Chapter 8. A Learning Framework for ePortfolio based on Design Patterns

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This chapter proposes a process-learning framework for ePortfolios based on the learning design theory of Diana Laurillard, which aims at providing continuity between instruction and incidental learning in the classroom. We developed and mapped this approach after observing that instructors needed guidance on providing a sequence of ePortfolio-centered activities during the development stage. This concept of teaching and learning as a process also helped students create and identify ***artifacts*** to document their learning.[1]

In today's educational paradigm, teacher educators employ multiple approaches to convey the nature of iterative relationships among teaching methods, learning activities, and learners' needs. However, the documentation of these approaches, as well as the sharing of innovative strategies with one another represent a lingering concern. Diana Laurillard's (2012) design theory, specifically her ***conversational framework***, provides the theoretical context for our model. The conversational framework provides a means for analysis of formal learning to establish an instructor's pedagogic design and the principles that underpin it through the affordances of technology. Indeed, the model's complexity provides the capacity to support sophisticated approaches to learning and ***assessment***.

The second lens we use is "pedagogical patterns" (Bergin et al., 2007; Laurillard, 2012). Pedagogical patterns describe the best teaching practices of a given domain. Patterns are written down, shared, and revised, thereby providing templates for successful learning activities that help faculty teach writing based on process theories. Our pedagogical patterns emerged from empirical evidence of, and experience with, effective ePortfolio teaching in the field of teacher education. In the teacher education curriculum, providing pedagogical patterns informed by design theory served a double purpose. First, in using the design theory and pedagogical patterns in our curriculum, we were able to show the teacher candidates who were our students how we as instructors were following the principles we advocated. Second, in requiring the teacher candidates to apply those principles and to include their learning artifacts in their teaching ePortfo-

1. The learning framework with ePortfolios that we discuss in this chapter resulted from the design of "Pedagogical Patterns" using Laurillard's "Conversational Framework" model. For others who wish to pursue this approach, we recommend Laurillard's Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology (Routledge, 2012).

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lios, they learned how ePortfolios could benefit their future students in the same way their ePortfolios were benefiting them as students in our courses.

The "Conversational Framework" for Learning with Technology

The conversational framework explains the teaching-learning cycle in formal learning derived from educational theories, pedagogical principles, and research findings (see Figure 8.1). In order to capture the principal elements of teaching and learning, the model requires implementation of methods and technologies: "The Conversational Framework specifies the roles to be played by teachers and learners in terms of the principal ideas in theories of learning, so the teaching-learning activities in a pedagogical pattern can be mapped to learning cycles in the framework" (Laurillard, 2012, p. 103).

The interaction among educators, learners, and peers defines a process of learning through concepts and practice, manifested in an iterative process of negotiation and co-construction of knowledge. At the same time, the learning cycles identified for each type of learning[2] are in play: a learning process of exchanging concepts and the outputs of their practice, either between teacher and learner, between learners, or even with oneself (Laurillard, 2012).

The learning cycles involved in the conversational framework are identified as teacher communication cycle (TCC), teacher practice cycle (TPC), teacher modeling cycle (TMC), peer communication cycle (PCC), peer modeling cycle (PMC), and the learner's internal learning cycle that modulates the learner's concepts (LC) and practices (LP). The TCC refers to the teacher's role in aligning goals, monitoring students' notions, and fostering conceptual knowledge. The teacher influences the learner's internal cycle at the conceptual level, while the TPC and TMC contribute to the learner's internal cycle through learning practices such as experiential learning, collaborative learning, or inquiry learning, etc. In a modeled environment, the teacher provides opportunities for learners to perform tasks related to the learning practice (e.g., posting artifacts in a ***workspace ePortfolio***). The PCC and PMC include the learner's role in encouraging peers to exchange ideas and experiences; the learners complement the role of the teacher in encouraging ***metacognition*** and the exchange of ideas and practice among peers.

2. Laurillard (2012) explains the model associated with learning through acquisition, learning through inquiry, learning through discussion, learning through practice, learning through collaboration.

