EPORTFOLIO TECHNOLOGY

IN HIGHER EDUCATION

by

Tina Trimble

An executive position paper submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Education in Educational Leadership

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TABLE OF CONTENTS

Appendix

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The intention of this improvement plan was to provide a snapshot of how other institutions across the country were approaching ePortfolio on their campuses and to discover what technology has the potential to support a student-centered ePortfolio initiative at UD. There is a growing number of technology choices available to support ePortfolio initiatives. Each of these choices has strengths and weaknesses. It is a challenge to choose technology that will support the specific goals of a student-centered program, while still being effective for documentation and assessment "of learning," as well as "for learning," in an institution-wide initiative. The exploratory and descriptive nature of the questions in this improvement plan favored a design that included a qualitative perspective in a document analysis. This strategy focused on the activities and events that occurred within the time frame and context of the Catalyst for Learning initiative. Participants from the twenty-four institutions of higher education that were involved in the project meticulously documented their expectations and efforts on a shared website. This centralized website was made available to the public through a grant-funded project as a resource for the academic community to increase the usability and value of ePortfolios in education. The central focus of this study is on the technology and its role in these experiences. The narratives by the participants involved in the Catalyst for Learning project indicated that they aligned their approach to ePortfolio initiatives with their institution's own unique combination of mission and resources. The details from the narratives reported by the participants identified UD's goals for the ePortfolio. This knowledge was

combined with an understanding of the activities and inputs necessary to create the process of ePortfolios. This synthesis allowed the determination of what technical requirements were needed to produce an initiative that met each of the stakeholders' goals. These findings make explicit the technology requirements that have the potential to support a student-centered learning experience, at the individual, and program levels, that supports the collection and documentation of evidence of student progress for assessment and accreditation efforts at the institutional level.

Chapter 1

THE IMPORTANCE OF ePORTFOLIOS

According to the National Learning Infrastructure Initiative [NLII], an ePortfolio is:

> a collection of authentic and diverse evidence, drawn from a larger archive, that represents what a person or organization has learned over time, on which the person or organization has reflected, designed for presentation to one or more audiences for a particular rhetorical purpose. (2003)

There are many compelling reasons for using ePortfolios in higher education, and their use is continually expanding. Clark & Eynon (2009) identified four reasons that remain relevant today. They suggested that (1) ePortfolios and the process required to create them support goals for 21st century learners; (2) technology advances promote the evolution from content consumers into content creators; (3) institutions are being held accountable for their programs, with documented success required; and (4) ePortfolios serve as a space that represents individual life-wide and life-long learning and experiences.

The Association of American Colleges & Universities [AAC&U] reported in their 2015 study that universities were being held accountable to higher standards for the academic success of their graduates. However, deciding what constitutes student

success has become more complicated and subsequently more problematic to assess (AAC&U, 2015). Pedagogy that supports the development of student success includes academic programs and requirements that engage students in ways that extend beyond a traditional lecture confined to the classroom. Curriculums increasingly include learning experiences challenging students to actively apply what they are learning to the world around them (Eynon & Gambino, 2017).

Employers value these qualities and search for potential employees who are critical thinkers, approach problems in an innovative manner, are capable of collaboration, and possess a sophisticated and relevant global perspective (AAC&U, 2015). The Association for Authentic, Experiential and Evidence-Based Learning (AAEEBL, 2014) reports that successful acquisition of complex and higher-level abilities involves a different consideration of which measurable outcomes represent the attainment of knowledge and skills. Traditional testing alone does not capture students' mastery of these effectively or accurately (AAC&U, 2015). Educators recognize the need for more than one form of assessment, as well as a different approach and format to evaluate the scope and depth of students' achievements (Penny Light, Chen, & Ittelson, 2012).

One way in which this growing need is being met is by academic programs requiring students to create ePortfolios as a selection of artifacts that represent their learning and showcase their best work (Sternberg, Penn, Hawkins & Reed, 2011). Some fields of study have utilized these portfolios for many years (Buyarski, Oaks, Reynolds, & Rhodes, 2017). As students transition from content consumers to content creators, the organization and presentation of their work becomes more complex.

Today's technology reflects that the evidence of student learning has evolved and expanded to include various forms of digital artifacts. These compilations do not always display effectively in paper folders, so these collections of student work are often presented online as ePortfolios (Eynon, Gambino & Török, 2014).

The use of ePortfolios to support learning has continued to increase in importance over recent decades in academic settings. Evidence of their importance resulted in being named the eleventh high impact practice in higher education at the Digital Learning and ePortfolio Forum in January 2017 (Eynon & Gambino).

Catalyst for Learning Initiative

Although the benefits of ePortfolios are considerable, universities are still experimenting with the technology used to integrate them. This improvement plan utilized data collected from Catalyst for Learning, a grant-funded project, which chronicled experiences from 24 institutions as they introduced ePortfolios to their campuses (Connect to Learning, 2014a). The 24 institutional participants, who were in the Connect to Learning (C2L) group, collaborated on campuses nationwide by sharing their knowledge and experiences with ePortfolios. Guiding their work was the Catalyst for Learning Framework, illustrated below in Table 1. It enabled them to explore how components of ePortfolios could support user-centered learning experiences on their campuses, as well as play a role in their institution's accountability and accreditation requirements (Eynon, Gambino & Török, 2014).

Table 1 The Catalyst for Learning Framework

Description	Components
Central Themes	Students and Faculty, Programs and Majors, Institutional Transformation
Interconnecting Categories	Pedagogy, Professional Development, Outcomes Assessment, Technology, Scaling Up
Design Features	Inquiry, Reflection, and Integration

Note: The data reported here were collected in June 2016.

The Catalyst Framework serves as the foundation and organizational structure for the Catalyst for Learning project (Eynon, Gambino & Torok, 2014b). There are three main parts to the model, with sub-sections within each. The first piece, central themes, includes three components – students and faculty, programs and majors, institutional transformation – and represents the layers of an academic community and its educational processes.

Catalyst for Learning Framework: Central Themes

Central Themes in the Catalyst for Learning Framework are as follows:

- Students and Faculty
- Programs and Majors
- Institutional Transformation

In the first component of this model, student needs are identified and defined within the Constructivist approach to learning and focus on the social nature of learning and comprehending, rather than on the behavioral and cognitive aspects (Jones & Araje, 2002). Faculty utilize the Constructivist frame of reference to create learning activities that make student learning visible and to support that process with formative and summative assessment. They also integrate methods that encourage

students to actively engage with their learning and to determine their own academic experiences (Peet et al., 2011).

The second component of central themes, programs and majors, applies the Constructivist approach to learning to ensure that the design of learning activities connect to clearly defined outcomes. This arrangement allows the learner to incorporate previous knowledge with new experiences and apply this understanding to their future interactions (Eynon, Gambino, & Török, 2014b).

Institutional transformation, the third component of central themes, refers to the response of campus communities when they implement ePortfolio into their courses and programs. Faculty and administration report that the process of examining their curriculums, and connecting authentic learning activities to relevant outcomes, does more than create an improved learning experience for students. These tasks are challenging and require increased levels of coordination and communication between educators. These formal and informal collaborations increase opportunities for faculty to interact with their colleagues and this improves their own knowledge and skills as educators (Eynon, Gambino, & Török, 2014b).

Catalyst for Learning Framework: Interconnecting Categories

Interconnecting Categories in the Catalyst for Learning Framework include:

- Pedagogy
- Professional Development
- Outcomes Assessment
- Technology
- Scaling Up

Interconnecting categories, the second piece of the Catalyst Framework, focuses on and organizes information via five components: pedagogy; professional development; outcomes assessment; scaling up; and technology. These categories interconnect and identify areas of an academic community where the impact of an ePortfolio integration occurs (Connect to Learning, 2014b).

The pedagogy component includes descriptions of theoretical concepts, as well as examples of ePortfolio applications on their campuses. Professional development topics describe participants' collaborative efforts regarding their education, and that of their colleagues, about the applicability of ePortfolio implementation into teaching. Outcomes assessment addresses the shift from accountability to, and integration of, processes and activities into opportunities for an improved learning experience for students.

Scaling up focuses on participants' narratives of their expectations for expansion - from individual and course level, to program, and/or institution wide initiatives - of ePortfolio practices on their campuses. Included are plans for increasing their programs from one level of implementation to the next and acknowledgement of limiting factors (Connect to Learning, 2014b). The final component, technology, reinforces the importance of consideration only after the goals for the initiative are known. Because technology considerations are determined by the pedagogy in ePortfolio implementations, the focus remains on creating a learner-centered experience that is supported by the Constructivist approach to understanding how people learn (Connect to Learning, 2014b).

Catalyst for Learning Framework: Design Features

Design Features in the Catalyst for Learning Framework include:

- Inquiry
- Reflection
- Integration

Design features, the third piece of the Catalyst for Learning Framework, include the components of inquiry, reflection and integration. These features underlie all the other elements of this structure, are essential to support, and inform the direction of the activities and processes within an effective ePortfolio implementation. They serve as the starting point in the design and provide guidelines for the application of practices that will create a learner-centered ePortfolio project (Connect to Learning, 2014b).

The concept of inquiry is central to the dynamic nature of learning with ePortfolios; it guides the process of creating academic experiences, containing learning activities and outcomes, and requires students to engage actively with their programs of study at a deep and meaningful level. Eynon, Gambino, & Török (2014b) reported that opportunities are generated for the entire campus community to integrate approaches to instruction and administration that align with how people learn.

Additionally, the incorporation of reflection, as an authentic and relevant element of curriculum, creates opportunities for learners to discover how to connect their new knowledge with their previous understandings about the world and their role in it (Eynon, Gambino, & Török, 2014b). Moreover, the use of inquiry and reflection supports an integrative learning experience for students. Learners whose academic experiences are framed on activities and outcomes, which allows them to connect new information with previous experiences and create knowledge that they can transfer to

future situations, can become citizens who are engaged with the world through an informed, reflective, and critical perspective (Connect to Learning, 2014b).

Improvement Plan

The goal of this improvement plan is to explore, understand, and identify technologies to support an ePortfolio component—meeting specific requirements for assessment and accreditation processes—of a student-centered, institution-wide assessment program.

From this information, promising practices will aid in identifying diverse technology options to support ePortfolio initiatives. They may also assist in understanding how technology can be leveraged to support a student-centered learning experience, while responding to the administrations' need for accountability. This goal supports the University of Delaware's mission statement to provide the highest quality academic experience for students (University of Delaware [UD], 2013).

This improvement plan consists of five chapters. Chapter one describes the role and importance of ePortfolios, and explains their use as a high impact practice in higher education. A discussion of the pressures faced by administrators to produce proof that their programs are successful is balanced against a heightened urgency for institutions to seek effective methods to assess student work and document outcomes to meet accreditation requirements. Chapter two reviews scholarly literature related to the current role of ePortfolio processes in higher education and how their implementation has the potential to support the direction of assessment at UD. Chapter three explains the methodology employed in exploring ePortfolios at 24 higher education institutions via the Catalyst for Learning website (Connect to Learning, 2014a). The findings are detailed in chapter four and include information

about how they emerged from the data. Chapter five recommends a series of steps that other institutions have found successful to supporting a large scale ePortfolio implementation.

The following questions guided this improvement plan and informed the recommendations.

- How are institutions across the country approaching ePortfolio initiatives?
- What available web-based technology has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at the University of Delaware?

The first question required collection of categorical information for an understanding of each of the participating institutions' profiles. This included self-reported data about the number of students enrolled, the level of degrees that were awarded, and whether they considered themselves a research institution. There were more details collected about reasons for using ePortfolios, those on campuses using them, level at which efforts and programs were directed, and type technology implemented.

This second question was explored by first establishing the purpose of UD's ePortfolio initiative, as stated in the C2L data on the Catalyst for Learning website. This informed the identification of activities and inputs required to accomplish this specific purpose, as defined in the C2L participant's data. Once the process was understood, the technological requirements necessary to accomplish this specific

purpose could be identified. The last steps required an exploration of what worked and what did not work as stated on the Catalyst for Learning website.

Background

The University of Delaware is a state-assisted, mid-sized institution located in the Mid-Atlantic region of the United States. It is a Land Grant, Sea Grant, Space Grant, Urban Grant and Carnegie Research University (University of Delaware, 2017). The main campus is located in Newark, Delaware, a suburban community of nearly 31,454, situated midway between Philadelphia and Baltimore (Suburban Stats, 2017). Fall 2017 enrollment totaled 23,774 which included 18,144 undergraduates, 4,024 graduate students, 804 Associate in Arts students, and 802 professional and continuing studies students (Institutional Research, 2017).

Problem

The problem addressed by this EPP is the difficulty involved in deciding which ePortfolio solution best aligns with an institution's needs. The problem is confounded on the supply side by the number of technology vendors entering this field and the rapid pace of technology change. Besides facing the prospect of having too many vendors to decide among, institutions also must figure out what are the requirements that their institution's ePortfolio initiative needs to meet. The University of Delaware currently faces this problem and the primary purpose of this EPP is to figure out which vendor's ePortfolio system best aligns with the University of Delaware's ePortfolio requirements.

In the United States today, individuals benefit when they earn an undergraduate degree. Those who have more education achieve greater job stability

and receive higher compensation than those who do not (Buam, Ma, & Payea, 2013). This reality places greater importance on the knowledge and skill sets that students receive in college to adequately prepare them to succeed in a competitive job market. A major goal of a liberal arts education is to prepare students to be thoughtful and contributing citizens in today's world (Association of American Colleges & Universities [AAC&U], 2013). Although there are no simple answers that define a quality education, increasing attention from students, parents, and the government encourages colleges and universities to prove the value of their degrees. This increases the pressure on administrators to produce proof that their programs are successful. Added to this heightened focus is incentive for institutions to seek effective methods to assess student work and document outcomes to meet accreditation requirements.

Today's college graduates are expected to gain knowledge and acquire skills to help them be successful. This success requires a perspective and understanding of the world that is knowledge-based, global, and enables them to think creatively. Graduates must also be capable of responding to a rapidly and continuously evolving work environment, at a level requiring complex skills and higher-level abilities. The goal of providing a curriculum that meets this demand requires educators to consider appropriate adjustments in their presentation and delivery of instruction. One approach is developing and implementing academic experiences whose design and delivery align with research findings that focus on how people learn. These include the creation of curriculums that require students to engage in relevant activities and authentic experiences. These opportunities increase potential for students to acquire complex skills and higher-level abilities (Eynon & Gambino, 2017).

High impact practices in education transform the educational experience for students and instructors in multiple ways. Because the process of learning occurs in formats and locations that are different than more traditional didactic lectures, measurement of their success must be reconsidered. The former ways of measuring student success need to be adjusted so that they can accurately evaluate the attainment of knowledge and skills in ways that are different and go beyond the traditional forms of testing. Educators realize that the form and function of assessment must evolve to match the changes in the curriculum (AAEEBL, 2014).

Educators are also recognizing the academic benefits of students creating ePortfolios that meet requirements for their programs of study. There is a perceived value in the opportunity to capture data from the processes and products that are available from an ePortfolio initiative. The data provides an informed view of curriculum effectiveness and can identify where interventions are needed to facilitate desired student academic outcomes. The information ensures that the most effective and efficient use of resources is utilized to target specific areas, strengthening and increasing the value of the programs (Eynon, Gambino & Török, 2014).

There are ways in which ePortfolios can extend the use of other forms of assessment and contribute to a student's attainment of higher-level skills. AAC&U (2016) reports that this is one of the reasons they have been added to the list of high impact practices in higher education. When educators understand the potential benefits of ePortfolios on student learning, they begin to incorporate them into the requirements for their programs of study. As a result, this form of instruction and evaluation of learning creates an opportunity to collect data from the processes and products that are available from an ePortfolio initiative. This data can provide an

informed view of curriculum effectiveness and can identify where interventions may be needed for improvement of student academic outcomes (Eynon, Gambino & Török, 2014).

Chen and Light (2010) report that there are many issues impacting the transition to using ePortfolios in an academic setting. One of the major considerations is the decision about what technology will best serve the purposes of the initiative. This decision process needs to begin with first defining the purpose and goals of the project. Bass & Eynon (2016) assert that there is a detrimental impact to the student learning experience when an initiative starts with the topic of technology. They argue that the purpose and goals of the ePortfolio program must determine the type of technology to be used.

Once the purpose and goals of an initiative are defined, the choice of technology to support these becomes important for the success of an ePortfolio program (Chen & Light, 2010). There are fundamental differences in the purpose and goals for individual students presenting their learning or achievements than for an institutional-wide implementation focused on assessment. The complexity of this process impacts every aspect of decision making. When an ePortfolio initiative is implemented at an institutional level it requires everyone involved to be included in the decision-making process (Chen & Light, 2010). In any initiative there is a great deal at stake if the inappropriate choice is made, but this is particularly more risky when exploring options for a campus-wide implementation. The cost of the technology necessary for an institutional-wide implementation is a serious consideration, and there are many factors that can affect that price (Chen & Light, 2010).

In order to help institutions make strategic choices when deciding upon an ePortfolio system, this EPP constructs a model for comparing the various ePortfolio systems in order to determine which vendor best suits an institution's needs. After reviewing the literature in Chapter 2, this EPP considers in Chapter 3 the 24 institutional cases comprised by the national Catalyst for Learning initiative. After constructing a list of ePortfolio requirements, a qualitative weight and sum approach is used to create a model for ranking available ePortfolio systems according to an institution's needs. After comparing how the 24 institutions approached their ePortfolio initiatives, Chapter 4 applies the logic model to the University of Delaware in order to identify which ePortfolio vendor best aligns with UD's local needs. This EPP concludes in Chapter 5 by making recommendations about aligning efforts, defining pedagogical goals, understanding activities and inputs, and understanding the pedagogical role that the ePortfolio system will play. Informed by these recommendations, institutions can replicate the model by creating their own list of ePortfolio requirements for performing a qualitative weight and sum ranking of available ePortfolio systems.

Chapter 2

THEORECTICAL FRAMEWORK FOR THE PROJECT

This improvement plan examines, within the boundaries of the Catalyst for Learning project, promising technologies to support UD's ePortfolio implementation goals as part of its campus-wide assessment initiative. A review of the scholarly literature revealed numerous topics that provided the foundation for the plan. These individual topics further explored the relationship between complex and interrelated concepts, as well as the origin, nature and processes of ePortfolios as a high impact pedagogical initiative.

The literature review is organized into categories to examine ePortfolios from four perspectives: how ePortfolios support learning (Purpose); inputs and activities to achieve ePortfolio project goals (Process); implementation aspects (Requirements); and applicability to the UD circumstance (Functionality). Each of these perspectives contributed to an understanding of the multiple purposes, processes and requirements for ePortfolio initiatives in higher education - specific to the goals of UD within the Catalyst Framework as presented on the Catalyst for Learning: ePortfolio Resources and Research website. Imperative to the design and goals of the study was to have an in-depth and comprehensive grasp of the characteristics of the C2L project, Catalyst for Learning.

