tool adopted by the learning center. Stemming from this volatile situation, there was an immediate need to engage in a self-development process to fill existing gaps, first and foremost, related to a knowledge of (or lack of) technological skills. In order to ensure a smooth transition when the group pivoted to a new way of communicating (entirely at a distance), some of Mayer's (2009) theoretical principles were embraced in an attempt to properly apply the science of learning to distance education. As such, during the first COVID-19 weekend in mid-March 2020, the students received one slide with their instructor's photo and a personalized audio message containing instructions on how to join a class mediated by a web-conference tool (to which they had not yet been introduced). Information on how to create an account and claim a personal meeting room was also provided to encourage students to host meetings on their own. By then, the second module was half over, and two of the four groups of students had previously shared their learning-to-date in the form of a presentation in one of our in-person instructional days.

During the first fully online session on May 16, 2020, the students seemed calm and comfortable as they experimented with the new technology; a few members of various groups took turns uploading slides and sharing their screen in preparation for the remaining presentations later that week. The focus of these initial group presentations was to provide opportunities for students to conduct group research, interact with one another and course content, create and modify proposed timelines, show leadership, and manage projects in collaboration with peers.

Learning Episodes and Feedback Interaction

The topics covered in the first four modules of the course for ESL students ranged from concrete (e.g., introduction to blended learning and academic strategies) to more abstract concepts (e.g., critical thinking and transferable skills); Module 5, the final module, housed the capstone ePortfolio project activities (Zuba Prokopetz, 2020). A constant in the modules was the ongoing use of the discussion forum as a place to gather thoughts, submit coursework for feedback, and engage in co-construction of knowledge. Since the capstone in the fifth module would embrace the learning history from the term, students were aware that, during project completion, there would be a reliance on these learning episodes (pedagogy) and each other (interaction).

Stimuli-Response Approach. The learning activities in the first two modules were equal in format, number of tasks, and level of difficulty. The goal was to

have students embrace a new blended modality and to stimulate discussion and interaction with content and peers in the forum—the place where the community members gathered at least twice weekly. Since this course was designed for learners of English as a second language in Canada, the learning tasks in skill-building and skill-using had to be aligned with the guide (Canadian Language Benchmarks, 2012). Thus, students were required to show evidence of attainment of competencies in the four language skill areas: listening, speaking, reading, and writing. In order to introduce digital learning to this community of ESL students, digital resources were supplied to facilitate language learning (e.g., connecting words and paragraph structure) and serve as a model during the creation of artifacts (e.g., visualization of a concept). As students began sharing their artifacts in the forum, they engaged in peer-feedback interaction to learn from and show interest in the work of their peers. For each comment posted, there was usually another with affirmation and/or request for further information—a behavioristic approach to stimuli-response in a digital community of ePortfolio creators.

Social-Learning and Information-Processing Approach. Feedback, as a form of assessment (self-assessment and peer-assessment), was an acquired skill that was prevalent in many of the learning tasks in the course. This community comprised of 20 students, an instructor, and a few guests strengthened itself by embracing the notion that, albeit at different stages of a digital pedagogical journey, the skills of each member were equally valued. Ongoing modeling, as a form of knowledge transmission, was practiced openly in the forum. This example of social learning was strategically implemented to further enhance language acquisition and application since feedback and comments were provided in the form of complete sentences (e.g., “you may consider changing . . .”; i.e., use of a modal followed by a verb and gerund). Students overtly and covertly processed information by first acknowledging and then discerning prior to accepting or discarding the feedback received from their peers and instructor—the sense of student agency was prevalent throughout the course.

Embracing Differences and Modifying Legacy Mindset

The value of ePortfolios reaches beyond content learning and academic education—it is entrenched in a subculture in internet spaces (Zuba Prokopetz, 2021). Their merit resides in their transformational and emancipatory capabilities that may lead to a change in mindset and philosophical (re)positioning. For such transformation to happen, these projects necessitate proper implementation to enable students and instructors to rely on this impactful instructional