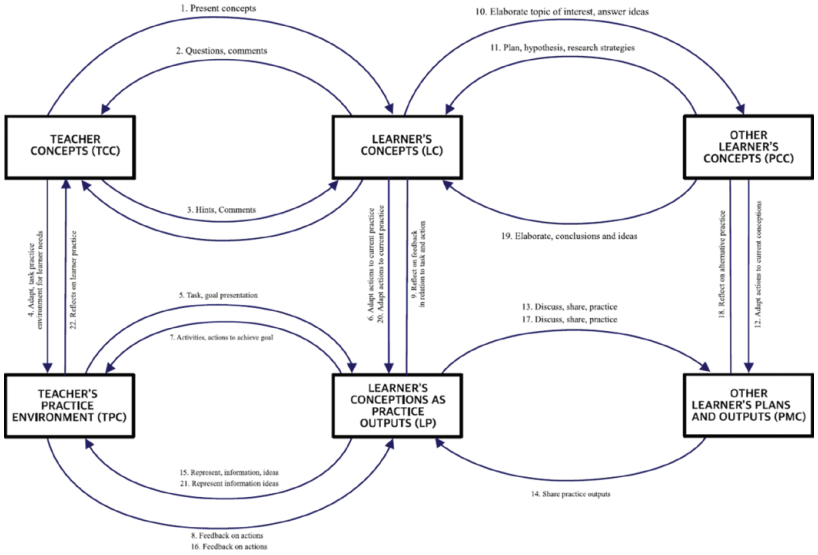

Figure 8.1. Conversational pattern mapped in the conversational framework.

These learning cycles appear in Laurillard's (2012) model as recursive loops that influence and contribute to the learner's internal learning cycle summed up by the base principles of learning in formal settings. The teacher designs a teaching and learning environment that provides the elements and design activities for each learning cycle, thus promoting the learners' capacity to develop their own concepts and practices. We mapped our ePortfolio onto the conversational framework to allow our students to evidence their learning by digital means. Our mapping process is described in Table 8.1, in which we indicate the learning cycle(s) involved and each LC's corresponding interaction according to the conversational model, as shown in Figure 8.1. We also include the number of students involved and the time allotted for each cycle. It is important to note each interaction between teacher and student can occur with just one student or a group of students.

Table 8.1. ePortfolio mapped to the conversational framework

Learning Cycles	Description of the Interaction	Group Size	Time
Teacher Communication Cycle TCC (1,2)	(1) The instructor introduces students to the concepts of the scientific method (the topic can vary if used in another subject) and technical and pedagogical specifications about ePortfolio for learning and through a flipped classroom using videos, tutorials, and learning by doing. (2) They provide activities to explore the ePortfolio platform and construct evaluation guides, ***rubrics***, and provision of feedback with students. Students comment and ask questions they may have.	138 students	1 session ePortfolio concept 1 session KPSI

Table 8.1 Continued			
TCC (3) Teacher Practice Cycle TPC (4,5,6)	(3) Students individually practice using their personal ePortfolio and post examples of learning evidence, creating their personal ePortfolio according to their own interests. (4,5,6) Also, they complete a Knowledge Inventory that determines prior knowledge, and which they later publish and reflect on in their ePortfolios. Also, the teacher prepares the learning environment to promote students' conceptualization.	138 students	1 session
TCC (7, 8, 9) Peer Communication Cycle PCC (10, 11)	Students work in groups of 3 to 4 to: (7,8) explore and elaborate on their own topics of interest; (9) perform basic biological research with petri dishes, following the scientific method; access digital resources related to the scientific method to present and discuss the topic; (10,11) choose a topic, plan the setting and hypothesis, research strategies, and use digital tools for information resources, data collection, and data analysis.	43 groups	Through 4 sessions
Peer Modeling Cycle PMC (13,14)	(13,14) Students collect information and interpret data from experiments and select the most relevant results. Students create representations of the information using digital tools and record them using the ePortfolio.	43 groups	Through 4 sessions
PMC (15,16)	(15,16) Students work in topic-specific groups and mediate feedback with the instructor.	43 groups	Through 4 sessions
PCC (18,19)	(18,19) Students analyze and reflect on results with peers and elaborate conclusions.	43 groups	Through 4 sessions
TCC (20,21)	(20, 21) Students publish results in varied digital forms (images, videos, text, blog entries) in their group ePortfolio.	43 groups	Through 4 sessions
TPC (22,23)	(22,23) Students individually post reflections in their ePortfolios and choose evidence from the activities to be published, acknowledging cooperative efforts with their peers.	183 students	Through 4 sessions
Designers' Reflections	It is important to know that the interaction between teacher and student can be to one student or to a group of students. Large groups of students require a lot of the instructor's time. It is necessary to group students to facilitate extrinsic feedback and peer interaction.		