Purpose – Components and Roots

The history and development of ePortfolios in education is rooted solidly in the Constructivist approach to learning, which focuses on the social nature of learning and comprehending, rather than on the behavioral and cognitive aspects (Jones & Araje, 2002). ePortfolios have become a valuable learning tool in higher education, and there are many ways in which they are incorporated within academic settings. Educators are continuously exploring ways to promote their integration into students' learning experiences. However, emerging and changing technologies present challenges for ePortfolio implementation and their use. Among these challenges is how to balance ePortfolios as student-centered, high impact educational practice versus the recognition of their potential to support the assessment of learning and accountability for administrative purposes.

Constructivism and the History of ePortfolio in Education

ePortfolios were recently added to the list of high impact pedagogical practices (Watson, Kuh, Rhodes, Penny Light, & Chen, 2016). These teaching practices support the type of learning necessary for students to attain skills for 21st century success. They also include the following: out of class experiences; discovery learning; capstone courses; internships; and study abroad courses (AAC&U, 2013). Evidence of student learning has evolved and expanded to include various forms of digital artifacts. As students transition from content consumers to content creators the organization and presentation of their work becomes more complex. These projects do not show to advantage in paper folders. Due to advances in technology, these collections of student work may be digitized and presented online as ePortfolios (AAEEBL, 2014).

When ePortfolios are "done well" they have the potential to influence the academic experience for every stakeholder in an institution (Eynon & Gambino, 2017, p. 16). This level of value represents the greatest benefit of ePortfolio, but, "done well" requires disruption and change that challenge an academic community (Carmean & Christie, 2006). Every institution is unique and due to the complexity and extent of the processes and activities of an ePortfolio initiative there does not exist a one size fits all formula that guarantees success. A step toward a favorable outcome begins with an understanding of the origin and nature of ePortfolio.

In their work with the Catalyst for Learning initiative, C2L participants used the process and activities of ePortfolio to configure the Catalyst Framework as described in the previous chapter (Eynon & Gambino, 2017, p. 4). They collected information that supported the development of this framework that identifies three fundamental concepts: inquiry, reflection, and integration. These are essential to an ePortfolio strategy "done well" when they are linked with each other in a unified, active, and iterative process (Eynon & Gambino, 2017, p.20).

Purpose - Inquiry, Reflection, and Integration

ePortfolios Support Inquiry

Universities strive to provide students with access to high-quality academic experiences that prepare them for success upon graduation. The last century brought tremendous change, shifting the focus from an industrial economy to one that is information-based. Also impacted is what people need to know in order to succeed, as well as significant changes to the educational system. In an industrial economy the ability to read, write and perform mathematics were the essential skills (Bransford,

Brown, & Cocking, 2000; Siemens, 2006). However, today's employers seek individuals who also excel in critical thinking, effective communication, exhibit an innovative approach to problems, possess strong collaborative abilities, and operate confidently with a comprehensive understanding of the global aspect of today's communities (AAC&U, 2015).

Acquisition of these higher-level skills requires a very different process than is needed to become literate. In addition to memorizing subject related facts and figures, today's students also need to understand how these facts are related to other pieces of information that support larger, more complex ideas. The educational approaches and methods that were designed to prepare students for survival in an industrial economy are not as effective in the 21st century. Fortunately, advances in research during the last century have aided in a better understanding of how people learn (Bransford, Brown, & Cocking, 2000; Siemens, 2006).

Siemens (2006) stated "All knowledge is information, but NOT all information is knowledge" (p. vi). He further asserted that there are two essential aspects of knowledge when he said that "it describes or explains some part of the world and … we can use it in some type of action" (p. vi). The student first needs to have solid grounding in facts on a topic, but, as Siemens (2006) noted, it has been found through research that for information to exist as knowledge, the learning process must go far beyond the rote memorization of unrelated pieces of information.

The student must next be able to bring those facts together in such a way that they begin to build meaning. When students are able to connect isolated bits of information with other data, they are engaged in the process that curates this formally unrelated data into information that is usable as knowledge. It allows them to connect

and understand larger and more complex concepts that can support their understanding of the world (Bransford, Brown, & Cocking, 2000, p. 9; Siemens, 2006). The student also needs to be able to categorize and arrange the knowledge so that it is readily available for use in multiple instances and settings (Bransford, Brown, & Cocking, 2000, p. 16). The nature of ePortfolios and the process of creating an ePortfolio make them ideally suited to support the acquisition of higher-level skills. The ability to think critically and solve complex problems is an important skill and involves more than the memorization of a collection of facts. Critical thinking is a higher-level skill that requires students to actively engage with material in an immersive manner. As students learn about the topic and reflect upon their learning they develop a critical perspective. The ePortfolio has the potential to support this process.

In their work on situated learning, Lave and Wenger (1991) documented the importance of the social aspects of learning. Institutions recognize that the social component of learning can strengthen their programs, and ePortfolios are viewed as a way to improve communication and collaboration (Eynon, Gambino, & Török, 2014). They can help students feel connected and have the potential to encourage an online community for professional collaboration (Bollinger & Shepherd, 2009). A situated learning approach to curriculum allows students to discover how to deal with real world problems in an active engagement with authentic situations (Lave & Wenger, 1991). ePortfolios are a good fit for Constructivist-based curriculums that use a situated learning approach. This is due to their creation and structure which support a wide range of forms representing the learning that takes place during the discovery process.

In their study that focused on the integration of a digital ePortfolio system into an academic program, Bollinger and Shepherd (2009) introduced an ePortfolio requirement to a semester long graduate level online instructional technology course. As a result of their success when integrating it into the course, their university is considering adding a mandatory ePortfolio requirement to their programs. They cite improved communication, student connectedness, reflection to view student development, professional collaboration via an online community, and measurement of learning as desired outcomes. Their technology choice is Google Sites, a collection of web 2.0 tools with a strong and stable platform to support social learning capabilities, as well as sophisticated processes that allow a high level of functionality (https://sites.google.com/site). Furthermore, their study found that the introduction of an ePortfolio component into the online course improved communication and lessened the isolation for many students in their course (Bollinger & Shepherd, 2010).

ePortfolios Support Reflection

Dewey (1997) explained the importance of students being able to reflect on the past in order to inform their actions in the present. Reflection is an important component of ePortfolios. It serves as a process central to students' ability to connect their learning from different sources and integrate this new information with their previous understanding of their world.

Eynon, Gambino, and Török (2014) found compelling support for the importance of reflection in the role of learning as institutions consider how to implement ePortfolios. They discovered that the process of creating an ePortfolio allowed transparency; the instructor was able to see concepts that students were comprehending, as well as areas in which additional help was needed. Additionally,

ePortfolios provide an opportunity for students to incorporate reflection with their learning so that they are able to interact with the material in an authentic manner. They also are able to make connections between what they already know and new information. This process supports the students' progress towards a profound understanding of complex topics (Eynon, Gambino, & Török, 2014).

These recorded reflections create a visible record that is a snapshot of the student's journey toward understanding how the information they are learning in their daily experiences connects or contradicts what they knew before. These recordings are built around the experiences and information that the learner is exposed to and engages with. They serve as benchmarks that represent more than an opportunity to consider the success of a curriculum or an institution's success. For a learner who is challenged to think carefully about a topic, record that reflection, and receive formative feedback as they progress through their program of study, there is the opportunity to really understand at a deep level what they are learning. This deeper level of learning has more potential for the student to transfer and apply that understanding to future experiences.

Reflection provides students with opportunities to relate ideas, information, and experiences in ways that unify their self-concepts, and this knowledge can help inform their future decisions. This process occurs repeatedly as students proceed through courses and programs through the integration of their entire undergraduate experiences. Reflection is the thread that connects and documents a student's journey. The connection begins at the point when learners begin to memorize facts in their fields of study. The process continues throughout their acquisition of knowledge and

attainment of skill sets, allowing them to competently evaluate the world in which they live, while creating new items within.

To create the ePortfolio, the student sorts through his or her work and decides what pieces best represent purpose for the audience. When students make these choices, and then reflect on the process, it allows them to feel in charge of their learning. Reflection supports the process of metacognition, which leads to a deeper learning experience. When students think and write about their experiences and learning, it allows them to examine a concept or piece of information from a different perspective. They have the opportunity to become more familiar with that knowledge at a deeper level. This is an important step toward becoming an autonomous learner (AAEEBL, 2014).

ePortfolios Support an Integrated and Connected Experience

The successful mastery of the outcomes for their academic program requires students to understand how their formal and informal learning experiences contribute to their roles as citizens in the 21st century. Freire (2002) stressed that students are not "containers to be filled." He stated the need for students to be able to engage with the material in a real way and be able to create new meaning for themselves.

A constructivist approach to learning recognizes that students come to the classroom with their own understanding of the world (Freire, 2002). ePortfolios provide a place for students to record information that becomes a benchmark for what they know at a specific time in their learning. This documentation allows the learner to view this entry later and see how much they have learned as they have new experiences and are exposed to ideas and information. And, the record also provides the instructor an opportunity to identify where in the curriculum the student has

learned or not learned the new material (Bransford, Brown, & Cocking, 2000, p. 78). This transparency provides an opportunity for the instructor to give feedback to the student that is formative and this has the added advantage of being available in a timely manner. Scaffolding is more effective when it is structured to promote the student's movement towards self-assessment, in the form of reflection (Black, Harrison, Lee, Marshall, & Wiliam, 2004; Nicol & Macfarlane-Dick, 2006). They define "good feedback practice" as an approach to assessment that increases the learners' ability to actively participate in determining their own learning as self-regulation (Black et al., 2004, p. 205).

Educators recognize that traditional didactic methods do not efficiently support students' acquisition of sophisticated skills and knowledge that will prepare them for the 21st century workplace. Researchers have found that the careful and authentic integration of ePortfolio into a curriculum can effectively support this kind of learning. Peet, Lonn, Gurin, Boyer, Matney, Marra, and Taylor (2011) used an action research approach to examine the integrative learning process and how it could be assessed and measured with the use of ePortfolios. They used data from this study to define, support and assess how students integrated their course work with life-wide and lifelong experiences using ePortfolios. In this program ePortfolios were used as a way for students to document their accomplishment of their planned activities in their academic program.

They incorporated into the curriculum activities and assignments that included components asking the students to reflect on how their projects were connected to life-wide and lifelong experiences. Life-wide meant that the students could relate the lesson with experiences outside of the specific course, such as in their other courses,

or away from the campus. Lifelong meant that the students were able to connect the lesson with experiences that occurred before they attended the program, as well as their relevance to future activities, even after they graduate. Their findings stress the need to identify and define integrative learning and how it can be assessed. It also explains the need to develop authentic and relevant activities to support the outcomes for students using ePortfolios so that they integrate their learning and life experiences (Peet et al., 2011).

ePortfolio as a Process for Learning vs as a Product of Learning

ePortfolios are deliberate digital format collections of students' work representing learning and/or accomplishments for a particular audience and at a specific point of time in their progress (Ravet, 2005). ePortfolios are created differently to reflect project purpose and intended audience. It is important for stakeholders in an ePortfolio initiative to recognize the varied roles that ePortfolios can play (Barrett, 2011).

Because the actual process of creating ePortfolios represents the very definition of a Constructivist approach to learning, their use is well-suited to the successful attainment of higher level learning outcomes for students in the 21st century (Eynon & Gambino, 2017). But, they can also be viewed or evaluated as a product of the ePortfolio process. They are particularly well-suited to serve as a venue to showcase skills and knowledge for students. The technology that exists today supports many possibilities for creative expression in an ePortfolio including video (Cheng & Chau, 2009), multimedia, and other interactive content.

The role of an ePortfolio as an active learning activity is different than the role of an ePortfolio that shows accomplishments. The first represents the process of

learning, and the second allows the learner to show what they learned. The student is the stakeholder in both, but the audience is different. This is an important distinction between ePortfolio as a process and ePortfolio as a product (Barrett & Wilkerson, 2004).

An essential 21st century skill for learners is their ability to represent themselves digitally for different purposes and audiences beyond their academic careers. There are very real advantages for students that possess the skill set to create different versions of their ePortfolios, for multiple purposes, and various stakeholders (Jarrott & Gambrel, 2011). This includes taking responsibility for creating their professional presence on the Internet. As students make the connection between the experiences, topics, and knowledge in reflection, they learn about their place in the world. The creation of an ePortfolio provides students with an awareness of the importance of having a digital footprint that supports a positive image. They will need to make decisions about how to represent themselves in different situations and to different audiences throughout their academic career and beyond. The process of ePortfolio creation arms them with the knowledge and skill sets to make it happen. When students are knowledgeable about which technology is best for their purpose and audience, they are able to make informed decisions (Heinrich, Bhattacharya, & Rayudu, 2007).

Challenges of ePortfolios

Institutional vs Student Ownership

There are multiple uses of ePortfolios in higher education. This understanding of the multiplicity of purposes for ePortfolios makes it possible to discover what activities and processes are needed to accomplish the different types. It is important to

understand their differences and to inquire about what technology is needed to make each successful. The discussion to this point has focused on how ePortfolios can support the constructivist approach to learning for a "learner-centered" perspective.

The Learner-centered ePortfolio

The goal for students is to fulfill the requirements for their field of study while engaging with the material and connecting it to the rest of their world. Successfully doing so requires learners to attain ownership and mastery of their own academic journeys. One potential for student-centered ePortfolios in education is that they allow students an opportunity to become the center of their own learning experience. Students who have control over how their work is displayed are more likely to engage in the process in an authentic way (Cambridge, Cambridge & Yancey, 2009).

This combination supports and enriches the empowerment that epitomizes the identity and role of a responsible and responsive citizen in today's world. Furthermore, this is an individual engaged with the world with an informed, reflective, and critical perspective that includes an understanding of its complexity and an acceptance of its diversity. Increasing the level of control students have over the creation and content of their ePortfolio allows them to develop a feeling of ownership. As students study and reflect on their projects and start to connect their meaning to make sense of their world, they are able to make decisions about what they learn (Cambridge, Cambridge & Yancey, 2009).

ePortfolio programs focusing on the needs of the learner can be a good way for students to have a record of their academic growth. During the time students are in courses or academic programs that utilize ePortfolios, they continuously collect the assignments they create in different courses. They also reflect on their learning

experience as they create each of these artifacts. The actual artifact combined with the thoughtful reflection represents their understanding of the concepts. In the next course, internship, or project that focuses on that concept, the students work to construct new meaning and to understand it at a deeper level. The structure of the ePortfolio allows the students to connect this new perspective to what they understood before. This iterative process of creation and reflection allows the students to understand how to integrate what they are learning with what they already knew. This becomes a visible record of their learning, and they can see their progress. The student-centered ePortfolio can provide an environment of reflection that encourages the development of the students' ability to assess their own competencies. This self-assessment is an important skill for students to master for successful careers in the 21st century. Students who are able to understand their strengths and weaknesses, and represent themselves in a professional manner, can use this knowledge to recreate their ePortfolios repeatedly for different audiences throughout their careers (Heinrich, Bhattacharya & Rayudu, 2007).

Assessment of Learner-centered ePortfolios

Results from traditional testing do not effectively or accurately demonstrate students' mastery of their knowledge and skills. The complexity of the process necessary for students to master the goals of these curricular and co-curricular activities and produce the digital evidence that represents that mastery, lends itself to the use of more than one form of assessment. A different approach and format are needed to capture the scope and depth of a student's achievements. To meet this need there are academic programs requiring students to create ePortfolios as a collection of artifacts that represent their learning and showcase their best work.

In some cases, however, the primary focus is on the needs and goals of the institution. An ePortfolio program may be initiated as a way to collect data for an external program review, or as an assessment of a program's effectiveness. These uses are described as "Top Down Driven" programs. Sometimes, it is only after the software and procedures are in place, that the students' role in these scenarios is considered.

Accountability and Accreditation

Research by the AAC&U and Hart Research Associates indicates the presence of high academic standards are vital to provide students with access to a quality liberal educational experience. The research and collaboration of faculty from many higher education institutions across the country have resulted in guidelines and publications to support educators in their efforts. As part of one of their initiatives, AAC&U launched Valid Assessment of Learning in Undergraduate Education (VALUE). This effort has resulted in rubrics designed to measure complex learning outcomes, such as "written communication, quantitative reasoning, and critical thinking" (AAC&U, 2013).

The Middle States Commission on Higher Education (MSCH) validates that colleges and universities consistently provide the highest caliber of educational experience to their students (http://www.msche.org/). MSCH conducts an Academic Program Review to determine whether institutions are delivering a quality educational experience to their students. This is a formal process whereby a carefully selected committee methodically examines all aspects of a program and/or institution. Following a formal evaluation, the MSCH committee issues a report stating what is working well and where improvement is needed. Assessment of student learning is an

essential component of these reviews (Middle States Commission on Higher Education, 2014).

At UD, the General Education Goals determine the direction and focus of the undergraduate program curriculum in the form of learning outcomes. These outcomes support the students' acquisition of knowledge, skills, and expertise that prepare them to succeed in 21st century organizations. These are higher-level skills that require students to actively engage with material and ultimately take control of their learning experience (University of Delaware General Education Initiative, 2018).

Process

The previous section focused on learning and how ePortfolios support learning. A thorough understanding of the ePortfolio process, combined with knowledge of the initiative's purpose, will aid in the exploration of technology options. This section identifies the inputs and activities necessary for the processes needed to achieve ePortfolio project goals. This understanding is important, as it will make visible the technologies needed for implementation.

Due to the wide range of purposes that ePortfolios serve, along with the transformational nature of their use, there are multiple perspectives of definitions and names regarding their implementation. This can create a great deal of confusion for educators who are tasked with making decisions regarding the best technology fit for their institution's goals. Identifying steps in the process provides a visible pathway to addressing implementation goals. It clearly outlines successful implementation pathways and guides decision making toward understanding what will and will not work. This strategy increases the potential of the ePortfolio project meeting specific goals of the institution. It also lessens the chances of stressing limited resources by

spending time and effort toward projects that fail to achieve the purpose of the initiative (Cambridge, 2010, p. 198).

Process vs Product

The Process of ePortfolio and the ePortfolio as a Product

There are many reasons to use ePortfolios; even institutions that are similar in size and mission, will still have a unique set of requirements for their goals. However, there are some aspects of ePortfolio that they all have in common. As previously stated, certain activities are common to the ePortfolio process. Cambridge (2010) identified these common elements and provided a framework for educators to use.

Table 2 shows how Cambridge's framework identifies five components of this complex process: capture; management; reflection; synthesis; and analysis (Cambridge, 2010, p. 191). He explained that these are central to a successful project and it is important to understand their specific role before deciding what technology to use (Cambridge, 2010, p. 198).

Table 2 Cambridge's Framework of Activities Common to ePortfolios

Activity of Support	Goal of Activity
Capture	Capture and Collect Evidence
Management	Aggregation and Management
Reflection	Sustained Reflection
Synthesis	Selection and Synthesis
Analysis	By Human Readers and Computers

Note: The data reported here were collected in the Spring of 2016.

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This framework becomes more useful when it is combined with the purpose of the ePortfolio initiative. As previously discussed, tension exists between finding a balance between initiatives that serve the interest of the learner versus those that support institutional goals. These two have different inputs and activities. Even though they both use the same framework, their purpose will determine what is needed for them to be successful in determining whether an ePortfolio is considered Learner-centered or Institutional (Barrett & Wilkerson, 2004).

Himpsl and Baumgartner (2011) introduced a "taxonomy of ePortfolio" and list the major activities in a slightly different configuration. Nevertheless, as Table 3 illustrates, it is possible to see the common elements.