practice to demonstrate learning and teaching, facilitate connection of students with learning artifacts, and foster collaboration and interaction (Eynon & Gambino, 2017; Kuh, 2008; Watson et al., 2016). ePortfolio practitioners and proponents are among those who have experienced a positive change in the educational system—an academic structure that includes fairness, inclusivity, as envisioned by McNair et al. (2020), and flexibility in addition to proper application of innovation. These advocates have begun to adjust their theoretical and philosophical positioning to better align with a “new imagined ecology”—an environment that necessitates a modified curriculum (Batson, 2015a, para. 4). Still unrecognized by many is the notion that the focus of this evolving digital environment is on the human element rather than on the technical aspect. Technology, when properly applied, connects humans to each other and to information as well as to inward thinking to help usher in a period of transformation. Changes in processes of thought and perception of knowledge are both difficult and inevitable if we are to engage in a pursuit of growth mindset. As purported by Siemens (2006), “changes do not manifest themselves significantly in society until they are of sufficient weight and force” (p. 3); this line of thinking necessitates an ongoing pursuit of knowledge (Zuba Prokopetz, 2016)—an endeavor that is much more onerous for those whose mindset is fixed.

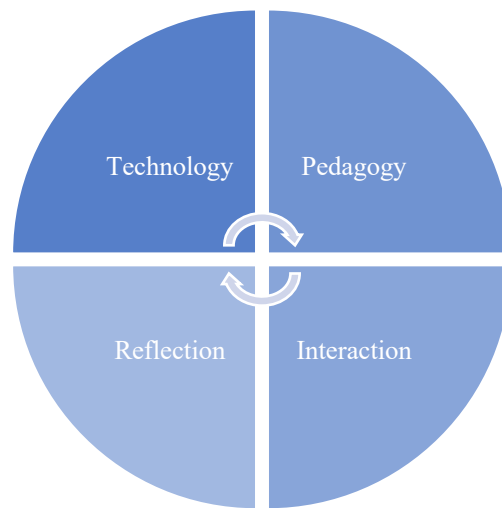
Modeling and Connecting Approach. Open discussions on content-specific topics in online forums, as I have experienced with my three groups of learners in the past decade—college educators, ESL students, and graduate students (in my doctoral studies)—seem to bring forth in the students a need to learn through observation and modeling (Bandura, 1977). In addition, since the rise of learning technologies has resulted in a certain mechanisation of the learning process (Harasim, 2017), this digital form of learning necessitates today’s educators not only to review the theories of learning that have stood the test of time but also to embrace—or at least learn about—the contemporary ones that align with learners in the 21st century (e.g., connectivism). These emerging learning principles help us better understand the contribution of social networks to a new pedagogical landscape since learning episodes are gradually moving learning theories into a digital age (Siemens, 2005). As purported by Cambridge (2010), there is research interest in learning and knowledge creation attained by participating “in social networks that is not sanctioned or initiated by institutions” (p. xiv); study results thus far have included topics related to “distributed cognition, emergence, crowdsourcing, long-tail communities of practice, and connectivist and networked learning” (p. xiv). Explorative research on these topics, as Cambridge (2010) suggested, would ground future scholarship. Long-tail communities of

practice, for example, rely on niche knowledge that is created, provided, and shared among members of a community that is broad and diverse enough to enable, as Siemens (2005) explained, connections via nodes that when altered “have ripple effects on the whole” (Networks, para. 1)—an endeavour that has similarities with ePortfolio communities as a subculture of internet culture (Zuba Prokopetz, 2021). Further research on how members of an ePortfolio subculture establish their agendas toward project completion would enable ePortfolio practitioners to gain additional knowledge related to ePortfolio pedagogy and alignment of theoretical underpinnings in course design. It is noteworthy to state that, as Yancey (2019) purported, curricular knowledge and practice aligned with ePortfolio composing differs from “models [that] require students only upload artifacts” (p. 2) during artifact creation that is not underpinned by the “selecting, designing, composing, and assembling—of the ePortfolio itself” (p. 3).

Theoretical Paradigms

I was introduced to the ADDIE Process of analyzing, designing, developing, implementing, and evaluating resources in my graduate studies (Zuba Prokopetz, 2012). It was only natural that when I began designing learning for online and blended spaces a year later, I would rely on this process originally created for the U.S. Army at the Center of Educational Technology at Florida State University (Branson et al., 1975; Watson, 1981). In addition, recognizing that the human brain is only able to process a certain amount of information at any given time, I also relied on a cognitive theory of multimedia learning as one of the foundations for my course design (Mayer, 2009) to properly facilitate and gently guide the online learning process of my students, who were college educators and ESL students at the time. I realized then that these theoretical paradigms seemed to align with the designing, developing, and evaluating stages I had experienced with my first ePortfolio as a terminal project at CMU. I also recognized that theoretical assumptions I may have made during my observation of different groups of students with their projects necessitate further research if they are to be substantiated. Thoughts similar to mine were most likely shared by early ePortfolio proponents whose feelings were “hampered by no prescription or even direction” (Cambridge et al., 2009, p. 2) of what might emerge when they attempted to implement ePortfolios in their practice. As we know, it was in the early-2000s when ePortfolios emerged as a reflective pedagogy; as a technology tool that disrupted instruction, it began positioning itself in a new educational movement