Table 8.1 Continued

Designers' Reflections continued	Also, providing the ePortfolio rubric in advance, along with all other course scoring rubrics (Appendix 2), may influence learners as far as evidence collecting. But this approach may be counterproductive as it discourages students from exploring other forms of doing. The strict time limit and reactions triggered by activities within the classroom can be positive as far as the instructor's feedback, but it would be valuable to know how this time frame suits each student's own pace.

Pedagogical Patterns

A pedagogical pattern can be defined as a detailed description of an educational practice that proposes a general solution for an educational problem, according to a set of determined characteristics within the learning environment. The goal is to effectively troubleshoot problems in similar educational situations. The pattern must follow a "problem-solving template" associated with each contextual and discipline settings (Bergin et al., 2007; Derntl, 2006; Derntl et al., 2009; Laurillard, 2012).

Pedagogical patterns differ from design patterns. In this case, "pedagogy" refers to formal learning; the instructor must be able to employ the pedagogy that proves most effective. The essence of a pattern is to solve a problem that recurs in different contexts, keeping in mind that a problem can reappear in a slightly different form each time. Teaching and learning activities are mapped in the range of learning cycles within the conversational framework. Each activity must play its part in prompting other activities to ensure interaction among cycles of learning. Therefore, this process represents modeling practices based on the characteristics of the learning environment and students as active learners (Laurillard, 2007).

A pedagogical pattern is presented in a formal description to capture sound pedagogy; this format identifies teaching design in terms of "general descriptors" or "context descriptors," which provide sufficient information linked to pedagogic design principles so that other instructors can use this information in other contexts. "Pedagogy descriptors" provide the information about the effectiveness of the teaching and learning design with technology, while the "evaluative descriptors" identify ways in which to improve the pattern.

Laurillard (2012) has categorized the general descriptors as: origin, referencing the source of the pattern; summary, a brief description of what is being taught and how; topics, or keywords to help other instructors to apply the pattern; learning outcomes, what the learner will know or be able to do by the end; rationale, the learning approach or pedagogic design principle; duration, time spent on the

activities (not necessarily continuous); learner characteristics, educational experiences, interests, etc.; setting, face-to-face, blended, or online learning; and group size. The pedagogy descriptors comprise both "teaching information" and "comments," which are categorized as: resources and tools, any physical and digital materials, as well as any conventional or digital technologies; learning cycles, the sequence of teaching-learning activities according to the conversational framework; the designer's ***reflection***; and student feedback. We formulated our pedagogical pattern using "general descriptors" and "pedagogical descriptors" to explain the purpose of the model in teaching the scientific method (see Table 8.2)

In Table 8.3, we summarize the learning design features of ePortfolio development into a generic pedagogical pattern. The description of every design feature identified is linked to its specific source in Table 8.4..