Table 3 Himpsl and Baumgartner Configuration of Elements Common to ePortfolios

Activity of Support	Goal of Activity
Capture	Collecting, organizing, selecting
Management	Representing and publishing
Reflection	Reflecting, testing, verifying and planning
Synthesis	Administrating, implementing, adapting
Analysis	Usability

Note: The data reported here were collected in the Spring of 2016.

Another resource for information related to ePortfolio is the Electronic Portfolio Action and Communication (EPAC) website. This website provides information on the technology that is available and links to information on how to make a decision about what tools work best for each initiative. The support is volunteered by experts in the field of ePortfolios (Barrett, 2017).

Peterson (2014) posted a way to define ePortfolios by their deployment. Table 4 shows how he codes levels as Institutional Deployment, Learner Deployment, and Third Party Deployment.

Table 4 ePortfolio Technology by the Type of Deployment

Deployment	Feature	Pros	Cons
Institutional	Operated by Institution	Technical Functionality is High	Limited Portability, Limited Control for Learner; Institution Controls
Learner	Learner Controls	Ownership Control is High for Learner	Technology Support May be Necessary
Third Party (Type 1) Designed as ePortfolio	Learner Adopts Third Party Tool	Ownership Control is High for Learner	Institution Access Limited
Third Party (Type 2) Not Designed Just for ePortfolio	Learner Adopts Third Party Tool	Ownership Control is High for Learner; High Portability	Institution Access Limited

Note: The data reported here were collected in the Spring of 2016.

According to Ravet (2007), "an ePortfolio is not a product and a process, but is a product as a result of a process." Table 5 shows how he presented the idea of an "ePortfolio enabled environment," comprised of the ePortfolio, ePortfolio Management System, and ePortfolio organizer. The ePortfolio organizer is the individual's repository of artifacts, reflections and other representations of the individual's digital identity. Ravet differentiated between this collection and the ePortfolio of the individual that is prepared for a specific purpose and audience. The

individual draws from the larger and complete personal collection that resides within the ePortfolio organizer and creates a more focused and specific snapshot representing successful attainment of skills and knowledge to meet criteria of a unique audience. The creation and process of hosting this ePortfolio resides within the ePortfolio Management System. This ePortfolio Management System is organizational software that oversees the direction, hosting and assessment of this ePortfolio (Ravet, 2007).

Table 5 Ravet Envisions a Model for ePortfolio Management

ePortfolio Environment	ePortfolio	ePortfolio Management System	ePortfolio Organizer
Purpose	Learner Prepares ePortfolio	Institution Originates and Learner Participates	Comprehensive Collection of Learner's Artifacts
Product	Product Used for a Specific Purpose and Audience: Showcase, Presentation, Accomplishments	Product Used as Evidence of Learning: For Certification, Degree Completion, Academic Requirements	Learner Curates: Selects Items that Represent Learning, and Achievement for ePortfolios
Ownership	Learner Owns Content and Context	Institution Owns the Process and Learner has Limited Level of Control	Learner Owns Content and Context – Learner Manages
Access	Learner Has Control Over Access	Institution Determines Access	Learner Has Control Over Access

Note: The data reported here were collected in December 2015.

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Requirements

Levels of Implementation

Learner-centered ePortfolio

If the major goal of the initiative is to facilitate learning, then it is reasonable to expect that students are major stakeholders in the process. This focus permits the learner to choose the best tool for their specific project. It is useful when the platform is sophisticated and highly functional and displays the student's work in a professional manner. Programs that allow advanced creative control of the design and look of the ePortfolio can increase the value of the student's experience. This happens because when students feel they can determine how their site looks then they are more likely to engage with the material and the process of learning (Barrett, 2004).

Thought must be given to ensure that students understand how to submit their assignments, as well as ensuring that they are viewable by the instructor. They must also understand how to protect their privacy. It is important that students know the mechanics of how to receive the feedback from their instructor and how to respond accordingly.

Courses ePortfolios

When the ePortfolio is aligned with the learning outcomes in a single course the instructor can create rubrics so that the students are able to understand the expectations for that semester. Identifying and communicating learning outcomes for each course is an important ingredient of a successful academic experience for students. ePortfolios can be very useful for this purpose, particularly in courses that

create learning experiences that are difficult to assess by a standardized test or paper assignment (Eynon, Gambino, & Török, 2014).

Formative assessment of student learning is a major consideration for instructors. The cycle of feedback and the act of reflection are features supported by an ePortfolio that make students' learning visible to the instructor. When the instructor can view the work that the students are accomplishing, and provide immediate feedback, this becomes a valuable learning tool (Parker, Ndoye & Ritzhaupt, 2012).

Academic Program ePortfolio

There are advantages and challenges to bringing an ePortfolio component to an entire program that are different from using them in an isolated course (Housego & Parker, 2009). The process of implementing an ePortfolio component into a program is influenced by many issues (Penny Light, Chen, & Ittelson, 2012). For the greatest impact in a student-centered learning experience that is central to the curriculum of an entire academic program, the ePortfolio needs to consist of collections of artifacts from course work, as well as experiences outside of the classroom. It needs to include the students' reflections on their learning. When this process begins in the gateway course to the major, and culminates in the capstone course at graduation, it means that each ePortfolio is a large, complex, and unique creation.

This level of ePortfolio integration allows instructors to visualize courses as a progressive continuum in a coordinated curriculum. There are program directors that plan their curriculums to support the successful integration of the ePortfolio experience beyond a single course and into the total length of the academic program. For these programs there is the opportunity for the ePortfolio to be an essential

component of the curriculum and to play a central role in the structure, placement, and focus of each core course (Wickersham & Chambers, 2006). It has more value to the students when it is integrated into the curriculum in an authentic and productive way (Wickersham & Chambers, 2006). Integrating the ePortfolio creation at the earliest point in the program is beneficial for timely delivery of feedback. This allows the assessment of students' work to start at the beginning of the program and continue at strategic intervals (Lowenthal, White, & Cooley, 2011). Since ePortfolios have the ability to make learning visible to the student and the instructor they allow the potential for continuous assessment during the length of the program. The students document their learning and integrate their reflections as they work their way through the academic program. Monitoring this process over this length of time provides a record that allows the students and their instructors to see how they have grown as learners. This helps them focus and pace their future activities. This also gives instructors a chance to make sure the students are getting the scaffolding they need to succeed in their field of study (Bollinger & Shepherd, 2009).

Institutional Level ePortfolio

There are multiple uses for student-centered ePortfolios, and there are also valid reasons why an institution would want a campus-wide ePortfolio program (Danielson & Abrutyn, 1997). Some institutions design an assessment initiative that is framed upon the ePortfolio, enabling them to collect and process data about the success of the instructors, staff, and the academic programs (Lowenthal, White & Cooley, 2011).

When information is consistently and systematically collected and organized it can be available to support an academic program review for the purpose of

institutional accreditation. Eynon, Gambino, and Török (2014) found that when an academic community grapples with the issues of implementing an ePortfolio program at a campus level, there is a unifying dynamic that encourages collaboration and focus on a shared commitment to create a "learning-centered" environment (Eynon, Gambino, & Török, 2014).

Assessment

There are compelling reasons for why an institution would implement a campus-wide ePortfolio program. Aspects of ePortfolios make them attractive to administrators, particularly as a way to assess the viability of an institution or success of a program. Institutions often seek and acquire an ePortfolio program that has strong components for the purpose of accreditation and or accountability (Jafari, 2004).

Benander, O'Laughlin, Rodrigo, Stevens, & Zaldivar (2017) identified three purposes for creating ePortfolios. The purpose and viewer are the primary factors for determining the type of ePortfolio.

- A learning ePortfolio documents how well a student is doing as they are in the process of learning.
- A professional, or "showcase" ePortfolio presents the individual's successes.
- An assessment ePortfolio measures what the learner has accomplished toward meeting the requirements.

Assessment of ePortfolios requires a commitment of time and resources from faculty, which needs to be considered. Because assessment is a major component of

the ePortfolio's purpose, it is usually closely tied to the requirements of the curriculum (Lowenthal, White & Cooley, 2011). There are different types of assessment. While ePortfolios are usually used as a tool to evaluate individual student learning, there are instances when faculty want the ePortfolio structure to support student "self-assessment" and "professional development." This represents a different approach to design and placement of the assessment needed for these purposes (Jarrott & Gambrel, 2011).

Functional Requirements

A thorough understanding of what an ePortfolio initiative is trying to accomplish, combined with the knowledge of how people learn, provides for exploration of what makes this process work. This process allows the steps to be visible, and that transparency is needed to ascertain what technology is required and how it is different (Mu, Wormer, Foizey, Barkon, & Vehec, 2010). There are various activities and processes, so there will be different requirements to maintain and sustain the implementation. When the individual steps to enable this complex process are identified and understood, Cambridge (2010, p. 198) recommends that the source for the selection of appropriate instruments include the broad spectrum of technology available.

When the goals are known it becomes possible to identify technology requirements that have the best potential to support them. The reality is that that there are many choices. There is also an added dimension of constantly changing technology, which occurs across a wide range and at every level. This is evidenced by change that has the potential to alter the most fundamental understanding of what is

possible, and thereby has the potential to impact the decisions that are made in small, but sometimes not so small ways.

Included are such advances as how many gigabytes of data can be stored, or what level of security can be applied to specific documents, or how functional are the protocols that support the interoperability between programs. Recent advances in technology that include the storage capacity, availability, and cost of using the "cloud" minimized previous problems with the large file sizes of ePortfolios. There were real concerns that the file size of media within ePortfolios would overwhelm and test the limits of most campus resources. At one time the cost for server space was a major consideration that could rule out platforms as options for adoption.

The severity and increasing number of cyber-attacks has become a threat that must be considered. This concern demanded the need for more sophisticated security for personal data. There is now more flexible and reliable security that aligns well with the particular needs of ePortfolio. Security is now available on every item uploaded whether it is a document or a video file. The level of access can be controlled by both the learner and the administrator to match the specific needs of the users.

Even recently, there were major issues with interoperability between systems across the Internet. But, there has been great progress in this area of technology. The development of standards and protocols has changed from a frustrating limitation to a situation where there are now many more options for adopting technology that is capable of increased integration, alignment, and interoperability with other technology.

These were some of the issues that were serious impediments to the function and usability of ePortfolio systems in education. This translated into frustration and

disenchantment for stakeholders and resulted in concerns about the practicality of ePortfolios in academic settings. However, in keeping with other technology in the 21st century, the appearance and acceptance of new technologies is changing dramatically. There is an expanding repertoire of solutions available, and these include the presence of technologies such as the "cloud", blockchain, and "tin-can." It remains true however, that when looking for technology that will support a process of this level, even when the process is clearly defined and understood, the choices can seem overwhelming.

Pedagogy Determines Technology

When deciding on the most appropriate technology, it is essential that the academic goals are considered first. Penny Light, Chen and Ittelson (2012) stated that though there is great value in using ePortfolios, careful attention must be paid to how the project begins and proceeds. They proposed a combination of strategies that support the integration of ePortfolios into an academic program. This "ePortfolio Implementation Framework" evolves as key questions are proposed and answered during the decision process. This must occur so that the decisions that are made align with the specific and unique needs of the program.

This ePortfolio Implementation Framework as described by Penny Light, Chen and Ittelson (2012, p. 2) consists of the following eight dimensions: "defining learning outcomes, understanding your learners, identifying stakeholders, designing learning activities, using rubrics to evaluate ePortfolios, anticipating external uses of evidence, including multiple forms of evidence, and evaluating the impact of ePortfolios."

Chapter 3

METHODOLOGY AND DATA COLLECTION

Introduction

Chapter three of this improvement plan examines the technology used to support ePortfolio initiatives on campuses that participated in the Catalyst for Learning project. I analyzed detailed descriptions of 24 institutions' ePortfolio initiatives documented at the Catalyst for Learning ePortfolio website in order to achieve an understanding of how other institutions across the country are approaching ePortfolio initiatives. This process supported the identification of technology that has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at the University of Delaware.

The first question in this examination focused on discovering how institutions of higher education are approaching the technological component of ePortfolio on their campuses. This exploration provides a snapshot of how the pedagogical goals of these academic communities influence decisions about their technology choices. This will allow the identification of available technology that has the potential to meet those requirements.

The next step was to discover what UD wanted to accomplish with an ePortfolio initiative. This would allow the identification of what process and activities were necessary to successfully attain that purpose. With this knowledge of the details of this process it is possible to decide what technology is required to support it.

Building on the scholarly literature review in chapter two, which discusses ePortfolio processes in higher education and their potential applicability to the UD circumstance, the data collection activities were designed to inform future decisions about technology choices. These must align with the pedagogical goals of UD. They must also discover, describe, understand, and identify the ePortfolio technology that will simultaneously support institutional level assessment and a student-centered experience.

The following questions guided the inquiry:

- How are institutions across the country approaching ePortfolio initiatives?
- What available technology has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at the University of Delaware?

The first question required the collection of data that identified what other institutions were doing to support ePortfolios at their schools. This data was cleaned and analyzed to determine what items represented the different institutions' requirements and what technology was in place on their campuses. A matrix was created to represent the results.

There were four steps taken to determine what technology qualified to answer the second question.

1. What is the purpose of UD's ePortfolio initiative, as stated in the Catalyst for Learning data?

2. What is the process necessary to accomplish this specific purpose as defined in the Catalyst for Learning data?

3. What are the technological requirements necessary to accomplish this specific purpose as defined in the Catalyst for Learning data?

4. What ePortfolio technology has the potential to support UD's goals for an ePortfolio implementation as stated in the Catalyst for Learning data (what worked and what did not work)?

To assist in meeting improvement plan goals, several concerns need to be addressed. These include the following: (1) discovery and description of UD's specific purpose for the project; (2) activities and processes needed to accomplish these goals; (3) technological requirements necessary to support the processes and activities; and (4) identification of technologies with the greatest potential to support UD's specific requirements. Addressing these concerns, while exploring the questions guiding this inquiry, will result in recommending promising practices to inform and guide UD about the technologies that best support an ePortfolio component. The inquiry process includes a qualitative approach to document analysis that included the use of qualitative weight and sum, the development of graphic representations as logic models, as well as creation of a matrix for answering the inquiry question.

Research Strategy: Qualitative, Document Analysis, and Data Display

An ePortfolio component for an institution-wide assessment program consists of a complex series of actions that are accomplished in a specific order. To achieve this level of implementation successfully, it is necessary to clearly understand overall

project goals; it is equally important to identify process details at a granular level. Thus, a strategy comprised of multiple ways in which to collect and analyze a volume of information is needed. Also necessary is a central location whereby inquiry data can be aggregated and referenced. A qualitative research strategy includes options for data collection and data analysis that are well suited to the goals of this exploratory and descriptive inquiry (Patton, 2002, p. 252).

Qualitative Document Analysis

When planning an improvement plan design, a qualitative approach lends itself to analyzing events through a "naturalistic" lens. This frame of reference supports inquiries occurring in authentic settings. It also means that the strategy is designed so there is no interference with the circumstances of the phenomena under inquiry (Patton, 2002, p. 39). Additional strengths of a qualitative approach to design planning include "emergent design flexibility" (Patton, 2002, p. 44), as well as understanding the nature of qualitative data and "dynamic systems" (Patton, 2002, p. 50). Furthermore, a qualitative strategy for data collection includes the examination of documents (Patton, 2002, p. 46).

A critical component of this improvement plan design is the qualitative orientation toward the use of "purposeful sampling." This sampling technique involves a thoughtful and deliberate selection process that seeks the most relevant and "information rich" participants (Patton, 2002, p. 45). This was used to decide which institutions were engaged in the Catalyst for Learning initiative. Purposive sampling was chosen because of the availability of useful and relevant data from institutions similar to UD in specific ways central to the ePortfolio process.

The purposive selection of institutions is also important since the goal of this inquiry is to generalize the findings to this particular type of context, rather than a larger population (Patton, 2002, p. 46). The design and scope of these institutions' initiatives are similar to UD's purpose and goals. This added a value of comparison and increased the potential for an analytical generalization (Yin, 2009, p. 38).

A qualitative approach is also useful for data collection, particularly when a great deal of information that comprehensively describes phenomena is the focus of the inquiry and needs to be collected. This is particularly important to the purpose of this improvement plan because it involves a complex process. Additionally, a great deal of the most crucial data is available from people who recorded firsthand and detailed descriptions of their actual experiences with an ePortfolio initiative. Qualitative data is collected with a document analysis (Patton, 2002, p. 49). For this inquiry, a thorough examination of the reports and narratives on the Catalyst for Learning website were essential steps toward understanding the process.

This became relevant during the process of reading participant narratives documented on the Catalyst for Learning website. It was important to focus on the pertinent facts, yet at the same time recognize that the participants grappled with new and often unforeseen situations. Their comprehensive and detailed reports revealed challenges they faced when dealing with technology in nontraditional ways. It was important to this inquiry to consider the context as these individuals sought answers to issues that often seemed conflicting and complex.

The data collection strategy for this improvement plan required an examination of what technologies worked and which did not regarding an institution wide ePortfolio implementation. The qualitative approach to a document analysis was

integrated into the inquiry strategy because it was the most logical and complete way to answer the questions (Merriam & Tisdell, 2016, p. 24).

The design of a document analysis is a plan. Its most important role is to ensure that the methods utilized connect the evidence to the questions asked in the improvement plan. Yin (2009) identifies five essential elements of a document analysis design to ensure that the inquiry purpose is linked to the data source, collection and analysis. These include the questions on which the query is based, purpose, phenomenon under study, a clear statement of how the methods connect to the purpose, and specifications for using the data (p. 27).

The Connect 2 Learning (C2L) project was selected as the data source because of its relevancy to the guiding questions of this improvement plan. Because this is an exploratory document analysis, what would usually be the hypothesis in other types of document analysis designs, is the actual "topic" of this inquiry (Yin, 2009, p. 28). This increases the importance of the purpose as an element in the design. The purpose of the discovery is to determine which technologies have the best potential to meet UD's ePortfolio requirements. Due to the goals, structure, and activities of the Catalyst for Learning initiative, and UD's role in that program, the Catalyst for Learning website was a rich, relevant, and authentic choice for the second essential element defined by Yin (2009, p. 28).

The third element of the document analysis design was the unit of analysis. For the purpose of this improvement plan, the questions ask exploratory and descriptive questions about specific technology as it relates to a defined ePortfolio initiative at UD. This means that the focus of the inquiry is the technology that is referenced in the Catalyst for Learning initiative.

It is important that the researcher set boundaries for the document analysis to ensure that necessary data is gathered and that it is specific to answering improvement plan questions (Merriam & Tisdell, 2016, p. 24; Yin, 2009, p. 32). Doing so guarantees that enough of the pertinent information is available, but not too much data is collected so that its organization and storage becomes a problem. This contributes to the usefulness of the data because the amount of information is manageable. Setting the limit on the scope of the inquiry means that the document analysis represents a "specific, real-life" situation (Yin, 2009, p. 32).

The size of the inquiry was also limited; only Catalyst for Learning initiative participant data, from the experiences and technologies used, was collected and analyzed. This assured that the data collected addressed the inquiry question.