Figure 2
Evidence-Based Theoretical Constructs



Note. Adapted from “Electronic Portfolios: Research Site in Internet Spaces,” by R. Zuba Prokopetz, 2021, *International Journal of ePortfolio*, 11(1), p. 31 (<http://www.theijep.com/pdf/IJEP354.pdf>).

(Batson, 2015b; Cambridge, 2010; Eynon & Gambino, 2017; Ravet, 2005). Two decades later, the theoretical underpinnings necessitate going beyond the cognitive domains in order to align with the ways of thinking and learning in the 21st century. Comparable to the influence of the taxonomy on programming in the previous century (Bloom et al., 1956), ePortfolios have become prominent enough in education to be the driving force behind collaborative efforts to organize 21st-century-compliant instruction, authentic assessment, innovative programming, and competency-based learning episodes. Therefore, there is an effort to transform current education to make it more equitable, inclusive, and diverse. In consequence, there is a renewed awareness of the affective domain (i.e., human emotion) in addition to a more ecological approach to constructivism (i.e., human cognition) to better align with the new thinking processes of digital learners. My ongoing observations of three distinct groups of learners at various stages of their learning process (language learning program, adult education certification, graduate studies) spanning a decade has enabled me to examine the overlap of the cognitive and affective domains (Anderson et al., 2001; Bloom et al., 1956; Krathwohl et al., 1964) in the activities of the students, as they learned to rely on their capabilities during the development of their digital projects. It is noteworthy to mention the interplay of an ePortfolio process and theories of learning—classic and contemporary—in existence today. In my online ethnography with graduate students (Zuba Prokopetz, 2021), I noticed an alignment of different theories of learning with student behavior at

various stages of their capstone ePortfolio project—an aspect that was also salient in capstone courses with two other groups of students—language learners and college educators. As I continued my observations, I also became aware of how the technology influenced the pedagogy, and how the project development relied on both interaction and reflection. This interconnected set of constructs became even more salient as I observed different groups of students during their ePortfolio development. I was able to perceive an interplay of some aspects of the theories of learning with the constructs in Figure 2: technology (information processing), pedagogy (leveraging affordances), interaction (reproducing information), and reflection.

Constructs Underpinning ePortfolio Implementation

The capstone projects in the final module of a 5-month program of studies for ESL students were undergirded by evidence-based theoretical constructs that interconnected with the learning activities. Students relied on modeling from the course instructor (vicarious learning) and feedback from peers (social learning) during the creation of digital artifacts to show understanding of course concepts. As the course progressed, there was an apparent level of discomfort with the technology (i.e., the choice of platform for the project) which subsided after some of the eager students began posting the link to the first few pages of their project in the discussion forum. As argued by Shepherd and Bolliger (2011), despite challenges during ePortfolio implementation, students tend

to demonstrate the ability to help in the project development process of their peers. As a result, in each course, students from previous course iterations would be invited to present their projects and subsequently address questions and concerns related to their platform of choice. There was a visible manifestation of four key aspects in the planning and development of these projects: (a) learning the technology, (b) experiencing the pedagogy, (c) interacting with peers, and (d) reflecting on the learning to date (Figure 2).

Technology

In her research studies on digital immediate gratification, Renard (2005) reminded educators to keep pace with new developments in technology to better understand how the new generation learns. She alerted those involved with students in the institution of education about consequences of their “having to wait so little time for so much information” (p. 44). Since “technology can play a pivotal role in student learning” (Renes & Strange, 2011, p. 203), it would be of good judgement to implement an ePortfolio project to guide students when they apply technology to learn, as was the experience of various groups of ESL students in five offerings of a capstone project course. The choice of platform (what) and the process involved in creating and populating the pages of a collection (how) were initially the main focus of discussion in a class of language learners embarking on their first ePortfolio journey. This phase is where technology and pedagogy come into play and have a direct effect on each other. The ePortfolio technology, or platform of choice, provides opportunities for additional learning during the selection of artifacts and recollection of learning.