Table 8.2. Pedagogical pattern for evidencing learning with ePortfolio in the context of teaching the scientific method

Title	Evidencing learning to teach the scientific method
Source	Spanish university class for pre-service teachers training during the course "Teaching and learning experimental sciences, social sciences and math" degree in Elementary Education.
Summary	Using ePortfolios to document and track students' products and reflection on learning activities carried out during instructional time; involving individual and group work on learning how to teach children the scientific method with petri dish experiments.
Topics	Evidence of learning, ePortfolio, teaching natural sciences, pre-service teacher education, collaborative work.
Learning Outcomes (forces)	To evidence knowledge of the scientific method, and to demonstrate teaching skills by developing strategies for conducting classroom experiments following the scientific method.
Rationale	Constructivist pedagogy, ***inquiry-based learning***, learning by doing.
Duration	Four weeks
Learner Characteristics	Pre-service teachers in the Elementary Education Program and the Teaching and learning experimental sciences, social sciences, and math course.
Setting (context)	Classroom, computer lab, and learning environments in practicum.
Group size	138 third-year undergraduate students in the Elementary Education Program.
Resource and Tools	Mahara ePortfolio Platform, Moodle, KPSI[3] test, handouts with general instructions, bibliographical sources, videos, blogs, social media, documents online.

3. KPSI i Knowledge and Prior Study Inventory (Giné, N. y Parcerisa, A., 2003)

Table 8.3. Learning design features of ePortfolio

Learning Design Features of ePortfolio				
Agency				
Taking different skill levels, interests, and participations into account.		Identifying learner's goals		
Managing Self and Interaction				
Journal-Reflection	Learners' interaction on social media and connection to ePortfolio.	Peer interaction/ collaboration	Content knowledge (theory)	Collaborative teamwork
Scaffolding				
Student-centered teaching	Problem-based learning	Learning activities	Assessment	
Identification of Evidence				
Evidencing learning		Making the learning process visible		

Additionally, the use of digital technologies is transversal to the design features. These design features add value by informing designers, instructors, and the target student population about the details of learning interaction with media technology. In this sense, the proposed pattern makes demands on the affordances of ePortfolio technology/platforms, so that stakeholders can adapt the same to suit their demands. ePortfolio technology may consist of platforms that might be augmented through the incorporation of social media, productive tools, reflective tools, LMS outputs, and ePortfolio software, as well as asynchronous online discussions, blog entries, website feeds, social media, publications from authoring tools, and tools for recording data and reflections, file sharing, and manipulation of documents (Presant, 2016; Ravet, 2015).

Table 8.4. Mapping of learning-associated patterns for ePortfolio to design solutions

ePortfolio for Learning Design Features	
Agency	
Take different skill levels and interests into account	Engaging students in ***active learning***; the thought is to motivate students, driven by their own interests, to produce new information. Reference patterns: "Expand the known world," "explore for yourself" and "students decide" (Bergin et al., 2002).
	Highlighting the idea that in student-centered settings, the learner ought to be effectively included in characterizing general learning goals in addition their own singular objectives for the course. In this sense, the educator can adjust the learning process to student-identified objectives. Reference patterns: "Elaborating goals and expectations" (Derntl, 2005, p 322).

Table 8.4, continued	
Managing Self and Interaction	
Journal-Reflection	Allowing students access to online platforms that facilitate journaling where students record changes in thinking and attitude, information gathering, ways of knowing, and express alignment of the content with their personal goals. Providing the conditions for students to search for solutions by exploring problems encountered during educational experiences. Motivating students through their own experiences. Identifying learning and the synthesis of evidence accompanied by the detection of learning gaps. Reference patterns: "Diary" pattern (Derntl, 2006, p. 272). "Reflection" pattern (Bergin et al., 2002)
Learner interaction via social media and connections to ePortfolio	Taking advantage of the open nature of social participatory media. Promoting networking among students with social media web tools or connected with ePortfolios, promoting the creation of a coherent presentation instead of disconnected pieces of text—giving value to this type of evidence. Managing digital media and online presence. Being aware of the managing of digital identity related with the ePortfolio, the criteria to consider something private or public. Most of these design features are referenced in the related framework for building and scaffolding interaction in social spaces, which denotes three group patterns: design of a social environment; supporting interaction inside (virtual) communities; and managing channel communications also related to patterns developed in the Rhizome project on digital identity (Warburton, 2012). Reference patterns: "Social Media and Learning Interaction in social spaces" (Warburton, 2014, pp. 151-158).
Peer interaction/Collaboration	Supporting meaningful academic conversations about learning. Facilitating asynchronous online communication among participants, instructors, tutors. Facilitating synchronous online interaction which is embedded to a certain learning activity. Asking learners to comment on each other's work. Allowing participants to discuss their contributions, resources, and ideas online and face-to-face. Reference patterns: "Chat," "Online discussions," "exchange of contributions" (Derntl, 2005, pp. 310, 377).