Merriam and Tisdell (2016) explain that the qualitative document analysis study approach may support an analytical generalization, but does not function toward the use of statistical generalization. Statistical generalization requires a different methodology that includes a sample selection generalized to a larger population (Merriam & Tisdell, 2016, p. 253). In contrast, a document analysis in evaluation research does not have this purpose or utilize methods necessary for this. The purpose of this inquiry is a deep understanding of a very specific process as it occurs in a particular institution. Therefore, the purposeful selection strategy allowed the collection of more valid information because the institutions were comparable to UD, both in academic goals and student composition.

Logic Model

The improvement plan seeks to discover and understand specific processes within organizations so that applicable technologies can be identified. Patton stated

that types of inquiries are defined by their purposes (2002, p. 224). And, according to his typology, this kind of inquiry is known as evaluation research. This is because its purpose is to ". . . improve an intervention: A program, policy, organization, or product" (Patton, 2002, p. 224).

Patton (2002) described evaluation research as "research that can be conducted on virtually any explicit attempt to solve problems or bring about planned change" (2002, p. 218). He stressed that the central and determining influence in all factors of an inquiry depend on defining exactly what the "purpose" is (p. 213).

Additionally, Weiss stated that "program theory" is an expectation that if specific activities occur, in a given order, they will result in certain outcomes (1998, p. 47). Thus, "program theory" sets the stage for the "implementation theory." A program's "implementation theory" explains the specific activities that determine the program's success (Weiss, 1998, p. 58). 'Theory of change' is applicable to this improvement plan's strategy because understanding this process, at this level, supports creation of a logic model that makes the presence of multiple and obscure operations explicit. It supports the presentation of clear picture program goals, along with planned actions toward achieving those goals. This becomes fundamental to understanding what activities worked and what activities did not work as planned in the program (Weiss, 1998).

To understand this complicated process, as well as the factors impacting its success, resources needing to be combined were examined to produce a successful ePortfolio implementation that matched UD's purpose and goals. This need was best answered with the use of a logic model, which illustrates the complex steps required in a campus wide ePortfolio initiative. The use of this approach also supports the ability

to discover and understand the specific function and role of technology, even though this process involves many inputs, activities, and outcomes (Weiss, 1998, p. 60).

Improvement Plan Design

This improvement plan's strategy provided an organized structure to guide the process as choices were made about design and methods to answer the guiding questions. This supported an exploratory and descriptive approach to identify and understand how different and unconnected processes evolved into a cohesive and logical sequence of actions. It is important to note that the specific design and method choices were determined by referencing the overarching inquiry strategy.

Instrumental to the design of the improvement plan is data collection, data reduction, and data analysis. From the beginning of this inquiry, these occurred concurrently (Corbin & Strauss, 1990, p. 6; Miles & Huberman, 1994, p. 10). A repeating relationship pattern, between these three processes, continued throughout the design, collection, and data analysis. The information collected from each of the questions informed the data collection and analysis methods for the next step. This ensured that the findings of this inquiry emerged directly from the data (Merriam & Tisdell, 2016, p. 195).

The focus of this improvement plan is on technology as it relates to the ePortfolio initiative at UD as referenced in the Catalyst for Learning reports. Participants were purposely selected for their active involvement in support of the technological processes and specific outcomes of the ePortfolio project related to the Catalyst for Learning technology project at their institution. Participants documented their experiences with this project on the Catalyst for Learning website. The purposeful sampling technique was appropriate because programs at these institutions

offered the richest source of data specific to the goals of the inquiry. The attainment of these goals depended on acquiring new knowledge for a theoretical generalization for use in a specific context. It did not include the goal of applying evidence to a larger population for statistical generalization (Yin, 2009, p. 38).

Data Sources and Data Collection

Documentary evidence was collected from the Catalyst for Learning site and it consisted of first-hand reports in narrative form. This included background information for the project and its conceptual framework (Bowen. 2009, p. 29). The data sources, methods for data collection, and a description of the collected data are discussed in this section. The following section includes information about how the data was managed for this inquiry. A qualitative approach and the use of document analysis indicated that there would be a great deal of data collected.

For the documentary evidence, data from 24 higher education institutions, each of whom participated in the Catalyst for Learning project, was utilized. Participants from these 24 institutions submitted first-hand individual reports based on each of the five components of the Catalyst for Learning framework. These topics included Pedagogy, Professional Development, Technology, Outcome Assessment, and Scaling Up.

The questions guiding this improvement plan asked how institutions across the country are approaching ePortfolio initiatives and what available web-based technology had the potential to support the processes that are necessary for a student-centered ePortfolio component of a campus-wide assessment program at UD.

Documentary Data Collection on Reports on C2L Website

The use of documentary data has been identified as one of the sources for evidence in a study (Bowen, 2009, p. 29). A qualitative approach was used to answer the questions for this improvement plan. This works well when there is a source that is rich with descriptions and lengthy narratives about a process and the context. The reports from the Catalyst for Learning site provided an authentic, comprehensive resource that documented the individual steps and activities necessary to support the complex process of an ePortfolio initiative on a campus (Patton, 2002, p. 294).

Collecting data from documentary sources offers an opportunity to gather a great deal of information. It has an added benefit for accessing data in a way that does not interfere with the phenomenon that is the focus of the inquiry (Bowen, 2009, p. 31). Another feature of documentary data is that it is instrumental to the process of collecting, analyzing, and reporting the evidence when the source is available in a format that is final. This aspect results in a source that can be referenced repeatedly without changing. For this improvement plan, it was beneficial to have the Catalyst for Learning site as a dependable resource for details because it increased the potential for greater accuracy (Bowen, 2009, p. 29). This was critical, particularly when tracking and referencing information, or documenting the detailed descriptions of complex processes that were the focus of the improvement plan (Merriam & Tisdell, 2016, p. 182).

The nature of documentary data potentially provides problems that need to be accounted for in the design of the improvement plan. When there is a great deal of text, sometimes the information necessary to answer the questions in an inquiry may not be easy to locate. However, in this case, the significant data was not difficult to locate due to the high quality of the website's design and construction. Also important

was the sizeable number of informative, peer reviewed, relevant, and published papers that served as an integral part of the reporting on the Catalyst for Learning site. These were often linked to various topics throughout the site in a logical manner, increasing the value of their substance, as opposed to a lengthy list of topics compiled at the end of each section.

When a source of relevant documentary evidence is located, permission to access this data has a potential to be problematic. This may occur for several reasons; one of these is confidentiality. The Catalyst for Learning site was designed by the C2L group specifically for use by the academic community as a resource on ePortfolio implementation.

Sometimes problems arise if there is a lack of comprehensive documentation about the inquiry from the chosen source (Miles & Huberman, 1994, p. 43). This would mean that the researcher must acknowledge the potential for bias when deciding what details to select but, this was not the case due to the amount and detail of the reporting on the Catalyst for Learning site.

Another concern with documentary data is that the person who authored the evidence may have included his or her own bias as the information was recorded. This means that documentary sources need to be cautiously utilized. It is not a good idea to accept every word as exact actions and events that occurred, without thoughtful awareness and consideration of the source and context (Merriam & Tisdell, 2016, p. 181).

The use of documentary evidence was suitable for this inquiry because of the complexity of the concepts and processes that were to be discovered and described (Bowen, 2009, p. 29). There was a great deal of background information about

ePortfolios, from the 24 institutional participants, that was posted on the Catalyst for Learning website. These included firsthand accounts, which were comprehensive narrations of their experiences. The format and focus of the recorded content allowed processes to be understood holistically. Yet, the detailed descriptions of these systems and activities enabled the focus of the inquiry and the context to be considered separately. This site's focus was tracking and documenting the process of campus-wide ePortfolio initiatives for each of the 24 institutions.

The documentary evidence was authored by the participants who were engaged in the Catalyst for Learning initiative from each of the individual institutions. This was comprised of detailed descriptions, in narrative form. These were firsthand descriptions of their experiences with the projects on their campuses. They included comprehensive accounts of the events and activities of their institutions' experience with an ePortfolio implementation as it occurred within the framework of the Catalyst for Learning. These accounts from different institutions generally followed an outline that had the same topics for each report. This resulted in rich documentary evidence that was even more useful because it followed a template that guided the content of the reports within a common organized structure (C2L, 2014c).

Though these were each unique and individualized perspectives, they were all activated within the context of the Catalyst for Learning's common framework. This resulted in stories that revealed how 24 different institutions approached and managed an event that was structured around unusually similar content and goals. These included a richness of detail that created authentic and compelling narratives.

Most of these included an integrated reflective component throughout, which added depth and meaning to the descriptions of the challenges and rewards of their

experiences. This integration increased the value of the authors' stories, as it incorporated and made visible the decision-making process behind their choices as they moved toward the goals of their initiatives. When this thought process was made explicit by this reflective process it increased the potential for collection of data that was more specific and relevant to the inquiry questions.

The purpose of the data collection from this documentation was to gather specific information that indicated how other institutions fared with technology in a similar initiative. It answered the questions, "What technology worked?" and "What technology did not work?" However, the process of collecting, managing, and analyzing this data has its challenges. The data collection activities were extremely time-consuming. Miles & Huberman (1994) cautioned that there was the possibility of becoming overwhelmed by the processes of selection, managing, and analyzing the evidence (p. 43). Due to the large amount of detailed information, it was important to have a plan in place to manage and organize the data. It was also critical to have a clear understanding of the goals of the inquiry and to stay focused on the data that was specific to the purpose of the inquiry (Merriam & Tisdell, 2016, p. 197).

Data Management and Analysis

The large amount of data that was collected needed to be managed so that it could be useful to the improvement plan (Patton, 2002, p. 432). A component of qualitative research is "inductive analysis and creative synthesis" (Patton, 2002, p. 56). This means that the investigation begins with examining the phenomenon under study, rather than starting with a preconceived hypothesis. The researcher first "explores" the data and "discovers" meaningful pieces of information that with "inductive logic" are combined to tell a story. The information gathered from the narratives recorded in

the documents is particularly suited to this approach (Patton, 2002, p. 56). This data was synthesized by sorting and organizing it into a format that best answered inquiry questions (Bowen, 2009, p. 32). This included carefully reviewing the questions in the inquiry, reexamining the data collected, and considering the new patterns as they arose from this iterative process (Bowen, 2009, p. 37; Corbin & Strauss, 1990, p. 7; Patton, 2002).

The strategy for processing the qualitative data was integrated into the research design. To identify and understand how the process of ePortfolios work, a logic model was created from the documentary evidence. This visual representation supported the discovery of the technology that was required to meet the requirements of UD's plan. The logic model also aided in the decisions about what to collect and how to analyze data from the individual institutional reports regarding their experiences with different technologies used. This information was used to create a representation of the strengths and weaknesses of this technology and how it performed against the list of UD's requirements. The use of the qualitative weight and sum (QWS) method allowed the synthesis of this information that answered the questions in the improvement plan (Scriven, 1991, p. 293).

Data Management and Preparation for Analysis

The goal of the data management plan was to support the processes of research design, data collection, data analysis, and reporting for the creation of a quality improvement plan. Having a viable and comprehensive plan for managing the data was important. Since this was a qualitative inquiry a great deal of data was collected from the C2L website. This was, for the most part, qualitative data and included text from the reports. There was attribute coding included with identifying information

about the institutions and ePortfolio technology. This identifying information described the setting and details about the institutions (Saldana, 2013, p. 69). This data has the potential to provide a snapshot of how institutions across the country approach ePortfolio initiatives. The goal was to collect and manage the data so that it would be most useful for the analysis and reporting stages of the inquiry (Saldana, 2013, p. 71). (Saldana, 2013, p. 71).

Bowen suggests an "inductive approach" would allow the questions in the study to determine the direction of the analysis (2009, p. 37). This approach to the collection and analysis of the data began early in the inquiry to keep the amount of data from becoming overwhelming and difficult to organize (Miles & Huberman, 1994, p. 50). This also enabled collected data to be useful toward informing the direction of the inquiry (Bowen, 2009, p. 37; Miles & Huberman, 1994, p. 50).

Data Analysis

Merriam and Tisdell (2016) described data analysis as "...the process of making sense out of the data" (p. 202). They expand on this description by stating that analyzing the data is the activity that resolves the questions raised in the inquiry. Patton (2002) added that the analysis of data from a qualitative research study is a process that "transforms data into findings" (p. 432). Miles and Huberman (1994) defined data analysis as "data reduction, data display, and conclusion drawing/verification" (p. 10).

Bowen (2009) states that "Document analysis is a systematic procedure for reviewing or evaluating documents…" (p. 27). He explains that document analysis is the repeated process that begins with a quick scan of the material, followed by a more focused study of the text, and then an explication of those results (Bowen, 2009, p.

32). The initial content analysis is a brisk look through of the document that allows the selection of information that is significant to the focus of the study. These are sorted into categories that help make sense of the data. The more focused and thematic analysis of the text identifies units of information that appear to have a recurring relation to the subjects of the study. Coding and grouping the data into categories allows themes to develop from the text that relate to the topic. As the pieces of data are identified and compared to other units of data they can be sorted into the categories where they become part of a different view of the data (Merriam & Tisdell, 2016, p. 203; Bowen, 2009, p. 32).

The documentary evidence that was used for this inquiry was selected from the reports that were part of the main Catalyst for Learning website (http://c2l.mcnrc.org/). Participants in the C2L project also developed individual sites that focused exclusively on their institution's activities in the initiative. These sites were linked to the Catalyst for Learning website. Each of these linked sites used the categories from the Catalyst for Learning framework to organize and present their experiences (C2L, 2014a).

Saldana (2013) suggested that for the novice, a modest size inquiry combining the tools in Microsoft Word and Excel area is a viable option (Saldana, 2013, p. 26). For this inquiry, Microsoft Word and Excel were used to collect, identify, organize, and store the data from the Catalyst for Learning website (Meyer & Avery, 2009). This proved to be a practical and appropriate choice for collecting, managing, analyzing, and reporting data because it supported the purposes of the inquiry (Merriam & Tisdell, 2016, p. 201). The combination of tools in Word and Excel also facilitated the creation of documents that helped track the progress of coding and

analysis in this inquiry (Berg and Lune, 2012, p. 42). These are available on this link https://sites.google.com/site/trimbleeportfoliotechnology/.

Analysis of Content from Catalyst for Learning Website

Analyzing data from the documentation included reviewing, coding, and interpreting the data. The data was organized so that there was a logical way to find specific information as it was needed.

To obtain an overview of the data, each section of the central Catalyst for Learning site and all of the individual linked institutions' C2L websites were read. During the data collection and analysis activities for this inquiry, the University of Delaware's C2L website pages were coded and analyzed. For the other partners in the C2L ePortfolio project, only the pages that focused on the topics of technology and the scaling-up efforts were coded and analyzed.

The narratives on the C2L site that focused on technology and scaling up activities were collected into Excel. Each sentence was reviewed and the text that referred to the topic of technology was identified and sorted into categories. The second coding involved a closer examination of how the pieces of information in each category related to other text. The units of text were organized according to themes that focused on the questions asked in the study. These themes helped identify the key concepts. This strategy also ensured that the answers to the questions came from the data collected for the improvement plan (Bowden, 2009, p. 34).

The focus of this inquiry is to determine how other institutions approached the use of ePortfolios on their campuses and whether available technology has the potential to support the processes that are necessary for a student-centered ePortfolio component of a sustainable campus-wide assessment program at UD. An examination

of what technology and activities other schools used in their ePortfolio initiatives provided information towards understanding what options had the potential to work in UD's academic community.

First, information was needed to provide an understanding of the project purpose and UD's narratives on the Catalyst for Learning website provided this information. Once the UD's purpose was identified and described, it was then necessary to understand the many factors that must be present to support a successful ePortfolio process. For this part of the inquiry, attention was focused specifically on the technology that supported this process. The data collected from the UD reports on the Catalyst for Learning website supported the creation of a logic model that made these steps explicit (W.K. Kellogg Foundation, 2004). The visual representation of this complex and multi-step process revealed the role and the placement of the technology needed to meet the goals of this implementation. It determined what UD wished to accomplish with the project, which was combined with the understanding of which inputs and processes would be needed to produce results.

At this stage it was necessary to find out what specific technology requirements were needed for a successful ePortfolio project at UD. To obtain this information, UD's reports were researched on the Catalyst for Learning website. The search focused on reports that referenced the technology. The technology related data from these reports, the logic model representing the inputs and processes, and an understanding of the goals for UD's initiative were analyzed in relation to one another. This process supported the creation of a requirements list specific to the needs of UD's ePortfolio project.

The technology that other Catalyst for Learning participants used was identified. Each of the technologies was categorized by a set of criteria that indicated what category of ePortfolio it was used for. Once technologies were identified and their functions understood, reports from institutions using those technologies were examined (C2L, 2014b).

One of the advantages of using the information from the Catalyst for Learning website was the access it provided to the large volume of data about institutions and educators who shared the vision and tenants of the Catalyst for Learning Framework and how they applied this to the ePortfolio initiatives on their campuses (C2L, 2014b). This information became even more crucial during the next stage of analysis to identify and understand what technology had the potential to support UD's specific requirements. It was necessary to discover what technologies worked and which did not.

The purpose was to identify and evaluate the function and usability of different technologies. The Catalyst for Learning website was searched for data that referred to the participant's experiences with each technology. What did not work was put in "red" font color. What did work was put in "green" font color. The list of requirements for UD's project were examined. Through this repetitious process of referencing the UD requirement list and exploring the participants' experiences with the technology, the profiles for each of the technologies began to take shape. The technologies with the potential to support UD's goals, as referenced on the Catalyst for Learning website, were identified and described (C2L, 2014d).

From this information, a list was created to represent UD's requirements for an ePortfolio project. The use of the qualitative weight and sum (QWS) method

produced an organized presentation of the strengths and weaknesses of each ePortfolio technology requirement. This method was chosen because its design allowed the importance of each requirement to be weighted. This meant that it could be determined how much it mattered if the technology functioned to support that requirement. This is an evaluation process that is often used to avoid some of the problems that may emerge with other techniques. There can be confusion when the numerical weight and sum (NWS) approach is used if numerical based methods are used for determining the effectiveness of a technology (Scriven, 1991, p. 293).

The list of requirements and their definitions was determined from analysis of the data found on the narratives in the Catalyst for Learning site. Each of these were assigned degrees of importance as suggested by Scriven (1991, p. 294) using the following classification:

- Essential E (symbol)
- Very Valuable * (star)
- Valuable # (symbol)
- Marginally Valuable + (symbol)
- Zero 0 (symbol)

This process allows a ranking. As Scriven advised, each of the scores could only fall within the range of the classification awarded during the weighting process (1991, p. 294). Then within each group of requirements, it is noted how many stars, double pluses, and pluses each technology received. The technology that is most appropriate for the goals of the initiative is determined by focusing only on the

ranking based on the number and combination of these symbols that each technology earns.

Researcher Notes

Quality of the Inquiry

Merriam and Tisdell (2016) state that there are several ways to evaluate the merit of evidence-based qualitative studies. These include "…internal validity, reliability, and external validity…" (p. 242). They are most effective when they are employed in various ways throughout all phases of the inquiry, from design to the final report (Merriam & Tisdell, 2016).