Pedagogy

Recent research projects sponsored by the American Association of Colleges and Universities (AAC&U) and the Center for Urban Education created at the University of Southern California focused on racial equity in higher education. McNair et al. (2020) are among the scholars who challenge educators to engage in institutional and systemic change as related to racial equity. They further posit that because our professional practice develops over a period of time, there is a need for “an honest assessment of . . . hidden biases” (p. xvi) pervasive in the institution of education. As a powerful pedagogy, ePortfolios facilitate critical reflection on what occurred (a form of reflectivity) and the perception of that occurrence (a form of reflexivity). By internalizing thoughts during the project development, project creators begin to embark on a journey of self-discovery—a pivotal point in the shift toward a more receptive mindset. Unlike some inward-

mindset people with ego-controlled thoughts, the receptive- and outward-mindset individuals derive energy from helping others. They rely on comments from peers (peer-feedback interaction) to be able to accomplish their objectives—in this case scenario, the completion of their projects.

Interaction

As subculture of internet culture, capstone ePortfolio projects become an agent for culture sharing; such culture, the learning and sharing within a community, strengthens with each course iteration (Zuba Prokopetz, 2021). Some of the characteristics of cultures, as suggested by Foster (1997), are the relationships generated and nurtured within a group during peer-interactions. These cultures become stronger with each successive course when students of previous course iterations return to share experiences with new cohorts of students who rely on the legacy of learners in previous courses (Zuba Prokopetz, 2019a, 2019b). Such interactions help students experience, as suggested by Wiggins and McTighe (1998), knowledge of self, and thus gain perspective of what they understand during their feedback interactions; in consequence, community members have a chance to deepen their ability to interpret ideas and empathize with feelings associated with the diverse experiences.

Reflection

As students perceive what may benefit them during their projects, they take part in reflection-in-action (i.e., engagement of thoughts at a certain point in time)—a time when action and reflection occur simultaneously (Schön, 1983). Their process of thinking back after the completion of an action and then reflecting on it was differentiated by Schön (1983) as reflection-on-action—which facilitates discoveries of possible outcomes. In the view of Barrett and Richter (2018), thoughts that are considered reflection-in-action are among those which may not have been properly formulated or even perceptible. The type of reflective thoughts that form the basis to an action was referred by Rose (2013) as reflection-then-action; collectively, such thoughts may help “restore personal and social balance, perspective, and mindfulness” and subsequently create “more space for reflection” (p. 31). These forms of reflection are both experienced and (well) articulated in online communities where the ePortfolio pedagogy is present—even in the ones where members speak English as another language. Opportunities for experiential learning unveiled to ePortfolio users may be attributed to many factors—learner characteristics, course content and design, and class size, among others. The ability and opportunities for students to reflect on

the learning-to-date, however, is closely connected with the theoretical underpinnings of the course per se and the positionality of the instructor.

Theoretical Underpinnings and Philosophical Positioning

As the development and expansion of the study of human learning continues, so too do ideas from various theoretical traditions “give rise to improvements in teaching and learning” (Schunk, 2012, p. x) in all educational settings, modalities, and age groups. Theoretical principles, as affirmed by Schunk (2012), along with the learning of new concepts and research findings, are (or should be) present in all learning and teaching settings. As such, educators, in their quest for professional self-development (Zuba Prokopetz, 2018) may consider engaging in a philosophical and pedagogical journey to gain new insights into their own learning process and of those who rely on them for guidance.

ePortfolio projects, a robust field of inquiry and a digital transformation pedagogy, are part of a growing movement in the field of education. They demonstrate alignment with many of the learning theories and capacitate instructor and student philosophical positioning. ESL students completing their projects (in a blended class and then entirely online during the pandemic) applied theories of learning ranging from behaviorism (from late-1920s) to constructivism (to late-2000s), thus demonstrating the theoretical alignment with various phases of an ePortfolio project development.

The eportfolio in capstone projects are a substrate for a variety of learning behaviours among students, which include

- stimuli-response behavior (Skinner, 1953; Thorndike, 1932; Pavlov, 1927),
- modeling behavior (Bandura, 1977; Schunk, 1981; Zimmerman, 1998),
- information processing behavior (Anderson, 1990; Baddeley, 2001; Loftus, 1991),
- individual and social constructivist behavior (Bransford et al., 2005; Bruner, 1966; Hatano & Ignagaki, 1991; Piaget, 1970),
- acts of reflecting on affordances in the environment (Hoven, 2008; Hoven & Palalas, 2016; Palalas, 2015), and
- social cultural behavior (Gauvain, 2001; Lave & Wenger, 1991; Rogoff, 1990; Vygotsky, 1978).