Table 8.4, continued	
Content knowledge (theory)	Promoting information gathering, supported by instructor and peers. Elaborating on content associated with learning as a concept. Discussing gathered information and subsequent results. Motivating participants to collect information such as examples, theories, brainstorming, results which could be gathered in collaboration and shares among peers. Reflecting on appropriate information within a given context. Maximizing learning by engaging students. Reference patterns: "Brainstorming," "Theory elaboration," "Information Gathering" (Derntl, 2005, p. 329). "Test Tube"; "Try it yourself" (Bergin et al., 2002).
Collaborative teamwork	Providing opportunities for participants to choose their team partner(s) and to work in teams (e.g., publishing in group ePortfolios). Providing social media tools to work collaboratively. Supporting authentic, organized team tasks. Encouraging peer support by information exchange, reciprocal inspiration, and social interaction, learning, and teaching to peers that can evolve into communities of learning and practice. Supporting team-initiated decisions. Determining team size on the basis of task requirements. Reference patterns: "Student group management" (Avgeriou et al., 2004). "Team building" (Derntl, 2005, p. 363). "Groups work" "Study groups" (Bergin et al., 2002).
Scaffolding	
Student-centered instruction	Providing scaffolding to ensure a student-centered environment and opportunities for interaction. Facilitating learners' assimilation of concepts and theory. Increasing participation gradually. Reference pattern: "Interactive lecture" (Derntl, 2005, p. 172): "Active Student" (Bergin et al., 2002)
Problem proposals	Allowing learners to choose between solving personal or assigned problems. To this end, learners can follow a method. Providing a specific, proven methodology to employ in project- or problem-based learning activities. Facilitating learners' active involvement in and dedication to the problem-solving process. Reference patterns: "Problem proposals" (Derntl, 2005, p. 356); "Real world experience," "Problem solving machine," "Students design sprints" (Bergin et al., 2002).

Table 8.4, continued	
Learning activities	These are related to agency as methodologies and problem proposals..
Assessment	Providing a space where learners share their work and refer to it during the learning activity. The following objectives associated with assessment patterns may not be graded as part of an ePortfolio, but their use may improve evidence throughout the ePortfolio process: - Grade teams fairly, ensure fair individual grading. - Ensure participants learn from their own experience. - Require participants to be less dependent on the instructor. - Require participants to apply theory. - Ensure participants understand the topic. - Suggesting tasks, activities that produce evidence of learning on ePortfolios. Reference patterns: "try it yourself," "self-test," "fair grading," "fair project grading," "peer grading," "key ideas dominate grading," "online ePortfolios" (Bergin et al., 2002); "Classroom display" (Pachler et al., 2009, p. 46). "Blended evaluation" (Comber, 2014, p. 293).
Feedback	Providing feedback characterized by given opportunities for learners to internalize concepts and ways of knowing. Offering constructive feedback. Tutors/teachers receiving feedback. Ensuring feedback can improve evidence in ePortfolio. Reference patterns: "Feedback on feedback," "differentiated feedback," "feedback," "feedback sandwich," "embrace correction," "acquire participants feedback," "anonymous feedback" (Bergin et al., 2002), (Derntl, 2006, p. 221, Whitlock & Mellar, 2014, p. 311).
Identification Use of Evidence	
Evidence learning	Guiding effective discussions, tasks, and activities that elicit evidence of learning. Keeping in mind that although this pattern resembles an ePortfolio scenario, it presents subtle differences in not being only an informal communication channel via a blog, as in the original source, but a persistent collection of personal assets. Providing an option to have an assignment that is created specifically for web presentation. Creating assignments that can be displayed in ePortfolios. Recognizing evidence and justifying criteria for credentialing and open ***badges*** (Ravet).* Reference patterns: "Showcase learning," (Robertson, 2014, p. 67); "Online portfolios" (Bergin et al., 2002).