Quality of Data Sources

The data used was available on the Catalyst for Learning website (http://c2l.mcnrc.org/). The website was created by the members of the Connect to Learning (C2L) group. These participants from multiple institutions of higher education documented their experiences as they implemented ePortfolio projects on their campuses. This website now also serves as a valuable resource for researchers. The Catalyst for Learning initiative was structured on three core principles of the Catalyst for Learning perspective. These principles were "Inquiry, Reflection, and Integration" (Connect to Learning, 2014c). This shared vision supported a framework that included a focus on five areas. These were Pedagogy, Professional Development, Outcomes Assessment, Technology, and Scaling Up. Emphasis was placed on the Technology aspect of the Catalyst for Learning initiative to answer the questions in this inquiry (C2L, 2014b).

Systematic Collection and Management of Data

Berg and Lune suggest the development of a plan for the design of the collection and analysis activities (2012, p. 43). It was essential to consider the collection and management of the data from the beginning of the planning stage of the improvement plan. The purpose of the plan is to ensure that the focus and direction of the processes remain relevant to the questions asked in the inquiry. The process of creating the design plan also alerts the evaluator to obstacles and requirements that may arise during the study. The development of this document helped guide the systematic collection and management of the data in this inquiry. The design plan for this qualitative document analysis is in Appendix B, Improvement Plan Design.

Reliability During Data Collection

Merriam and Tisdell describe the creation and use of an audit trail to keep track of the activities of coding and analyzing the data (2016, p. 252). The tools in Word allowed the creation of a document that was used as a location to record the progress of coding and analysis used in this inquiry. This supported the documentation of decisions that were made about the data collection, management, and analysis during the processes of the inquiry. To review these decisions, follow this link to https://sites.google.com/site/trimbleeportfoliotechnology/.

External Validity During Data Analysis

Merriam and Tisdell (2016, p. 253) state that "External validity is concerned with the extent to which the findings of one study can be applied to other situations." The findings from this qualitative documentary analysis are not meant to represent a

causal relationship. That would include the necessity of proving that there is not another variable involved that may have actually impacted the outcome. The purpose of this improvement plan is not to generalize to a larger population. The nature of this study is exploratory and descriptive.

Chapter 4

FINDINGS

The intention of this improvement plan was to provide a snapshot of how other institutions across the country were approaching ePortfolio on their campuses and to discover what technology has the potential to support a student-centered ePortfolio initiative at UD. The exploratory and descriptive nature of these questions favored a design that included a qualitative perspective in a document analysis. This strategy focused on the activities and events that occurred within the time frame and context of the Catalyst for Learning initiative, from 2011 to 2015 (Eynon & Gambino, 2017, p. xiii). Participants from the twenty-four institutions of higher education that were involved in the project meticulously documented their expectations and efforts on a shared website (http://c2l.mcnrc.org/). This carefully organized collection of first hand narratives and granular details of the activities and processes of their experiences serves as a valuable resource on the topic of ePortfolio implementation in higher education.

The goal to discover, describe, understand and identify the ePortfolio technology that has the potential to support a student-centered experience with ePortfolios in academic programs, as well as institutional level assessment, determined the nature and orientation of the questions asked in this improvement plan. This exploration begins with discovering how institutions are approaching ePortfolio initiatives on their campuses by collecting and examining categorical information about the participating institutions from the Catalyst for Learning initiative's website.

Considering these schools' experiences provides a comprehensive view of a wide range of technology options that have the potential to support ePortfolio specific activities and processes of ePortfolios.

Since the primary goal of the plan was to align the technology with UD's initiative, it became necessary to discover the purpose for the project. The next step was to identify the inputs and activities of the process necessary to achieve that purpose. When the complexity of the process was made explicit it was possible to understand and determine what technology was required to meet the goals of the effort.

This combination of discovering the purpose for the initiative, describing the inputs and activities required for the process, and understanding the technical requirements needed to support the initiative made it achievable to ascertain from the participants' narratives what technology worked and what technology did not. The information gained from this inquiry may expand the understanding of what role technology has in the process and activities of ePortfolio on campuses that strive to create learner-centered academic experiences for their students at the individual and program level, and concurrently support aspects of assessment for the purposes of accountability and accreditation at the institutional level.

Presented in this chapter are the findings derived from the examination of narratives chronicled by the participants from the 24 institutions (Appendix A) that took part in the Catalyst for Learning initiative about their experiences as they implemented ePortfolio on their campuses, from 2011 to 2015 (Eynon & Gambino, 2017, p. xiii). The central focus of this study is on the technology and its role in these experiences. There were five key findings derived from this inquiry:

1. The narratives by the participants involved in the Catalyst for Learning project indicated that they aligned their approach to ePortfolio initiatives with their institution's own unique combination of mission and resources.

2. The details from the narratives reported by the participants in UD's initiative revealed that the purpose was to use ePortfolios to create a student-centered learning experience, at the individual, and program levels, that supported the collection and documentation of evidence of student progress for assessment and accreditation efforts at the institutional level.

3. In the narrative reports on the Catalyst for Learning website, the participants identified and described the inputs and activities that supported the process of a student-centered ePortfolio at the individual and program level, as well as the institutional goals for assessment. These were collected from the reports and made explicit in the creation of a logic model.

4. The information derived from the identification of UD's goals for the ePortfolio was combined with an understanding of the activities and inputs necessary to create the process of ePortfolios. This synthesis allowed the determination of what technical requirements were needed to produce an initiative that met each of the stakeholders' goals.

5. An examination of the narratives, documenting the experiences of participants from multiple institutions, as they dealt with the different technologies used in the C2L initiative, informed the collection and organization of data that made clear what worked and what did not work. This information supported the creation of a matrix that displays the findings.

The next section of this chapter includes descriptions of how these findings emerged from the data, and details why they answer the questions asked in this study. A narrative, logic model and matrix are used to make clear the inputs and activities that support the process of ePortfolio. This combination provides the opportunity to identify how other institutions are approaching ePortfolio as well as the technology that is necessary to achieve UD's program goals.

Question #1: How are institutions across the country approaching ePortfolio initiatives?

To answer the first question in the plan, categorical information about the institutions participating in the Catalyst for Learning initiative was collected from the website (http://c2l.mcnrc.org/). This included: background information about the degrees offered at the institution, total number of enrolled students, how many students are using ePortfolios, what the purpose for the ePortfolio program is, and at what level is it implemented. The technology used by the schools was also determined.

Finding 1: Institutional Approaches to ePortfolio

The data for all 24 institutions are formally organized in Table 6, Table 7, and Table 8. This matrix format identifies the institution in the first column and arranges their related information in the rows to the right.

Table 6, Table 7, and Table 8 show a snapshot of ePortfolio programs at the 24 institutions that participate in the Catalyst for Learning initiative (http://c2l.mcnrc.org/). The schools are identified by name and they are organized by the level of the degree plans they offer: doctoral, graduate, undergraduate degree granting, and research institutions; masters, bachelor, or associative degree granting institutions; and associate degree granting institutions. The focus of their initiatives is displayed as assessment or not assessment. The identification of the level of these ePortfolio initiatives is included. The information on the Catalyst for Learning website indicates the initiatives were launched at the course level, program level, institutional level, and general education level. The technology platform that each school used during the C2L initiative, from 2011 to 2015, is also shown (Eynon & Gambino, 2017, p. xiii). There are estimates on the student population in relation to their ePortfolio initiatives that include the number of students that attend the schools, and the percentage of those students using ePortfolio.

Table 6 How Institutions Approach ePortfolio Initiatives in C2L Project (Doctoral, Graduate, Undergraduate, and Research Institutions)

Institution	Program Level	Student Total	Students Using ePortfolios	Percent Students Using ePortfolios	Focus	Level	Technology
Virginia Tech	Doctoral, Research	30,000+	3,000	45.0	Assessment	Course, Program, GEN Ed	Sakai OSP
Northeastern University	Doctoral, Research	24,000	3,000	13.0	Assessment	Program	Digication
Stony Brook University	Grad, UG, Research	23,000	13,000+	50.0	Assessment	Course, Program	Digication
University of Delaware	Doctoral, Research	20,000+	1,671	10.0	Assessment	Course, Program, GEN ED	Sakai OSP, Google Sites
Indiana University-Purdue University	Doctoral, Research	20,000+	4,000	13.0	Assessment	Course, Program, GEN ED	Sakai OSP
San Francisco State University	Doctoral, Research	20,000+	1,600-2,000	15.0	Assessment	Course, Program, GEN ED	eFolio
Rutgers University	Doctoral, Research	20,000+	400	2.0	Assessment	Course	Sakai OSP
St. John's University	Doctoral, Research	20,000+	7,000	33.3	Assessment	Course	Digication
Georgetown University	Doctoral, Research	15,000-20,000	600	4.0	Assessment	Course, Program	WordPress Digication
Boston University	Doctoral, Research	15,000 UG	4,500	Not Available	Assessment	Presentation, Prog, Institution	Digication
Pace University	Doctoral, Research	10,000-15,000	2,000	20.0	Assessment	GEN ED, Writing Assessment	Mahara

Note: The data reported here were collected in June 2015.

Table 7 How Institutions Approach ePortfolio Initiatives in C2L Project (Masters, Bachelor, or Associate Institutions)

Institution	Program Level	Student Total	Students Using ePortfolios	Percent Students Using ePortfolios	Focus	Level	Technology
SUNY Empire State College	MS, BA, Associate	20,000+	Not Available	Not Available	Assessment	Degree Program Planning	Mahara
Hunter College	MS, BA	20,000+	700	N	Assessment	Course, Program	Digication
Lehman College	MS, BA	12,000	150	10.0	Assessment	Course, Program, School-Taskstream	Digication Then Taskstream
CUNY School of Professional Studies	BA	2,000-5,000	700	17.0	Not Assessment	Course	Digication
Manhattanville College	BA	2,000	500	25.0	Assessment	Course	Digication

Note: The data reported here were collected in June 2015.

Table 8 How Institutions Approach ePortfolio initiatives in C2L Project (Associate Institutions)

Institution	Program Level	Student Total	Students Using ePortfolios	Percent Students Using ePortfolios	Focus	Level	Technology
LaGuardia Community College	Associate	20,000+	10,000	55.0	Assessment	Course, Program, GEN ED	Digication
Salt Lake Community College	Associate	20,000+	31,007	50.0	Assessment	Program, GEN ED	Google Sites, Weebly, Wordpress
Tunxis Community College	Associate	7,000	1,300	30.0	Assessment	Course, Program, GEN ED	Digication
Norwalk Community College	Associate	6,500	1,100	17.0	Assessment	Course	Digication
Queensborough Community College	Associate	5,000-20,000	6,620	30.0	Not Assessment	No Info	Epsilen
Three Rivers Community College	Associate	2,000-5,000	300+	7.0	Assessment	Course, Program	ePortfolio.org now moved to Digication
Northwestern Connecticut Community College	Associate	2,000	1000	40.0	Assessment	Course, Program	Digication
Guttman Community College	Associate	2,000	600	100.0	Assessment	Course, GEN ED	Digication

Note: The data reported here were collected in June 2015.

Question #2: What ePortfolio solution works best for UD?

Having analyzed how other institutions approach ePortfolio initiatives across the country, this EPP addresses the question of what available web-based technology has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at the University of Delaware. Answering this question involved considering the ePortfolio's purpose, process goals, and requirements, which served as inputs to a qualitative weight and sum analysis indicating which ePortfolio solution best aligns with UD's portfolio needs. Answering question #2 therefore involves multiple findings presented as follows in finding 2 (purpose), finding 3 (process), finding 4 (requirements), and finding 5 (what may work best for UD).

Finding 2: Purpose

The details of the experience reported by the participants in UD's initiative on the Catalyst for Learning website, indicated that ePortfolios would be used to create student-centered learning experiences, at the individual, and the program level that also supported the collection and documentation of evidence of student progress for assessment and accreditation efforts at the institutional level (University of Delaware C2L ePortfolio Leadership Team, n.d., para. 9). This information is presented in Table 9, Purpose for ePortfolio Categorized by Focus for Initiative.

Table 9 Purpose for ePortfolio Categorized by Focus for Initiative

Requirement	Presentation ePortfolio	Academic Program ePortfolio and Course	Institutional Administration ePortfolio
Purpose			
	Showcase Accomplishments for Projects, Non-Academic Activities	Assessment Centered for "For Learning" and "Of Learning"	Evidence of Learning in Courses, Programs, Certification Events, Professional Development Efforts, and Community Outreach for Reporting
	Evidence of Learning as a Product Created for Courses, Programs, Projects	Supports Roles that are Specific to Student, Instructor, and Evaluators' Access to Course Materials, Tutorials, Learning Instruments and Products of their use	Assessment for Institutional Goals
	Career/ Professional/Employment as Representation of Knowledge and Skills	Supports "Evidence of Learning" for Updating and Improving Curriculum in Courses	Management of Resources
		Supports "Process of Learning" in Courses, Programs, Certification, Professional Development	Planning, Management, Mission Alignment
		Supports Evaluation of Learners' Progress in Courses, Programs Certification, Profession Development events	Evaluation by External Organizations
		Benchmarking, Tracking and Documenting Progress	Accreditation
			Tracking: Activities, Completion Rates,
			Community Impact
			Evaluation of Progress for Learners in Courses, Programs, Certification, Professional Development
			Benchmarking, Tracking, Documenting, Reporting, Archiving

Table 9 (continued).

Requirement	Presentation ePortfolio	Academic Program ePortfolio and Course	Institutional Administration ePortfolio
Audience	Academic Evaluators, Colleagues, Potential Employers, External Certifying Organizations	Academic Evaluators, Program Administrators, Institutional Administrators for Data Collection	Administrators, External Organizations, Accrediting Organizations
Ownership			
	Learner Control over Look and Feel,	Learner has Predefined Control Over Look and Feel, Determined by the Instructor, Course and/or Program Requirements,	Control over Look and Feel Determined by Institution's Goals
	Learner Control over Access	Learner has Staged Control over Access	Institutional Control over Access for Administrators
	Portability: Learner Can Export for Other Uses	Learner has Control of Access by Others During Process of Learning	Can be exported Only by Institution for Internal and External Evaluation and Reporting (Not Designed for Portability by Student
		Portability: Learner has Predefined Limited Control Exporting Content	
Reflection			
	Supports Reflection with Text Authoring Tools,	Reflection:	Reflection is not Identified as a Process or Activity for Institutional Evaluation
	Supports Connection Between Reflection and Artifact	Supports Reflection with Text Authoring Tools,	
		Supports Connection Between Reflection and Artifact	

Table 9 (continued).

Requirement	Presentation ePortfolio	Academic Program ePortfolio and Course	Institution Administration ePortfolio
Evaluation	Supports with Rubrics, Outcomes that are Aligned with Standards	Supports with Rubrics, Outcomes that are Aligned with Standards Assessment: Supports Formative Assessment When Appropriate: Evaluator Can Include Feedback within Assignment for "Evidence for Learning" Supports Summative Assessment Individual at Course, Program and Professional Development Level for "Proof of Learning"	Supports with Use of Rubrics, Outcomes that are Aligned with Standards Supports Summative Evaluation for "Proof of Learning"
Functions		Tracking: Activities, Completion Rates, Community impact Function to Support Evaluation of Process, Activities, Products, and Progress in Courses, Programs, Certification, Professional Development Benchmarking, Tracking, Documenting, Reporting, Archiving	Tracking Activities, Completion Rates, Community impact Function to Support Evaluation of Process, Activities, Products, and Progress in Courses, Programs, Certification, Professional Development Benchmarking, Tracking, Documenting, Reporting, Archiving
Communication	Evaluators, Peers, Collaboration	Learner with Evaluators, Peers and External Individuals and Organizations Collaboration for Social Learning Feedback for "Evidence for Learning", Supports Summative for "Proof of Learning"	Administrators, External Organizations

Note: The data reported here were collected in January 2016.

The project began with the premise that the ePortfolios were to originate at the program level with faculty ownership. This approach supported the central role of ePortfolio activities yet accommodated the presence of multiple academic programs and the diversity of their curriculums at the University of Delaware (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

It was also determined that the Sakai OSP technology possessed the necessary functions to support the requirements for the ePortfolio project (UD C2L ePortfolio Leadership Team, 2014b, para. 3).

An essential theme of the C2L project at UD was the development of a student-centered learning experience. The UD C2L Leadership Team reported their goals included an integrative approach for curriculums that included reflection and opportunities for students to experience deep learning with high-impact practices (UD C2L ePortfolio Leadership Team, n.d.-a, para. 6).

The initiative would also create the opportunity for program faculty to align the learning activities within their degree plans with objectives and make the connections visible for students and faculty. The plan for this ePortfolio project also included integrating processes for formative and summative assessment that supported the collection of data to use for program and institutional needs (UD C2L ePortfolio Leadership Team, n.d.-a, para. 4).

The focus on data collection was important as the UD community responded to requests for coherence and relevance in academic programs to meet the needs of students. There was also pressure from external stakeholders that warranted increased attention towards improving and updating assessment and accreditation activities at the institutional level. Academic leadership at UD was actively engaged with an analysis of the existing configuration of the General Education requirements and how they related to the university breadth requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 31).

One of the reasons that the Catalyst for learning initiative was a valuable resource was that all participating institutions were working towards the goal of improving the academic experience for their students using the same theoretical approach towards learning. It was also useful that they followed the same outline in their narratives and answered similar questions about their activities (Eynon and Gambino, 2017, p. 15). The data from all of their initiatives contributes to understanding how other institutions with similar goals are approaching ePortfolio initiatives. Considering all of these schools' experiences provides a broad view of how well a wide range of technology options functioned to support specific activities and processes of ePortfolios. However, since it is the primary goal of this plan to align technology with the specific needs of UD, there were some questions that needed to focus on data from institutions that were more similar to UD. The schools were grouped by criteria that included the level of degrees they offered, and the emphasis on research in their missions. This emphasis allowed more attention to the details about technology that was more likely to support the goals of UD.

The factors that were considered when deciding which institutions to compare with UD for these particular questions included: the level of degrees offered, the emphasis on research in each school's mission, the number of students enrolled, the focus and the level of the ePortfolio initiative. This categorical information was collected from the Catalyst for Learning website (http://c2l.mcnrc.org/) and is displayed in Table 6. More explanatory detail for how and why these decisions were made is in Appendix C, Selection of Relevant Institutions Protocol.

The ePortfolio leadership team for the C2L initiative at UD included individuals from the Center for Teaching and Assessment of Learning (CTAL), Information Technology-Academic Technology Services (IT-ATS) and the Office of Educational Assessment (OEA). They worked together with program directors, faculty, and students during the four years of the C2L program, from 2011 to 2015 (Eynon &

Gambino, 2017, p. xiii). They combined their efforts to pilot ePortfolio on campus and reported their activities in the University of Delaware C2L website (UD C2L ePortfolio Leadership Team, n.d.-b).

When looking at technology choices for ePortfolio implementations there are many options. The first consideration is to determine the purpose of the project. This knowledge will allow the identification of the level of the project. This is important information as it determines who the stakeholders are and what their roles are (Balaban, Mu, & Divjak, 2013; Himpsl & Baumgartner, 2009; Lampe, 2013; Posey, Plack, Snyder, Dinneen, Feuer & Wiss, 2015; Slade, Murfin, & Readman, 2013; Sweat-Guy & Buzzetto-More, 2007).