Thinking Metaphorically





Educators have been designing learning episodes for their students since their teaching practicum as

student-teachers in a traditional setting. They continue to do so online albeit in a modified format. In either modality, the learning activities, most likely created with a learning theory in mind, contribute to deep learning. To be both effective and meaningful, learning experiences necessitate a foundation ingrained in principles of instructional design which, in turn, are guided by theories of learning. Surface learning may prevail, however, in the absence of a theoretical foundation for such learning episodes. As posited by Christensen (2008), choosing a theoretical underpinning from the onset may be of help during the design of instruction, the analysis of learning tasks, and subsequent assessment of learning.

Regardless of the theoretical camp with which designers and educators associate, learning unveils itself in a gradual fashion during sense making—factual, analytical, and metacognitive (Marzano & Kendall, 2007). Moving from concrete knowledge up the ladder toward analytical thinking necessitates that the learners connect with content, instructor, and peers to provide co-construction of knowledge as an outcome. As Siemens (2006) suggested, learners “do not always construct (which is high cognitive load), but [they] do constantly connect” (p. 27). As we aim to construct knowledge, we make connections between what we understand and how we visualize that knowledge; as such, we may rely on metaphors to provide aid to our understanding. Bruner (1986) recognized that science is full of metaphors which are used as “crutches to help us get up the abstract mountain” (p. 48). As visual creatures, human beings are better at grasping information in graphic form than, if presented solely in words, may elude them (Mason, 2019). In consequence, the deployment of metaphors to help illustrate the various theoretical positions may help novice instructors who are learning to apply them. Relatedly, “while the theories suggest different ways in which all people learn, they do not automatically tell teachers or instructors how to teach” (Bates, 2014, Conclusion section); yet, they aid in grounding the teaching that may eventually take place.

Using vision as a means to thinking metaphorically, Christensen (2008) shared a heuristic framework to help with the identification of instructional problems and their connection to theoretical perspectives, methods of analysis, and assessment strategies. Relying on a number of metaphors to illustrate different theoretical views, Christensen (2008) shared assumptions on the nature of knowledge underpinning them. Figure 3 illustrates possible alignment of these metaphors with some of the learning theories from the standpoint of a language provider as experienced in various phases of a capstone project development in her ESL classes.

Figure 3
Learning Theories, Metaphors, and ePortfolio Project Development

Behaviorism	Social Learning	Information Processing	Constructivism
			 classroomclipart.com
Box: unveil artifacts	Camera: model actions	Computer: process choices	Rhizome: make connections

Note. Adapted from “The Role of Theory in Instructional Design: Some Views of an ID Practitioner,” by T. K. Christensen, 2008, *Performance Improvement*, 47(4), p. 27 (<http://dx.doi.org/10.1002/pfi.199>).

Learning Theories

Learning theories seem to undergird the various stages of the development of ePortfolios—from displaying the artifacts, and modeling (Bandura, 1986), to expressing agency and enabling connection.

As a digital learning site, eportfolios capacitate introspective learning that can be translated into overt behaviors such as attitudes and expressions of both satisfaction and frustration. This aspect of the experience, or affect, enables the user to emotionally interpret knowledge connected not only to content but also to each other (Huitt & Cain, 2005). These corresponding behaviours align with the information processing theory that frames the individual as a processor of information and also with social cultural theory that values the social environment and its influence on perceptions. ePortfolio events also connect with aspects of the Taxonomy of Learning Domains (Bloom, 1956) and principles of Ecological Constructivism (Hoven & Palalas, 2016; Palalas, 2015).

Having an at-a-glance view of the various theories of learning aid in the conceptualizing of where to position instruction to better support the learners in capstone ePortfolio courses. Concepts illustrated in Figure 3 help substantiate the notion of ePortfolios as a substrate for a variety of overt and covert behaviors among students—from selecting and displaying artifacts, to relying on modeling, and making connections. As illustrated in Figure 4, the development of capstone projects aligns with a number of the learning theories. It is our sense-making toward an understanding of these theories that helps unveil our philosophical and pedagogical beliefs. These intentional acts of inward thinking will subsequently have an impact on future practice, and, as posited by Ragan (1999), cause sustainable changes in behavior.