Table 8.4, continued	
Make the learning process visible	Allowing learners to express themselves in a narrative form. - Learners make sense of events and observations. - Learners can use digital objects to converse about a common learning activity. - The student must reflect either on a blog or a dedicated element embedded in an ePortfolio. - Learners comment and interact with each other. Reference patterns: "Narrative spaces," (Pachler et al., 2010, p. 51). "Spotlighting the learning process," (Derntl, 2014), "Object to talk with" (Pachler et al., 2010, p. 54).

**Note: Badges "were created to capture learning whenever and wherever that learning occurs: formal, informal, public, private, group, individual" and Open badges "can be designed to represent a small thing, such as fundamental principle or a single competency or to represent a large thing like a competency set, license, or a degree."*

Instructors can map ePortfolio elements to all learning cycles described in the conversational framework, depending on how they incorporate technology in instruction and assessment.

Design Pattern for Evidencing Learning in ePortfolios

When married to learning strategies for ePortfolio, design patterns have the potential to link course activities and students' reflections in order to evidence students' learning during formal instruction. The mapping of learning-associated patterns, independent of learning outcomes and methodology, serves to (1) facilitate participants' trust in their own knowledge, (2) make the value of gained knowledge visible and (3) make learners reflect on their own participation in classroom/course activities.

A problem may occur when students need to evidence their learning either for recognition in a ***showcase ePortfolio*** or to recall aspects of learning in a workspace model, or both. At the same time, instructors need access to student evidence to follow up on their learning paths, to ensure formative assessment complements summative assessment, and to provide feedback and support. Also, teachers need to identify pedagogical challenges about ePortfolio implementation during formative moments.

Students may not be able to place certain traces of digital interaction in their ePortfolios, such as responses during simulations or immersive virtual worlds, mainly due to digital incompatibility. However, there is the possibility of validating the evidence originated in these kind of learning environments. This feedback is provided by considering different learning paths as methods developed; therefore, its importance relies on the moments the learner or the mentor acknowledge the need to evidence learning.

Solution

Through the exploitation and interconnection of digital spaces, the ePortfolio allows richer and more diverse opportunities for interaction among stakeholders. For this purpose, the technology should offer "simplicity, immediacy, transparency, customizability and support for intuitively structured instructor-student and peer interaction" (Derntl, 2014, p. 61). The ePortfolio may provide evidence of learning during instructional time, such as when the student constructs their (digital) personal identity in their ePortfolio (Barrett 2005, 2016). Also, learners collect and construct evidence all the time by reflecting on their learning needs, considering their previous experiences in a subject area, keeping track of social media interactions, working with other students, gathering information from the content area, completing scaffolded learning activities, retaining feedback (which can occur online and face-to-face, during evaluation, co-evaluation, self-evaluation) designing their own learning, and so on.

Theoretical Justification

The functional elements of ePortfolio can serve as a display of learning at many consecutive moments during the flow of learning activities. Learning activities display different actions at different moments of the learning cycles, as seen in the conversational framework pattern (Figure 8.1). The student is constantly performing some type of action, even if that action is perceived as passive (e.g., observing/listening to their partners when engaged in teamwork). In these moments, students create evidence that comes inherently from the course design and from intrinsic motivation, depending on the educational experience. These learning activities have been described in terms of design patterns (Derntl, 2005; Mor et al., 2014), which happen at different moments during formal learning. The instructor and/or other instructors can recycle these patterns in subsequent course designs.