The Center for Teaching and Assessment of Learning (CTAL) worked with the UD campus community to introduce ePortfolio into academic programs. They developed an approach that supported the considerations of teaching, learning, and assessment as central to a program level implementation. The goal for this "Programmatic Teaching and Assessment of Learning (TLA) ePortfolio" was to assess what students learned at the program level and use this information at the institutional level for General Education requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

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As described in the narrative on the Technology section of the C2L site, UD explored the use of ePortfolios before the Connect to Learning initiative. In 2007 the goals focused on a learner-centered project that would make data available for institutional purposes. This was balanced at the program level. The goal was to help students academically but the tracking efforts were weighted towards the institution's need for formal endorsement from outside agencies (ePortfolio Leadership Team, 2014).

According to the ePortfolio Leadership Team (2014), "The first two ePortfolio projects in 2007 were aimed at improving student learning outcomes and documenting

student learning for academic programs, primarily for external accreditation purposes (e.g. NCATE)."

This balancing between considerations of a learner-centered or an institutional focused approach continued through the next several years as represented. During this time the "Teaching, Learning, and Assessment" (TLA) unit worked with programs and faculty to pilot ePortfolio as reported on the University of Delaware's Technology page on the C2L website.

Finding 3: Process

There exists a wide variety of uses for ePortfolio in educational settings. An understanding of the purpose and the audience for the ePortfolio project determines the process and requirements necessary for an implementation that meets the needs of the institution. During the C2L project at UD, the participants worked with ePortfolios that generally fell into two categories. The first were presentation-style ePortfolios for individual students. The second type were learning ePortfolios originated at the program level, that also supported assessment efforts at the institutional level (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

Both of these approaches to ePortfolio projects focused on improving the academic experience for the learner, but there are very real differences between the activities and processes. In ePortfolio implementations it becomes more complex when there are multiple levels simultaneously in use on a campus or in an academic program. It is often difficult to isolate what inputs and activities are working and where changes are needed. Weiss suggests that using a logic model to decipher what makes a program work contributes to understanding how to make it better (Weiss, 1998, p. 55). Table 10 identifies the stakeholders and their activities that result in the outcomes that support a learner-centered presentation-style ePortfolio used at the course level to fulfil academic program requirements. This logic model supports the creation of the work flow

depicted in Figure 10. This is a visual representation of how multiple inputs and activities coordinate together in a specific process that is meant to function at the individual student level within a program and produce a presentation-style ePortfolio.

An ePortfolio initiative that includes plans for assessment at the institutional level requires different outcomes from an implementation that is designed to focus at a course or program level. These differences require alternative choices and adjustments in activities as demonstrated in Table 11. Figure 2 illustrates how the inputs from Table 11 support an ePortfolio project that is focused on assessment of learning outcomes at the program level, that concurrently support reporting and accreditation efforts at the institutional level.

Table 10 Logic Model for Learner-Centered ePortfolio Initiative at the Course Level as an Academic Program Requirement

Situation: Implement learner-centered ePortfolios at the course level as presentation and evidence of learning for an academic program requirement.			
Inputs	Outputs Activities	Outputs Participation	Outcomes
Students Instructor Staff IT Support Technology Scaffolding Program Learning Outcomes Rubrics Courses Students' Content for ePortfolios Program Requirement of ePortfolio Technology for Presentation ePortfolios	Communicate Develop Instruments to Support the ePortfolio Process Collaborate Evaluate Technology Assist Support Training	Students Program Faculty Instructors IT Staff	Students complete ePortfolio requirement as measured by submission of working URL Students receive feedback on ePortfolio as measured by Communication tools in (LMS) Students have opportunity to learn from feedback and resubmit work as measured by Assignment submission records in (LMS) Instructor is relieved of administrative challenge of tracking submission of many and complex ePortfolios As measured by Communication tools and submission records in (LMS) Instructor has record of Students' progress on ePortfolio as measured by assessment record in (LMS)
Note: The data reported here were collected in Fall of 2014.			

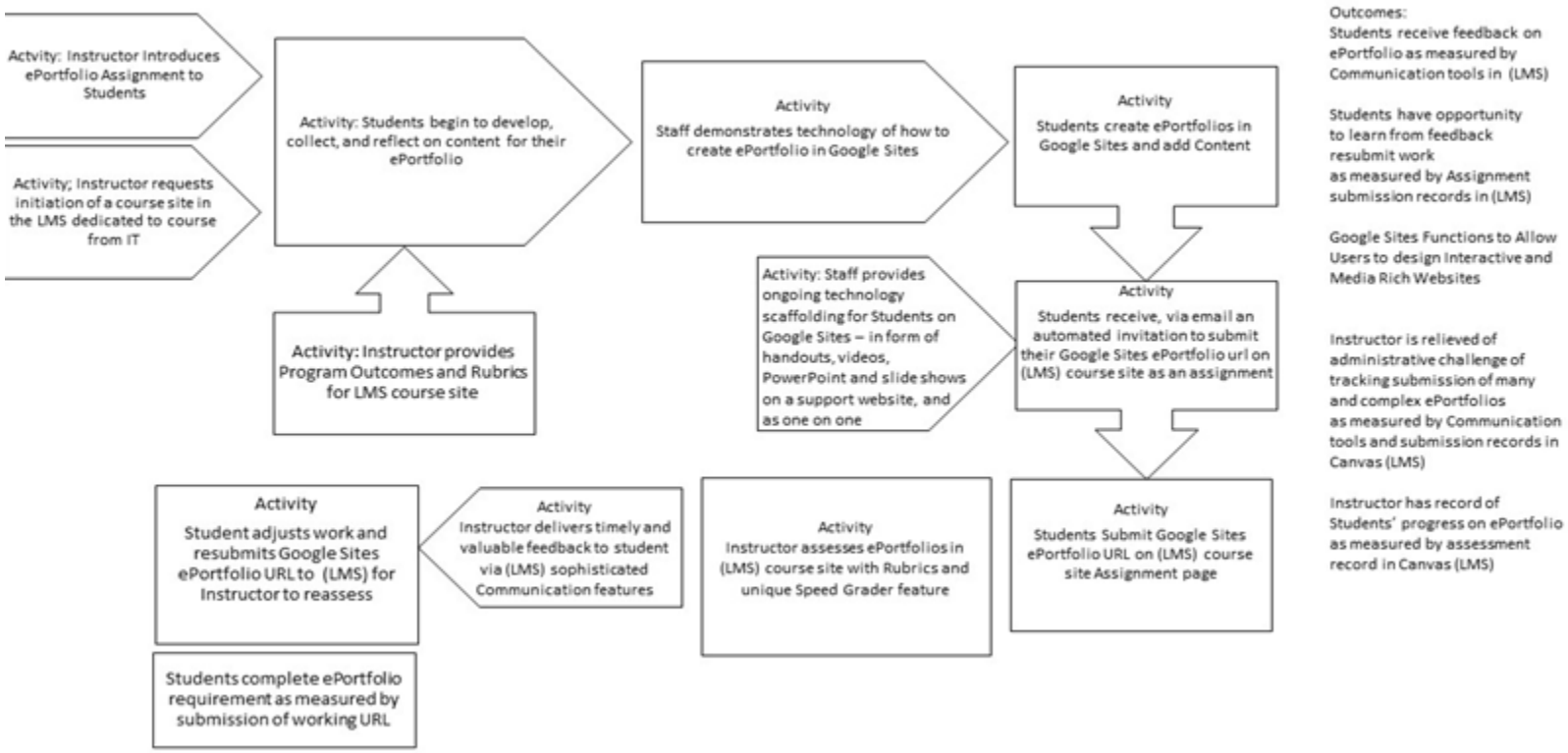

Figure 1 Learner-Centered ePortfolio for presentation and evidence of learning at the course level as an academic program requirement. This work flow illustrates the process of the learner-centered ePortfolio initiative at the course level when it is also an academic program requirement.

Table 11 Logic Model for Assessment ePortfolio at the Program Level and Institutional Level

Situation: Goal of the Teaching, Learning, and Assessment (TLA) ePortfolio IT Team with the Connect to Learning (C2L) Project at University of Delaware (UD) Use available technology to implement a program level ePortfolio on campus http://c2l.mcnrc.org/category/university-of-delaware			
Inputs	Outputs Activities	Outputs Participation	Outcomes
Students C2L IT Team C2L Team Program Faculty Instructors Administrators IT Staff Research base Curriculums Materials Learning Tools Syllabi Rubrics Outcome Requirements Technology Equipment Money Time LMS Access	Conduct Workshops Meetings Communicate Develop Instruments to Support the ePortfolio Process Establish Reflection Activities Collaborate Evaluate Technology Assess Curriculums Develop Rubrics Learning Outcome Requirements Assist Support with Scaffolding Training Document Student Progress Align Learning Outcomes with Program Requirements and General Education Goals Collect and Manage Data Reporting Processes	Students C2L IT Team C2L Team Program Faculty Instructors Administrators IT Staff	Connect the evidence of learning produced by students to the learning outcomes within programs of study Use available technology to implement a program level ePortfolio on campus Collect the reflections recorded by students that are focused on the projects created by the students that represent their completion of the learning outcomes for their program of study Use rubrics that allow students to receive scaffolding on their assignments that are submitted as evidence of successful completion of learning outcomes Support the process of instructors' scaffolding students as they submit their reflections that are associated with each learning outcome tools and submission records in (LMS) Instructor has record of Students' progress on ePortfolio as measured by assessment record in (LMS)
Note: The data reported here were collected in the Fall of 2015.			

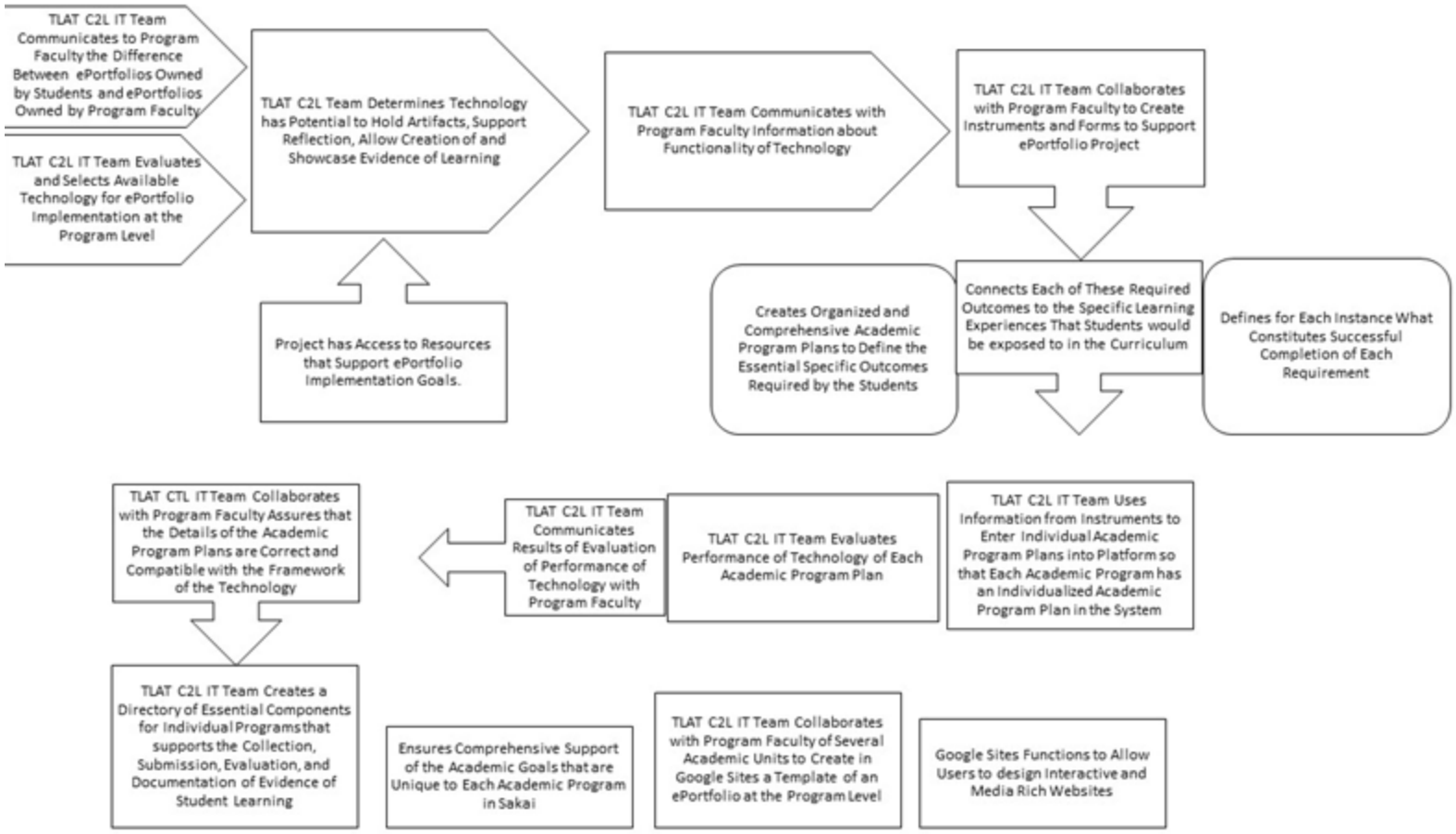

Figure 2 Program ePortfolio for assessment. This work flow illustrates the process for an ePortfolio initiative that is implemented at the program and institutional level.

Process and Activities and the Goals of Stakeholders

In the narrative reports on the UD C2L website, the participants identified and described the inputs and activities that supported the processes for individual presentation focused student-centered ePortfolios, as well as the student-centered ePortfolios at the program level that supported institutional goals for assessment.

The reports from the UD C2L leadership team indicate that UD started to explore the technology that supports ePortfolios in 2005. Two years later several ePortfolio pilots were implemented in Sakai with the Open Source Portfolio (OSP) feature. These were balanced at the program level. One purpose for these early projects was to help students academically. The activities also included efforts to collect data that the institution needed for formal endorsement from outside agencies (UD C2L ePortfolio Leadership Team, 2014b, para. 24). This balancing between considerations of a learner-centered or an institutional focused approach with ePortfolios continued through the next several years.

Process and Activities for Presentation-style ePortfolios

There was an increase in student interest in using ePortfolios to showcase their academic accomplishments. In 2009 students began to create individual presentation ePortfolios in Sakai. There were security concerns about students having access to the Learning Management System (LMS) for the UD campus platform after they graduated. In 2010 GoogleApps was added to the UD campus and students were encouraged to use the functions in Google Sites for building individual websites instead of Sakai (UD C2L ePortfolio Leadership Team, 2014b, para. 26).

The presentation-style ePortfolios were not included in the C2L grant (UD C2L ePortfolio Leadership Team, 2014b, para. 19). When the UD C2L leadership team began to use Google Sites for the presentation-style ePortfolios they were considered student owned. Faculty and students continued to request ePortfolio at the individual

level that showcased their academic efforts and provided evidence of their learning. IT at UD supported students as they created ePortfolios in Google Apps with training sessions, technical support documentation, and the development of relevant learning tools.

The academic activities that support a presentation-style ePortfolio at the individual level generally start for the student at the beginning of a course or a program. The instructor introduces the assignment of a presentation-style ePortfolio as a component of the course. During the course or program of study the student collects course items that represent their learning of a course objective. The student composes a relevant and thoughtful reflection about the assignment that indicates their understanding of the objective. When the student submits the assignment with the reflection, the instructor evaluates both. If the assessment is formative, the student receives the instructor's comments, uses the feedback from the instructor to make changes, then resubmits. If the assessment is summative, the student submits the original assignment and reflection together. The instructor assesses the work and assigns a grade. The student may receive written feedback on the assignment, but a grade is also included.

Paper portfolios existed as a requirement in some of the academic programs. The teacher candidate students in the in the Childhood Education program previously created paper portfolios in the capstone course for their academic program. These portfolios represented their learning for the National Association for the Education of Young Children (NAEYC) standards. During the C2L project the teacher candidate students were able to use Google Sites to create ePortfolios that made their work more accessible to evaluators (UD C2L ePortfolio Leadership Team, 2014a, para. 27).

Process and Activities for Programmatic ePortfolios

The activities that supported the use of the programmatic ePortfolios used in the C2L project were initiated well before the first day of class (UD C2L ePortfolio Leadership Team, 2014b, para. 5). The UD CTL leadership team communicated with the faculty in the academic programs about the role of ePortfolio in assessment. The UD C2L leadership team found that it was necessary to first clarify the distinction between presentation-style ePortfolios that are owned by students, and program level ePortfolios that are owned by program faculty for assessment (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

The UD C2L team conferred with program faculty to create instruments and forms to support their ePortfolio project in the Sakai Open Source Portfolio (OSP). The program faculty worked to create organized and comprehensive academic program plans to define the essential and specified outcomes required by the students. The learning activities in the courses were examined and adjustments were made to align them with specific academic objectives. A clear and precise definition of what constitutes successful completion of each requirement was necessary (UD C2L ePortfolio Leadership Team, 2014b, para. 9). The UD C2L IT team used the information from the program faculty to enter individual academic program plans into the Sakai platform so that each academic program had an individualized plan in the system.

As the project continued the UD C2L IT team evaluated the performance of the technology with each program's academic program plan. They communicated with program faculty to assure that the details of the academic plans were correct and compatible with the framework of Sakai. This monitoring was important to ensure the process supported the collection, submission, evaluation, and documentation of evidence of student learning. This support made sure the academic goals that are

unique to each academic program were part of the process in Sakai (UD C2L ePortfolio Leadership Team, 2014b, para. 5).

Feedback from faculty indicated that the process of curriculum mapping to coordinate the learning activities with the program objectives was informative and guided decisions that improved the programs. Program faculty stated that the matrix developed from the curriculum mapping provided a graphic representation of the academic program that made it possible to adjust the sequence of courses to match the program objectives. This transparency allowed program faculty to note where there was duplication of efforts in the curriculum. They could also see where activities needed to be added to improve student learning (UD C2L ePortfolio Leadership Team, 2013b, para. 27). These efforts helped the faculty to identify the learning activities that were most effective (UD C2L ePortfolio Leadership Team, 2014b, para. 7).

Faculty reported that the students appreciated the chance to see how the courses related to the program objectives. Students were able to visually map the connection between the courses and this helped them plan their schedules (UD C2L ePortfolio Leadership Team, 2014c, para. 14).

There were challenges that related to the actual process of ePortfolio that are specific to their activities.

- The timing for the assignment submission did not align with the grading cycle. The submission times for the reflections did not allow enough time for the faculty to give timely feedback to the students. This seriously limited the effectiveness of the reflection process (UD C2L ePortfolio Leadership Team, 2013b, para. 11).
- Some students indicated that they did not receive information that supported a clear understanding of the purpose for ePortfolios in their courses. They were not able to recognize how the activities of creating the components for their ePortfolio could add depth and coherence to

their academic experience. They had difficulty discerning the value of the assignments and this lessened their engagement with the process (UD C2L ePortfolio Leadership Team, 2014b, para. 50).