Philosophical and Pedagogical Beliefs

The development process of ePortfolios is intense; as such, it provides the proper terrain that capacitates

instructor and student philosophical positioning. When we hold on to nonsense during our sense making, we engage in what Homes (2015) suggested as the power of not knowing. By letting go of our fixed mindset, we enable some form of change to happen, so we can embrace a mindset that embodies growth. In consequence, we may start to find comfort (rather than distress) when, as vulnerable beings, we allow for expressions of confusion during, as Homes (2015) described, moments of “nervous laughter, embarrassed smiles, . . . hesitations, and perplexed glances” (p. 2). Adherence to a pedagogical stance adds another pillar of support for educators as they attempt to reach out to their students at a distance. Identifying our own philosophical and pedagogical positionality has become even more prominent now that we search for an anchor to help us keep our bearings in—what is for many—still a new landscape.

Axiological Approach

My axiological assumptions became salient during the online interactions of the students with their ePortfolio projects in the Discussion Forum. My co-presence within the setting caused me to develop a solidarity with the participants in the course (Hine, 2016), albeit temporarily, and thus start to influence some of their choices. As such, as the course instructor and an ePortfolio creator and user, I made an effort to be cognizant of the personal values I brought along with me (Creswell, 2013) during the feedback interactions and the various student iterations of their projects. I achieved a less partial view of what I was seeing, hearing, and experiencing by engaging in a process of reflecting on myself—my motives, actions, and beliefs. As “part of [a] digitally mediated classroom space” (Cicchino et al., 2021), both ePortfolios and the discussion forum necessitate that members of the academy, as suggested by Coley (2012), possess a certain level of literacy in digital ethics—I aimed to demonstrate mine as I modeled

Figure 4
Learning Theories: Possible Alignment With ePortfolios

Theories	Theorists	Alignment With ePortfolios
BEHAVIORISM	Ivan Pavlov (1927) B. F. Skinner (1953) Edward Thorndike (1932)	<ul style="list-style-type: none"> • Stimulus, response, and reducing unproductive behaviors
Behaviorism main metaphor: Black box		<i>(Showcasing artifacts)</i>
<ul style="list-style-type: none"> • Role of performer: Student obtains and shows use of knowledge 		
-ePortfolio: Showing behaviors that lead to certain outcomes		
SOCIAL LEARNING THEORY	Albert Bandura (1977) Dale Schunk (1981) Barry Zimmerman (1998)	<ul style="list-style-type: none"> • Modeling, incentives, and reciprocal causation where behavior is controlled by self through cognitive processes, environment, social events
Social learning theory main metaphor: Video camera		<i>(Reproducing information)</i>
<ul style="list-style-type: none"> • Role of observer: Copies knowledge from others 		
-ePortfolio: Modeling during peer-feedback interaction to help trigger reflection		
INFORMATION PROCESSING THEORY	Joan Anderson (1990) Alan Baddeley (2001) Elizabeth Loftus (1991)	<ul style="list-style-type: none"> • Individual (similar to a computer) is a processor of information • Possible to study the internal mental processes that lie between the stimuli (environment) and the output (response)
Information processing theory main metaphor: Computer		<i>(Choosing what to apply)</i>
<ul style="list-style-type: none"> • Role of processor: Strategizes to obtain and use knowledge 		
-ePortfolio: Learning the technology to develop the capstone project		
CONSTRUCTIVISM: INDIVIDUAL AND SOCIAL CONSTRUCTIVISM	John Bransford (2005) Jerome Bruner (1966) Giyoo Hatano (1991) Jean Piaget (1970)	<ul style="list-style-type: none"> • People construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences • People understand better together
ECOLOGICAL CONSTRUCTIVISM	Debra Hoven (2008) Aga Palalas (2015)	<ul style="list-style-type: none"> • Engagement in the internal reflection aspect of learning • Perception of the affordances in the environment
SOCIAL CULTURAL THEORY	Mary Gauvain (2001) Jean Lave (1991) Lev Vygotsky (1978) Barbara Rogoff (1990)	<ul style="list-style-type: none"> • Importance of social environment in one's development • View of how cultural backgrounds influence thoughts, behaviors, perceptions
Vygotsky's Theory of Cognitive Development		
Constructivism main metaphor (cognitive and social): Rhizome		<i>(Reaching out to others)</i>
<ul style="list-style-type: none"> • Role of explorer (cognitive): Discovers knowledge by interacting with the environment and others in it • Role of collaborator (social): Makes sense of knowledge by negotiating, collaborating, interacting socially 		
-ePortfolio: Finding congruence in their own experiences with the affordances of the environment		