As well, complementary learning activities associated with ePortfolio integration and implementation foster the manifestation of design patterns associated with ePortfolio for learning, especially reflective elements within the ePortfolio, the use of evidence based on artifacts, and reflection supported by social media. New patterns can be derived from related patterns already implemented, thereby supporting the learning design. In our case, we identified the relationship between the patterns we had gathered as part of the solution and the five key aspects for ePortfolio integration: situational factors, learning goals, feedback, assessment, and teaching and learning activities (Fink, 2013), knowing that every ePortfolio has a different purpose and every discipline has its own timing and resources (see Coleman et al., this collection).[4] Therefore, instructors must articulate ePortfolio

4. Fink (2013, p. 76) has identified the situational factors as class, size, level of the

components with the course design, based on the mapping of course activities and assessment.

Teaching and learning activities should align with the learning outcomes. These activities must reflect the principles of active learning and reflective dialogue for (personal) learning goals. To understand the integrative nature of the learning ePortfolio, Fink (2013) points explicitly to the relationship between effective teaching and learning activities, on one hand, and meaningful feedback and assessment procedures on the other: "this is the relation between feedback and assessment activities that enhance the learning process" (p. 94).

Feedback and assessment components provide students and instructors a qualitative measure for how well they are achieving their goals, and also provide value and meaning to what is being taught (Castaño et al., 2015). Instructors should provide frequent and immediate feedback, caringly delivered in accordance with the principles of positive feedback (Nicol & Macfarlane-Dick, 2006). Assessment procedures should also have clear criteria for showcasing skills and achievement and provide opportunities for self-assessment and peer assessment (Abrami & Barrett, 2005; Derntl, 2014). Feedback and assessment procedures should be included in the design of student-centered ePortfolios in which students showcase collected evidence of what they know from diverse educational experiences and contexts. Through this intentional design, students are more likely to engage in meaningful reflection, which should lead to the identification of learning, the synthesis of evidence, as well as the identification of gaps in learning (Borman & Dowling, 2006; Johnson et al., 2006). ePortfolios for assessment should likewise include students, instructors, and peers in the evaluation process. K. Chang Barker (2006, p. 312) affirms that ePortfolios for assessment must include some form of "student achievement by teachers" and assessment of "student progress and changes in knowledge, skills and abilities." This assessment model provides a bigger picture of students' work over time.

Therefore, the success of ePortfolio-mediated learning is dependent on appropriate ePortfolio-mediated pedagogy, which, with careful design, may facilitate learners' ability to identify significant evidence of their progress and sense of value for their learning. Some ePortfolio course integration proposals have promoted the use of specific activities at various points in the learning cycles such as: encouraging students to engage with the learning outcomes of the course so these become their own goals; teaching students how to evidence their learning achievements; providing opportunities to gain awareness of their strengths and weaknesses through self-reflection, peer review, and teacher feedback; providing opportunities for students to share their work; encouraging group work; show-

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course, time structure; general context: curriculum, traditional or online; nature of the subject: convergent or divergent physical skills; student characteristics: prior knowledge, attitudes, personal situation, reason for enrolling; and teacher characteristics: level of development, course expertise.

casing students' work in class; evaluating a learner's own work and his/her peers' work based on common criteria; and making room for learners to question content while providing evidence (CityU, 2011).

Additionally, ePortfolio creators need to weigh a number of factors when they prepare to publish their ePortfolio (Castaño, 2014). As technologies, ePortfolios offer many options for how they can be constructed. For example, they offer an array of technological components such as pages, menus, navigation options, feeds, social media integrations, and so on. Given these rich choices, each ePortfolio can be tailored to meet a particular need such as applying for a teaching position as compared to showcasing consulting work.

In this regard, students face challenges when crafting online identities, mostly in terms of their self-representation in a context with conflicting cultural influences (Yancey, 2006). Social media and learner interaction allow for the creation and exchange of user-generated content by means of social software supports that add value through human social behavior, message boards, social networking, etc., which are the technologies that support more democratic and distributed interaction and production on the web (Coates, 2005; O'Really, 2005). This influence in education is significantly altering ways of accessing information and is facilitating multiple forms for dialogue among educators and students and among students themselves (Siemens, 2008).