- Some faculty did not have experience with ePortfolios and they were unsure how to communicate guidelines to the students on the processes necessary to develop them. This included faculty that were unfamiliar with the nature of formative feedback. They were not clear on how to integrate it into their courses. There were others that were unaware of the role of reflection in ePortfolios and were not prepared to introduce the concept to students (UD C2L ePortfolio Leadership Team, 2013b, para. 13).
- Faculty were not prepared for the amount of time needed to complete some of the processes for ePortfolio. Faculty found the task of reading the reflections and giving feedback unexpectedly time consuming (UD C2L ePortfolio Leadership Team, 2013b, para. 13).
- Feedback from some faculty indicated that the level of academic program leadership in an ePortfolio initiative was an issue that affected the level of faculty engagement within the departments. According to the ePortfolio leadership team (2013b), "We realized the importance of active involvement by the department chairperson and how it positively impacted faculty commitment to ePortfolio implementation" (para. 12).

Processes and Activities for Assessment ePortfolios at the Institutional Level

The goals for the UD C2L leadership team in this ePortfolio initiative included the intent to improve the tracking and recording of evidence that would document the success of the curriculums towards the need to qualify for a formal stamp of approval

from the external organizations for accreditation requirements (UD C2L ePortfolio Leadership Team, 2013b, para. 31).

For the institutional level, data needed to be collected that would be usable for reporting efforts. When the program faculty worked with the UD C2L leadership team to create the matrix in Sakai, they examined the rubrics that were developed through the efforts of the AAC&U for General Education competencies. They made changes in the rubrics to accommodate their academic program's goals (UD C2L ePortfolio Leadership Team, 2013a, para. 15).

There were challenges that impacted the level of success towards using the C2L ePortfolio project in Sakai to collect data for assessment at an institutional level.

- There was a limited number of academic programs that actually went through the entire process of creating a matrix that represented the learning objective for their program of study. This meant there was not enough data that was useful for assessment activities.
- In Sakai each program's matrix was different because it was developed to map the specific curriculum of only that academic plan. This did not support data comparison between programs.
- Faculty had also adapted rubrics to meet the needs of their curriculums within the same matrix and this limited the data that could be used for assessment activities within the same programs.
- Because the Sakai matrix was used for a short length of time, not enough data was available to assess completion of General Education requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 46).

The Goals of Stakeholders

The process and activities necessary to support a successful ePortfolio component in an implementation are dependent upon established program goals.

Program goals also define the identity and roles of the stakeholders. Stakeholders for this initiative included learners, faculty, program directors, members of the Teaching, Learning and Assessment unit at UD, IT personnel, and administrators. The focus of the questions in this study and the findings indicate that decisions about the technology needed to emerge from an understanding of the process and activities that supported each of these stakeholders (Penny Light, Chen & Ittelson, 2012).

Finding 4: Requirements

During this time the "Teaching, Learning, and Assessment" (TLA) unit worked with program directors and faculty to pilot ePortfolio. They recorded their efforts on the University of Delaware's Technology page on the Catalyst for Learning website. They depended upon the structure and focus of the "Catalyst Framework for Effective ePortfolio Practice" to guide their efforts. This required attention to the fundamental tenets of this framework that were identified as inquiry, reflection, and integration. When the focus of an initiative is the learner, it is essential to use these three perspectives to guide their activities (Eynon & Gambino, 2017, p. 12).

To support an initiative that incorporates the goals for both a learner-centered academic experience, and the structure to enable assessment and accreditation, it is critical to choose the most appropriate technology.

The technology chosen to support the ePortfolio initiative was the Open Source Portfolio (OSP) component in the Sakai learning management system (LMS). One reason this platform was selected is it aligned with the resources on the UD campus. When the UD community started to use ePortfolios, Sakai was the LMS in place. This made it a good fit economically. This saved additional resources that would be required if a new technology was chosen. The systems and trained personnel were already in place to support the Sakai platform (UD C2L ePortfolio Leadership Team, 2014b, para. 25).

Sakai had functions that supported the participants' efforts to match the learning activities that were used in the coursework, to the outcomes that were developed to support the academic program's academic objectives. (UD C2L ePortfolio Leadership Team, 2014b, para. 59).

The technology allowed the collection of students' work. It also supported written dialogue between the student, faculty, and other evaluators. This communication component was essential to enable activities needed for formative and summative assessment of student learning. In addition, the OSP in Sakai possessed features that supported the creation of a matrix that represented the unique curriculum requirements and linked these to the specific learning activities. Rubrics could be used with the matrix in the OSP system to document assessment that was formative or summative (UD C2L ePortfolio Leadership Team, 2014b, para. 59).

The information that emerged from identification of UD's goals was used to discover what activities and inputs were necessary to support the process for ePortfolios. Since the goal here was to determine what was required to support the specific activities and processes for UD, only the information from their site applied. Though other institutions' narratives were reviewed only the data from the UD reports were collected and analyzed for this list of requirements. UD's sections of the Catalyst for Learning website were searched for data that referred to what they were trying to accomplish with the ePortfolio on their campus. An extensive list of requirements was created. Duplicates were removed and similar items combined until the list was complete but manageable. The technologies with the potential to support UD's goals, as referenced on the Catalyst for Learning website, were identified and described.

The details from the narratives reported by the participants in UD's initiative revealed that the purpose was to use ePortfolio to create a learner-centered academic experience, at the individual level with a presentation-style ePortfolio. The narratives also revealed that UD wanted an ePortfolio at the program level, that supported the

collection and documentation of evidence of student progress for assessment and accreditation efforts at the institutional level. According to the (UD C2L ePortfolio Leadership Team: "Ideally, faculty are looking for a user-friendly platform to obtain actionable assessment data to achieve the ultimate goals of the TLA ePortfolio" (UD C2L ePortfolio Leadership Team, 2014b, para. 44).

To begin the decision process about technology a careful consideration of roles and processes that support ePortfolios in academic settings must be considered. There are many different types of ePortfolio implementations. Each of these has potential to represent a broad and diverse range of purposes, goals, and activities in an educational setting. It can be challenging to sort through these to make an informed decision about technology options that are appropriate for a specific situation (Batson, 2011).

When institutions make decisions about technology for their ePortfolio initiatives they have many options to consider. They can pay for hosted software as a service such as Taskstream, eFolio, Epsilen, or Digication. Some choose to customize an open source technology like Mahara or Sakai. There are also options that include combining relevant technology that is available online; or even constructing a system that meets their institution's goals (Richardson, n.d.). Even within these different categories there exists a wide range of possible functions and usability issues that must be considered in the decision-making process.

A learner-centered ePortfolio can be implemented with the focus on the process of learning. It can also serve as a product that results from the learning process, in the form of a presentation ePortfolio. ePortfolio initiatives that are intended to support assessment and accreditation need stakeholders to approach the decision-making process with those goals as central. The view of the ePortfolio as a product of the process means that the system needs to have functionality that supports that. The array of possible uses for ePortfolio in higher education has not permitted the creation of a one-size-fits-all solution for every institution that answers the question of what is the

best technology for an initiative. This process is made more complicated because every institution's culture, structure, and mission combine to produce a unique entity and that singularity needs to be addressed in the decision-making process (Joyes & Smallwood, 2011, p.25). It is essential that the technology chosen aligns with those unique requirements for a successful implementation. Once all of the critical factors are carefully considered, it is possible to have a pathway to guide the decision process (Himpsl & Baumgartner, 2009).

Barrett (2012) has created a version of classifying the ePortfolio technology according to its ability to support the specific processes and activities. This approach categorizes the available technology by examining pertinent functions that support the varied uses of ePortfolio along a continuum. These are described in this narrative and organized in Table 12.

Table 12 Description of Technology Platforms Used by Participants in C2L Project

Technology	Hosting Status	Key Features	Communication
Creative Tools: PowerPoint, Word, Adobe	Not Digitized Uploaded and linked or embedded in sites	Learner has "Ownership"	Only on the Web if Digitized
Web Options: Weebly, WordPress, Wix, etc.	Web Service Presentation Sites	Learner has "Ownership" of Content	Web 2.0
Google Sites	Web Service Presentation Sites, Single Course	Learner has "Ownership" of Content	Web 2.0
Mahara	Open Source, Hosted by Institution Designed to Support ePortfolios	Access Flexibility Learner Limited "Ownership"	Social Networking, Web 2.0
Sakai, OSPI	Open Source, Hosted by Institution Designed as Learning Management System (LMS) with integrated ePortfolio Option	LMS, Assessment Learner Limited "Ownership"	Communication, Feedback
eFolio	Hosted, Software as Service Designed to Support ePortfolio	Interoperability Portability Learner Limited "Ownership"	Feedback Features, Social Networking
Digication	Hosted, Software as Service Designed to Support ePortfolio	Option for Student Presentation and Creation, Collection, Assessment at Individual, Classroom, Program Level, Assessment with Standards, Evaluation, Add on Management for Data Learner Limited "Ownership"	Communication, Feedback
Epsilen	Hosted, Software as Service Designed as eLearning Tool & to Support ePortfolio	Presentation Sites, Assessment, Evaluation, (At the time of this inquiry) No Support for Assessment Learner Limited "Ownership"	Social Networking, Web 2.0
Taskstream	Hosted, Software as Service Designed to Support ePortfolio and Features of CMS (Integrated Course Management System)	Course, Program, training level, Rubric Aligned with Standards for Accreditation. Aggregation Level Data Management Learner Limited "Ownership"	Communication, Peer Evaluation

Note: The data reported here were collected in the Fall of 2015.

Due to the variability of function and purpose between the technologies, they may qualify to be in more than one group. There are some technologies with functions that clearly serve the needs of the learner, others that focus on requirements of the institutions, and a select few that attempt to appeal to both groups. These functions include the ability of the technology to support communication between the learners and evaluators, to collect and manage data, and the presence of mechanisms to support creation of reports from that data.

This approach looks first at the purpose for the initiative. The goals of the initiative determine if it is considered an "Individual & Institutional" or if it is strictly "Institutional" (Barrett, 2012). This classification system separates the tools based on how their structure and function support the goals of individual and institutional initiatives into two groups. In the first group common to both individual and institutional are technology that supports input and editing by the learner, web publishing, or web publishing that also supports collaboration. The second group of technologies that are designed for initiatives that are institutionally driven include software that is hosted on the institution's server, programs that are hosted by an external organization, and systems designed to support assessment and are also externally hosted.

Within the two groups the tools are identified by their level of "interactivity." Tools that are used offline such as Word or PowerPoint are identified as having no "interactivity." These are not considered online resources until they are digitized and loaded onto the web. These tools allow a higher level of creativity by the learner, but they limit the audience to, in most cases, just the instructor. These are not designed to support a dialogue that could provide ongoing input or formative feedback.

The next group includes platforms that allow the creation and publication of ePortfolio on the web. They expand the potential to share the ePortfolio with a larger audience, but do not offer functions that support a high level of interactivity. This

software includes programs such as WordPress, Blogger, and Google Sites and these offer functions that allow individuals and institutions to build and put ePortfolios on the Internet. These can showcase student work or accomplishments and support limited dialogue and feedback between the creator and the audience but do not have functions for tracking or recording student academic progress through a course or program (Barrett, 2012).

This approach to categorizing the technology identifies several types of tools as most likely to be useful to institutions. These include open source tools like Mahara and Sakai. These possess functions that support aspects of ePortfolio. The institution must provide the hosting for these, usually on their own servers. Their technology functions to contain the ePortfolios, and allow interaction between the learners and the audience. However, these platforms often require additional modifications and workarounds to manage data for purposes of assessment or accreditation and these requirements may challenge an institution's resources (Barret, 2012).

Institutions can also use platforms that are hosted separately from their server such as Digication, Taskstream, eFolio, Google Apps for Education, or Epsilen. These are also capable of providing a venue for learners and their audience to communicate and interact with the material on the sites. However, they vary widely in their range of functions and are not uniform in their abilities to collect, organize, and report data for assessment or accreditation purposes.

The last category includes software that is designed for data collection, and analysis, as well as reporting and includes Taskstream. Digication and Epsilen offer the option to add these features to their systems for additional cost. These platforms are structured to host the institution's ePortfolios. All of these vary in their ability to support collaborative activity.

Barrett (2015) further differentiates the tools by their potential to support different "Levels of Personal Expression and Creativity." This measure's value is determined by how much control the learner has over the look and feel of the ePortfolio.

All of the software programs in this classification system are ordered on the "Level of Interactivity" possible for learners (Barrett, 2012). This measure indicates if there are functions that support communication between learner, instructor, and or evaluators. This element becomes of greater significance when assessment is formative and ongoing within the ePortfolio.

No discussion of decisions about technology would be complete without an inquiry into the topic of its usability. Jakob Nielsen (2012) defines usability as how people perceive the level of difficulty they experience when using the technology. The term "user-friendly" is often used when talking about what creates a positive "user interface." Christensson (2014) suggests that a user-friendly interface would be uncomplicated. The layout and placement of items should make sense. Navigating the links should be a pleasant experience without the need for directions that are long and involved. Reliability is an important inclusion in this list of user-friendly requirements because the user must be able to depend upon the software functioning properly and without loss of data.

Finding 5: What Worked and What Did Not Work

The last finding for this improvement plan consists of identifying what technology has the potential to support the goals for ePortfolios at UD. The qualitative weight and sum (QWS) method was used to evaluate the function and usability of the different technologies discussed on the Catalyst for Learning website. This approach allowed the level of importance for each requirement to be considered in the evaluation process (Scriven, 1991, p. 294).

All of the participants with the Catalyst for Learning initiative wrote five separate reports that were then posted on the shared website. Each of these narratives focused on a different component of the Catalyst for Learning Framework model. These topics included: Pedagogy, Professional Development, Outcomes Assessment, Technology and Scaling Up. Each of these accounts were reviewed, but the data referenced for this finding emerged from the two reports that focused on the technology.

First a list was created from UD's Technology and Scaling Up reports that represent the institution's specific requirements for an ePortfolio project. Once the UD list of requirements for ePortfolio technology was created, each of the items was defined. These definitions are found in Appendix D, ePortfolio Technology Requirements Definitions. UD's requirements were organized into categories that represented the three different levels of ePortfolio processes that were identified as appropriate to support UD's goals. These included: presentation; course and/or program; and institutional levels of initiatives. The presentation level is used by individual students to showcase their accomplishments to a specific audience and at a particular point in time. The course and/or program level are for the use of ePortfolios within a single course as an assignment or for documenting a student's progress through an academic program. The institutional level was for the assessment of General Education requirements and accreditation purposes. A fourth group included information on the vendor and factors important to administration. The last category represented information about the required resources that include cost, institutional support, and system requirements for the technology.

At this point in the QWS approach, each requirement was given a weighting depending on its importance in the process. This rating level was decided based on the specific needs of UD as documented in the Technology and Scaling Up sections of their Catalyst for Learning reports. Referencing only the UD's report at this step increased

the potential for the findings in the plan to identify the most appropriate technology to support the activities and processes necessary for a successful ePortfolio project.

Each of the requirements on the list was assigned a non-numerical rating that represents that item's degree of importance. The following codes were assigned to each requirement to indicate its value as suggested by Scriven (1991, p. 294): Essential (E), Very Valuable (*), Valuable (#), Marginally Valuable (+), and Zero (0).

For the next step in the QWS method used in this evaluation, each of the technologies that was utilized in the Catalyst for Learning initiative was listed. These technologies included: Digication, eFolio, Epsilen, Google Sites, Mahara, Taskstream, WordPress. The identified and now weighted UD requirements were listed under each of these technologies. Information was collected from all of the institutions' Technology and Scaling Up reports relevant to the participants' experiences with the technology on their campuses. All 24 of the participating institutions in the Catalyst for Learning initiative were included in the collection and analysis of the data for this part of the QWS method to support the consideration of all available technology options. This broad inclusion worked well for this part of the inquiry because each campus used the same outline template to document their experiences. Each institution was answering the same questions about the technology they used. This became valuable for the evaluation of the technology that was used by multiple institutions.

For the next step in the QWS method, a rating was assigned to each of the requirements that indicated how well the technology performed. Each of the assigned ratings could only fall within the range of the weighting assigned to that requirement in the original UD list. This limitation allowed a view of how significant each requirement was to the ePortfolio process through the filter of UD's goals.

It was noted how many stars, double pluses, pluses, and zeros each of the technologies received within their assigned categories: individual presentation; course and/or academic program; institutional; and vendor and administration. The

combination of symbols was compared to the original list of UD weighted requirements. The technology that was the closest match to the UD list meant that its features had an increased potential to align with the goals of an ePortfolio initiative on UD's campus.

The use of the qualitative weight and sum (QWS) method produced an organized presentation of the strengths and weaknesses of each technology's performance to meet the requirements (Scriven, 1991, p. 294). Table 13 presents the evaluation results within each of the four categories. The expanded table for the QWS evaluation is included in Appendix E, Qualitative Weight & Sum (QWS) Evaluation Expanded.

Table 13 Qualitative Weight and Sum (QWS) Evaluation of ePortfolio Technology

Technology	Presentation			Course			Institution			Vendor		
Rating	+	#	*	+	#	*	+	#	*	+	#	*
Weight Rate	0	4	6	0	3	10	0	2	6	0	2	5
Digication	5	2	3	1	2	10	0	3	5	2	2	4
eFolio	7	1	2	2	4	7	1	6	1	2	1	5
Epsilen	7	2	1	6	1	1	2	0	0	3	1	4
Google	0	4	6	2	1	3	2	0	0	2	2	3
Mahara	7	2	1	7	3	3	6	2	0	1	3	3
Sakai	6	3	1	4	5	4	3	4	1	3	1	3
Taskstream	6	1	3	1	2	10	0	2	6	1	2	5
WordPress	2	4	4	2	2	2	0	0	0	2	2	3

Note: The data reported here were collected in the Fall of 2015.

The results of the QWS approach to the evaluation of the different technologies within the categories are displayed in tables 14 through 17 below. Collectively, they summarize the activities and processes for each type of ePortfolio and present how well

the technology performed to support these. This information allows the consideration of which technology has the potential to support a successful initiative.

The information in Table 14 summarizes the QWS evaluation results for the individual presentation ePortfolio. This category of ePortfolio is most valuable when the function and usability of the technology produce a professional and attractive product. It is also better if there are features that increase the learner's control of how the ePortfolio looks, who has access to their work, and the option to use it after they leave the institution. In this category Google Sites' combination of symbols mirrors the requirement ratings for the UD's list. Google Sites has functions that allow a high level of control for the learner over the look and feel of the ePortfolio which can increase feelings of ownership. This is supplemented with a high level of control for the learner over who has access to their work. Additionally, the ePortfolio can be exported after graduation. This portability is a plus for students who want to continue to use their ePortfolios after leaving the institutions. It also rates well on usability. WordPress produced a similar combination of ratings and had stars on four of the same features. Students find that both of these technologies possess features that support the creation of professional sites they can share with evaluators and for potential employment opportunities when they complete their degrees. These two stood above the other technology in the functions needed to support presentation ePortfolios. Though they all supported the essential features such as reflection the other technology did not rate well on the functions that tend to engage the learner such as usability and feelings of ownership.