Note. Adapted from "The Role of Theory in Instructional Design: Some Views of an ID Practitioner," by T. K. Christensen, 2008, *Performance Improvement*, 47(4), p. 27 (<http://dx.doi.org/10.1002/pfi.199>); "Resolving Conflict in Distance Education Situations: Changing Roles to Break Down Barriers" [Paper presentation], by D. Hoven, 2008, ALT-C Conference (<https://www.slideshare.net/debrah/alt-c-pres08hoven>); *Essentials of Educational Psychology* (pp. 19-20), by J. E. Ormrod, 2009, Pearson; and, "The ecological perspective on the 'anytime anyplace' of Mobile-Assisted Language Learning," by A. Palalas, in E. Gajek (Ed.), *Technologie Mobilne w Kształceniu Językowym* (pp. 29-48), 2015, Texter.

certain behaviors. As Penny Light et al. (2012) pointed out, various stakeholders can benefit from the “learning that is being documented in ePortfolios” (p. 21). This meaningful personalized documentation may be used to underpin good practices “to address not only today’s learners but also the complex problems faced by our ever-changing society” (Penny Light et al., 2012, p. 23). Among the performance standards the authors recommend for practice across the curriculum are civic and intercultural knowledge, ethical reasoning, and lifelong learning.

Ontological Approach

As members of an online language community, our activities encompassed many realities constructed through interactions which aligned with a social constructivist approach (Creswell, 2013). As an ontological view on the access to reality, interpretivism aligned with my seeing the reality of the course participants through many perspectives. There was a sense of being there—with the students and their projects—which helped me rely on first-hand accounts of these rich activities (Hine, 2016). My role was to immerse myself in the *vivencia*, or life experiences (Fals Borda, 1997), of this online community of language learners in the final module of their 5-month, five-module program of studies. During times of questions or concerns, my personal way of seeing contributed toward a more authentic report on the different views of our realities (Creswell, 2013). I aimed to position myself as a personally and socially responsible instructor and to apply ethical reasoning and action (Penny Light et al., 2012) throughout the term.

Epistemological Approach

My epistemological view on the nature of knowledge—as a proponent of constructivism/interpretivism—is that knowledge is experienced in a subjective way; it is dependent on a personal belief, opinion, and preference. Knowledge can be shaped by individual efforts (Creswell, 2013) at each stage of a learning journey. Throughout the project development phase, I made attempts to understand the complexities of the activities from the point of view of the students (Schwandt, 1994). As Creswell (2013) suggested, proponents of this epistemological philosophy develop “varied and multiple” (p. 24) subjective meanings of their experiences; they “look for the complexity of views rather than narrow the meanings into a few categories or ideas” (p. 24). Based on that perspective, I adopted a more ecological constructivist approach (Hoven & Palalas, 2016; Palalas, 2015) to show that I

was letting the student interactions inform my views of what I perceived as affordances of their online environment. The lenses through which we interpret our participation in student ePortfolio experiences align with our identity and help us engage in reflexivity as a “disciplined [form] of self-reflection” (Wilkinson, 1988, p. 493). As such, they influence which outcomes to consider important in this subjective way of viewing knowledge. In terms of initial thinking processes of ePortfolio project implementation, some of the learning outcomes considered essential include those developed by AAC&U (2009); among other areas, these outcomes relate to the type of learning (what) and the use of ePortfolio in other contexts (how, why). As described by Penny Light et al. (2012), they include knowledge (of human cultures), skills (of intellectual and practical nature), and responsibility (on a personal and social level)—the latter includes “civic knowledge and engagement and ethical reasoning and action” (p. 45).

Recommendations for Practice

My observations of ePortfolio creators at various stages of their project development process spanning a decade has enabled me to view an alignment of the capstone ePortfolio projects with some of the learning theories (Figure 4). Further examination of the overlap of the cognitive and affective domains (Anderson et al., 2001; Bloom et al., 1956; Krathwohl et al., 1964) during ePortfolio activities of the students made me aware of their reliance on their capabilities during the development of their digital projects. The following recommendations for practice are based on my observations as an instructor of courses that included a capstone ePortfolio project—for ESL students (five 5-month courses), for college educators (six 8-week courses), and for students in a graduate program (three 3-month courses).