A Learning Framework for ePortfolio

According to the Joint Information Services Committee (JISC), ePortfolios should offer pedagogic support for action planning especially because different disciplines adhere to different processes for reflection on and presentation of learning (2008, p. 6) (see Coleman et al., this collection). Therefore, integrating ePortfolio into a course requires careful implementation of an action plan. Several authors have proposed different models and guidelines to map the interactions among students, instructors, and content with ePortfolios (Fink, 2013). However, every ePortfolio has a different purpose and every course, program, or discipline has its own time and resources. Likewise, every ePortfolio model should be integrated with its own map of activities and assessments (see Coleman et al., this collection), with reflection as its core component and instructions to ensure students know how and when to evidence their learning (Barrett, 2009).

A learning framework can be conceptualized by grouping patterns in relation to main concepts associated with ePortfolio learning that center on evidence produced during the learning process and showcased in the ePortfolio publication. The cross-cutting themes in group patterns that may influence the ePortfolio process and publication can be linked to or embedded in the ePortfolio (Jankowski et al., 2011; Johnsen, 2012; Light et al., 2012). They include agency, managing self and interaction, ***scaffolding***, and identification of evidence. These concepts pertain in turn, to topics and are designed for very specific purposes such as ***active***

learning, experiential learning, assessment, feedback, and so on, but are also part of the learning process that can be evidenced in the ePortfolio in forms of digital artifacts such videos, images, podcasts, texts, maps, graphics, etc. (see Table 8.3).

Conclusion

The framework challenges instructors to incorporate the concepts and technology of ePortfolio in the classroom and questions the notion that instruction on the ePortfolio concept and related technology must happen outside the classroom, due to time limitations and curricular demands. However, the intentions of ePortfolio for learning is to document learning that can happen at any time. Although our ePortfolio model originates as a practice in pre-service teacher education, the ePortfolio for learning extends beyond academic time and spaces to incorporate life experiences in addition to evidence from a course or academic program. In this sense, the framework acts as an answer to many ePortfolio practitioners who ask how to support course activities to benefit learners, mainly in lectures and learning contexts influenced by social media and digital narratives. The pattern-based methodology has the potential to address the complexity and fluidity of the ePortfolio scope approached by social science research (Bryant & Chittum, 2013). For this reason, the framework is based on the pedagogical pattern mapped by the conversational framework in a specific educational practice and then proposed as a generalization for educational practices where learning evidence is connected or embedded in the ePortfolio. Therefore, the continuous validation of patterns can be classified by the theoretical justification. The validity of the framework relies on quality specifications of the referenced design patterns that have been deployed in relevant projects by main pattern design authors such as those who led the Rhizome Project (Warburton, 2014) and the JISC Project (2008) "Scoping a vision for formative e-assessment."

Producing and collecting evidence of learning is transferable in most educational contexts and an essential part of the process of learning. Representing a pattern to evidence learning through educational technology via ePortfolio or its evolution into an open passport for credentials presents endless possibilities; that is, production in learning design relies on constructing multiple practices to map and combining documented pedagogical patterns. We note that this work is not finished but represents a continuum. We do not offer a prescribed way to "perform" and evidence learning with ePortfolios, but rather broaden the possibilities for a dynamic ePortfolio that complements other representations of learning (learning designs, pedagogical patterns). It is important to note a certain level of flexibility in teacher's guidance of constructing and collecting evidence, making it more personal to the student. However, too much freedom could eventually result in a situation in which students may not demonstrate attainment of the learning outcomes. A balance must be found between flexibility and guidance, key for the learning design and pedagogical intentions and decisions.

We hope to influence future studies on the facilitation of evidencing learning through ePortfolio as well as other future systems and technologies for recognition, such as Open Badges and Open Passport, to connect ePortfolio process and product towards accreditation of each individual's learning path. We look forward to new technological platforms or systems that support flexible management of artifacts and other evidence of learning that enable students to select their learning tools and make evidence of their learning available to different audiences.

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