Instructors in university, college, and K-12 as well as pre-service teachers considering implementing ePortfolio projects in their practice may benefit from

- Reviewing the theories of learning that have stood the test of time and learning about the contemporary ones that align with learners in the 21st century (Connectivism and Ecological Constructivism);
- Applying metaphors to help illustrate the various theoretical positions for student teachers in pre-service teacher education;
- Revisiting the levels in Bloom’s Taxonomy of Cognitive and Affective Domains (Anderson et al., 2001; Bloom et al., 1956; Krathwohl et al., 2001);

- Gaining further knowledge of the pedagogical application of higher order learning processes as outlined in the Valid Assessment of Learning in Undergraduate Education (VALUE) rubrics by AAC&U (2009);
- Identifying aspects of the ADDIE Process of analyzing, designing, developing, implementing, and evaluating in ePortfolio course design (Branson et al., 1975; Watson, 1981);
- Aligning aspects of ADDIE with the process of artifact creating, selecting, designing, composing, and assembling in ePortfolio curriculum design (Yancey, 2019); and
- Creating an ePortfolio reflective project as professional self-development (Zuba Prokopetz, 2018) while learning to apply the science of learning to distance education (Mayer, 2009).

Conclusion

As an evolution and a transformation of past practice, ePortfolios are being utilized beyond the initial field of education in some nations (Ravet, 2005). In academia, their benefits for educators and learners are far reaching. Their worth resides in the transformational and emancipatory experiences that may lead the way to a change in mindset and philosophical (re)positioning of learners and educators alike. As educators, our goal is to make “humans better through developing and instilling deep learning skills and abilities practiced at higher order levels of complexity” (Rhodes, 2018, p. 89). An ePortfolio project is “multilayered and involves learning about learning, deep immersion in thought processes, and relationship building”; the ePortfolio continues to gather momentum and is positioning itself as a sophisticated pedagogy, an elegant research site, and a technology-mediated professional self-development option (Zuba Prokopetz, 2019a, p. 24). As pedagogy, capstone projects align with different theories of learning since they “reflect different positions on the nature of knowledge” (Bates, 2014, Conclusion). As research site, ePortfolios are well positioned in the linked-data space of the web (Berners-Lee, 2009) to be included in labs where members of a global community can collaborate. In this constantly evolving digital ecosystem, researchers worldwide are now able to more easily advance discourse on “ePortfolio’s role in promoting liberal learning” (Rhodes, 2018, p. 87) and to continue “thinking about why we encourage utilization of ePortfolios” (p. 87) in our practice. As we connect with each other in various parts of the world, we begin to understand better how “the connections that enable us to learn more are more important than our current state of knowing” (Siemens, 2005, p. 5).

The implementation and development of ePortfolio projects are undergirded by a theoretical foundation that aligns with the thinking and reasoning of the members of each ePortfolio community. These projects

necessitate proper guidance to instill trust among members and foster a certain level of comfort with being vulnerable; co-construction of knowledge is an unavoidable outcome. As suggested by Siemens (2006), learners “dance and court the knowledge of others in ways the original creators did not intend” (p. 7). A close connection between the axiological (nature of values and value judgements), ontological (nature of reality), and epistemological (nature of knowledge) assumptions is powerful enough to ground community members’ assertions during the development process. These philosophical paradigms undergird thought processes, provide contextual information, and aid with the understanding of the worldview of ePortfolio creators (educators and learners alike).

ePortfolios are a robust field of inquiry, a digital transformation pedagogy, and continue to be part of a growing movement in the field of education. As a substrate for a variety of learning behaviours among students, they exemplify alignment with some of the learning theories and capacitate philosophical positioning of educators and learners. As suggested by Rhodes (2018), ePortfolios “involve educators and learners in a shared dance of give and take” (p. 87). They place the instructor at the back of the orchestra and the students in the front row, as per my experience with five groups of intermediate-level English as a second language learners before and during the pandemic. My immersion in the *vivencia*, or life experiences (Fals Borda, 1997) of this online community of language learners as they completed their capstone projects in the final module of their program of studies affirmed the core value of ePortfolios—they enable students to become aware of their learning history and facilitate their philosophical positionality.

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