Table 14 Evaluation Results for the Individual Presentation Level ePortfolio on Technology Used in Catalyst for Learning Initiative

Individual Presentation Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	Word-Press
Showcase Accomplishments	*	+	+	+	*	+	+	+	#
Career/ Professional/Employment	#	+	+	+	#	+	+	+	#
Level of Learner Control over Look and Feel	*	+	+	+	*	+	+	+	#
Level of Learner Control over Access	*	*	*	*	*	*	*	*	*
Supports Reflection	*	*	*	#	*	+	#	*	*
Multiple versions for different Audiences	#	+	+	+	#	+	+	+	+
Portability after graduation	*	+	+	+	*	#	#	#	*
Access for Evaluators	*	*	#	#	*	#	#	*	*
Usability	#	#	+	+	#	+	+	+	#
Tutorials, Learning Instruments and Products	#	#	+	+	#	+	+	+	+
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 4 6	5 2 3	7 1 2	7 2 1	0 4 6	7 2 1	6 3 1	6 1 3	2 4 4

Note: The data reported here were collected in the Fall of 2015.

Presentation-style ePortfolio with Sakai

Sakai was the platform that students used for presentation-style ePortfolios at UD before GoogleApps became available. It was limited in features that allowed creative control over look and feel of the site, but it functioned as a location that students could share their work with evaluators. Sakai was the Learning Management System (LMS) for UD and the sites that students created were owned by the institution. There were security concerns that limited student access to the system after students left the campus (UD C2L ePortfolio Leadership Team, 2014b, para. 26).

If students wanted to use the artifacts and reflections after graduation they were required to download their ePortfolio contents into a zip file (UD C2L ePortfolio Leadership Team, 2014b, para. 58).

Presentation-style ePortfolio with Google Sites

When GoogleApps became available students created their ePortfolios in Google Sites. This allowed them to have the access to the sites after graduation (UD C2L ePortfolio Leadership Team, 2014b, para. 26).

The students had ownership of the sites. The platform offered features that allowed customization and creativity in their sites. There was the understanding that Google provided a highly functional, stable, and sustainable platform for their work (UD C2L ePortfolio Leadership Team, 2014b, para. 58).

The students were able to produce multiple sites for different purposes and audiences. Students were able to add rich content, make links, and present videos, audio and images on websites to share with evaluators. Students also controlled the level and timing of access to their pages. Google Drive was available for storage of their work. The interface was more user friendly than Sakai, but IT supported students

and faculty with demonstrations, online learning tools, and a central location where they could ask for help (UD C2L ePortfolio Leadership Team, 2014b, para. 26).

Some students were already using other technologies that were available. These included programs such as WordPress, Weebly, or Wix. These varied in their features, but some students felt that there were some areas where these other choices performed better than Google Sites. Students that were already using other applications were familiar with the technology and comfortable with their functions. They were not supported by IT at UD, but for some applications individual faculty allowed the students to choose their own technology (UD C2L ePortfolio Leadership Team, 2014b, para. 57).

Presentation-style ePortfolio with Canvas LMS

When the Canvas Learning Management System was piloted on the UD campus, IT advised students to use other platforms to create their presentation-style ePortfolios. There were very real security concerns that influenced this course of action, but it was also found that IT saw the value of student ownership for this kind of ePortfolio. Other technology would support students' use after they left the campus (UD C2L ePortfolio Leadership Team, 2014b, para. 28).

The UD C2L leadership team stated that although the presentation-style ePortfolios that were student-owned did not fall under the scope of the C2L grant, they were increasingly valued by students and faculty for their role in integrative learning in academic programs (UD C2L ePortfolio Leadership Team, 2014c, para. 19).

Their experiences with faculty and students as they worked with the presentation-style ePortfolios indicated that there were features and functions that were important. They found that it was essential that students had "access" to their ePortfolios after they leave the campus. Students and faculty also looked for technology that was not difficult to learn. They valued a user-friendly interface with

robust functions to support the creation of sites that were visually appealing and professional. It also helped when the tools were intuitive and possessed functions that supported the use of multi-media. They preferred a technology that allowed them to modify and personalize their ePortfolio and make multiple versions for different audiences. Students wanted security features that allowed them to decide who has permission to see their files and control the timing of that access (UD C2L ePortfolio Leadership Team, 2014b, para. 19)

In Table 15 the evaluation results for the course and academic program level ePortfolios are displayed. At this level of ePortfolio initiatives it becomes desirable to have technology that can document academic achievement, support assessment with rubrics, and provide multiple methods of communication between users. For academic programs the ability to track students' progress through the program requirements is important.

The ratings for Digication and Taskstream are the closest to the weights that were assigned to the UD requirements in this category and this indicated that they would fare well at the course and program level. At this level of ePortfolio implementation functions that document learning become more valued. Two of the programs that rated low in the ability to track student learning were both open source technology: Mahara and Sakai. Most of the programs fared well in the formative and summative assessment rating. The ratings for collaboration were also high for of the technologies. There was a definite weighting in favor of technology that had features to collect data, and Digication, eFolio, and Taskstream did will in this area.

Table 15 Course and/or Academic Program Level ePortfolio Information on Technology Used in Catalyst for Learning Initiative

Course and or Academic Program Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	Word-Press
Document Achievement	*	*	#	+	0	+	#	*	0
Path through Curriculum	#	#	+	#	0	+	+	#	0
Evaluation and Assessment	*	*	*	+	#	#	#	*	+
Supports with Rubrics	*	*	*	0	0	+	*	*	0
Supports Formative Assessment	*	*	*	+	*	*	*	*	*
Supports Summative Assessment	*	*	#	+	*	#	*	*	*
Supports Roles that are Specific to users	*	*	*	+	+	*	*	*	0
Supports "Evidence of Learning"	*	*	#	0	0	+	#	*	#
Evaluation of Progress for Learners	#	#	#	0	0	+	+	#	0
Functions that Collect Data	*	*	*	0	0	+	#	*	0
Functions that Document learning	*	*	*	0	0	+	+	*	0
Supports Collaboration for all users	*	*	*	*	*	*	#	*	#
Flexibility	#	+	+	+	+	#	+	+	+
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ #	+ # *	+ # *
Rating Total (Sub-Total)	0 3 10	1 2 10	2 4 7	6 1 1	2 1 3	7 3 3	4 5 4	1 2 10	2 2 2

Note: The data reported here were collected in the Fall of 2015.

Sakai was the technology used on UD campus during the C2L initiative to support the programmatic ePortfolios.

Programs that have functions that go beyond merely collecting and storing data and have features that can track and document students' progress are most useful for institutional level implementations. The ratings in Table 16 highlight the importance of these abilities. Epsilen, Google Sites, and WordPress received multiple 0's in requirements that involved the management of data.

When institutions are looking at technology for accreditation efforts and assessment of General Education requirements, functions that support robust and comprehensive data management are essential. Digication and Taskstream performed well in this category and were at the top of the list for data management features. Interoperability is an important issue at all of the levels of deployment, but the technologies examined were generally weak in this category. The weighting and results of the evaluation for requirements in this category are very important indicators of how well a technology will support institutional wide implementations. Digication and Taskstream both showed strong ratings in this group.

Table 16 Evaluation Results for Institution Level ePortfolio Technology Used in Catalyst for Learning Initiative

Institution Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	Word-Press
Accreditation	*	#	#	+	0	+	#	*	0
Assessment for Institutional Goals	*	*	#	0	0	#	#	*	0
Supports Accreditation	*	*	#	+	+	#	#	*	0
Functions that Manage Data	*	*	#	0	0	+	+	*	0
Functions that Support Reporting	*	*	*	0	0	+	+	*	0
Archive Functions for Data	#	*	*	0	0	+	+	*	0
Interoperability with systems in place	*	#	+	+	0	+	#	#	0
Scalability	*	*	#	0	0	+	*	*	0
Multiple levels of ePortfolio	#	#	#	0	+	+	#	#	0
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 2 6	0 3 5	1 6 1	2 0 0	2 0 0	6 2 0	3 4 1	0 2 6	0 0 0

Note: The data reported here were collected in the Fall of 2015.

111

Programmatic ePortfolio in Sakai OSP

The technology chosen to support the ePortfolio initiative was the Open Source Portfolio (OSP) component in the Sakai learning management system (LMS). One reason this platform was chosen is it aligned with the resources on the UD campus. When the UD community started to use ePortfolios, Sakai was the LMS in place. This made it a good fit economically and because of its continued use on campus as systems and trained personnel were already in place to support the platform (UD C2L ePortfolio Leadership Team, 2014b, para. 25),

This platform functions supported the program faculty's efforts to match the learning activities that they used in the coursework, to the learning outcomes that they had developed. This tool's functionality supported and made useful the work that they had done to connect the assignments to the course requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 59).

The system allowed the collection of student work and supported written dialogue between the student, faculty, and other evaluators. This communication component was essential to enable activities needed for formative and summative assessment of student learning. In addition, the OSP in Sakai possessed features that supported the creation of a matrix that represented the unique curriculum requirements and linked these to the specific learning activities. Rubrics could be used with the matrix in the OSP system to document assessment that was formative or summative (UD C2L ePortfolio Leadership Team, 2014b, para. 59).

Although Sakai supported many of the activities that were needed for the UD C2L ePortfolio project, there were some challenges with the platform (UD C2L ePortfolio Leadership Team, 2014b, para. 61).

- The matrix in OSP allowed the course objectives to be connected to the learning activities for the academic programs; however, once the process

was started and the students' information was collected, there was no way to make any adjustments. This rigidity had to be accounted for in the planning stage with the program faculty before the matrix was operationalized (UD C2L ePortfolio Leadership Team, 2014b, para 60).

- The UD C2L leadership team found that once the information needed for assessment was collected, there was no efficient or convenient support within the system for aggregating or reporting the data (UD C2L ePortfolio Leadership Team, 2014b, para. 44)
- The lack of reporting capabilities in Sakai were compounded by the severe limitations of the program's interoperability with enterprise systems that were already in use on campus (UD C2L ePortfolio Leadership Team, 2014b, para. 47). It was also awkward for grading activities due to the lack of connection between the grading tool within the Sakai LMS and OSP (UD C2L ePortfolio Leadership Team, 2013b, para. 10).
- The Sakai system slowed at times when there was a lot of activity on the platform. Larger sites had more issue with slowness and impaired functions when more students were using Sakai during peak times (UD C2L ePortfolio Leadership Team, 2014b, para. 47).
- There were workarounds and customizations that could address some of these issues, but only IT could implement them. These changes required resources in time and personnel that IT did not have at the time (UD C2L ePortfolio Leadership Team, 2013b, para. 10). The technology for the software and hardware in this system were aging. As a technology becomes older it is more difficult to update and modify (UD C2L ePortfolio Leadership Team, 2014b, para. 61).

The UD C2L leadership team evaluated the feedback they received from the faculty and considered the technology choices available on campus. They made the decision to include the use of sites created in Google as an option for academic programs (UD C2L ePortfolio Leadership Team, 2013b, para. 20).

Programmatic ePortfolios in Google Sites

The UD C2L leadership team communicated and worked with faculty to create a template to support a programmatic ePortfolio in Google Sites using a curriculum map. The faculty and staff that used this template reported that the Google Sites was satisfactory but there were some challenges (UD C2L ePortfolio Leadership Team, 2014b, para. 12).

- In Google Sites there is no function to organize the sites in any logical order.
- There are no features to manage the large number of student sites that a faculty would need to evaluate.
- There were problems with sharing the students' sites with external reviewers (UD C2L ePortfolio Leadership Team, 2014b, para. 13).

Programmatic ePortfolios in Canvas

There was some consideration by IT of the potential for Canvas as a viable option for programmatic ePortfolios. At the time of the UD participation in the C2L ePortfolio initiative, IT was looking at the rubrics' capabilities in the Canvas system and checking for functions that support the processes of collecting, aggregating, and reporting (UD C2L ePortfolio Leadership Team, 2014b, para. 27).

Table 17 has the evaluation results for the vendor and administration details. Here in Table 17 requirements that are important for any level of implementation are rated for each of the technologies. For the issues of security, privacy, and the accepted

artifacts media there was almost unanimous success for all of the technologies. For Section 508 there was some variability that needs to be considered. Taskstream, eFolio, and Epsilen do meet this requirement. Fulfilling this requirement pushed Taskstream to a better position in these ratings than Digication. It is interesting to note that the final combinations for this category were fairly similar across the technologies. These requirements are not specific to the level of the initiative and are important considerations for every type of ePortfolio technology.

Table 17 Evaluation Results for Vendor and Administration Information on Technology Used in Catalyst for Learning Initiative

Vendor and Admin Information	Requirement Weighting.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Company Responsiveness	*	*	*	*	0	0	0	*	0
Storage space per owner account	#	+	+	+	#	#	+	#	#
Security	*	*	*	*	*	*	*	*	*
Privacy	*	*	*	*	*	*	*	*	*
Section 508	*	+	*	*	+	+	+	*	+
Migration	#	#	#	+	#	#	+	+	*
Systems Integration	*	#	+	+	+	#	#	#	+
Accepted artifacts/media	*	*	*	#	*	*	*	*	*
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 2 5	2 2 4	2 1 5	3 1 4	2 2 3	1 3 3	3 1 3	1 2 5	2 2 3

Note: The data reported here were collected in the Fall of 2015.

Scriven (1991, p. 294) indicates that at this stage of the evaluation process the information from the QWS has provided a "ranking" that allows a "final grading step" for a decision. This sorts evidence to identify several technologies that qualify as potential platforms for the ePortfolio management system as described by Ravet (2007).

In Table 18 there is related information about each technology presented categorically as a resource. These factors are important elements to consider at this stage of the decision. For the purposes of this plan, it is information that helps explain some of the differences between the technologies. A system that is originally designed as an ePortfolio platform will generally function well in the areas that support ePortfolio implementations. A detailed list of requirements for each technology is found in Appendix F, Table of Requirements for Each Technology.

Table 18 Resource Information on Technology in Catalyst for Learning Initiative

Resource Information	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Required system by institution	Internet w/browser	Hosted web service	Internet connection	Internet	Internet browser, JavaScript, etc.	Browser, Linux, JDK 8, Apache Tomcat 8, MySql or Oracle	Browser	Browser depending on choice of service
Hosted service (Software as a service)	Hosted	Hosted	Hosted	Hosted	Institution	Institution	Hosted	Hosted
Student pricing	Google Apps for Edu (Free), per account $+9.95 per year	Sliding Scale	Free to student for life	Free	Open source	Open source	Per student	
Institutional pricing	Range $5 to +*$ per user per year	Per module	FTE basis model	per student license	Open source	Open source	Based on student pricing	
Additional services		Hourly basis	Free	Fee	Institution pay Partners	Institution determines	Free excpt integrate	
Alumni	Free w/institution model in place/or +9.95 per year	Fee with instit	Free for life		Export as HTML/Leap +A XML	Zip file	Zip files	
Institutional Support	Free online and email/Fee based other	Negotiated as needed	No service fees	Free online	Institution provides support	Institution determines	None	
IT Staff	No IT staff required	No IT staff required	No IT staff required	No IT staff nec	Institution determines	Institution determines	No IT staff required	

Note: The data reported here were collected in the Fall of 2015.
(Batson, 2011; Himpsl, & Baumgartner, 2000; Miles, 2012; Petersen, 2014)

For the "…final grading step…" described by Scriven (1991, p. 294) more information is available in Table 19. This table lists the doctoral and research institutions in the Catalyst for Learning initiative and identifies the ePortfolio technology that they used. Categorical information from the C2L website provided the total number of enrolled students and the number of these students that use ePortfolios at that school. This table also includes the level of implementation that the participants used for the ePortfolio project on their campus. These levels are listed as a combination of the following types: presentation, course, academic program, institution, general education (GEN ED), and or writing assessment.

For this table the information from the Technology and Scaling Up reports on the C2L website was referenced and organized to display the level of satisfaction that participants experienced with the technology. Data from these narratives also indicated if the institutions have plans to change the technology that they used for the Catalyst for Learning project and this is also listed in Table 19.

Table 19 Doctoral/Research Institution Satisfaction with ePortfolio Technology Used in Catalyst for Learning Initiative

Institution	Total Students	Students Using ePortfolio	Level of Use for ePortfolio	Technology	Satisfaction Level	Technology Plan
UD	20,000	1,671	Course, Program, GEN ED	Sakai	Somewhat Satisfied	Exploring Other Options
VT	30,000	13,000	Course, Program, GEN ED	Sakai	Somewhat Satisfied	Exploring Other Options
IUPUI	20,000	4,000	Course, Program, GEN ED	Sakai	Somewhat Satisfied	Exploring Other Options
RU	20,000	400	Course	Sakai	Not Satisfied	Exploring Other Options
NEU	24,000	3,000	Program	Digication	Somewhat Satisfied	No Change Planned
SBU	23,000	13,000	Course, Program	Digication	Satisfied	No Change Planned
SJU	20,000	7,000	Course	Digication	Very Satisfied	No Change Planned
BU	15,000	4,500	Presentation, Program, Institution	Digication	Very Satisfied	No Change Planned
SFSU	20,000	1,850	Course, Program, GEN ED	eFolio	Very Satisfied	No Change Planned
Pace	10,000	2,000	GEN ED, Writing Assessment	Mahara	Somewhat Satisfied	No Change Planned
GU	12,500	600	Course, Program	WordPress	Somewhat Satisfied	Exploring Other Options

Note: Satisfaction Criteria Rating: Very Satisfied, Satisfied, Somewhat Satisfied, Not Satisfied and Technology Plan Criteria: No Change Planned, Exploring Other Technology. The data reported here were collected in the Fall of 2015.

The information on Table 19 supplements the results of the qualitative weight and sum evaluation and provides a more substantial view of the usability of the technology. The results that appear in Table 20 below indicate how important the usability factor of a technology is in the decision process. The statements from the participants found in Appendix G (Participant Experiences with Technology Excerpts) may provide additional details for Table 19 and Table 20. Referencing these narratives provides specific information on what worked and what did not. This includes where in the process the positive or negative issues occurred and how they impacted the outcome. Information from these reports indicates that several of the institutions (including St. John's University and Northeastern University) used Taskstream before transitioning to Digication. The narratives indicate that even though their goals for ePortfolios included assessment, and Taskstream excels in this function, these institutions chose to adopt a different ePortfolio technology.

Table 20 More Detail in Narrative: Assessment of Taskstream

Institution	Previous Tech	Assessment of Taskstream
Stony Brook University	Taskstream	"Task Stream and other assessment-driven ePortfolio systems were dropped from our list because the focus was more on institutional assessment, rather than integrative and lifelong learning. They were too expensive and didn't fit our campus learning culture." (http://c2l.mcnrc.org/sbu-tech-story/)
Northeastern University	Taskstream	"However, Taskstream proved difficult for faculty and students to use." (http://c2l.mcnrc.org/neu-oa-story/)
St. John's University	Taskstream	"We found the Taskstream platform to be extremely focused on assessment at that time with less flexibility on the front end as it related to the interface and social components. Students found it difficult to use and did not like the final look of their portfolio after they invested time with the tool. So, we began the process of considering other tools in 2010." (http://c2l.mcnrc.org/sju-tech-story/)

Note: The data reported here were collected in the Fall of 2015

Chapter 5

RECOMMENDATIONS

The reason for this improvement plan was to understand how other institutions are approaching the use of ePortfolio on their campuses and what ePortfolio technology had the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at UD. These questions determined the focus and the direction of the inquiry. The findings and recommendations are derived from that process. The areas of focus explored the following:

- How are institutions approaching the use of ePortfolio on their campuses?
- What was the purpose for UD's ePortfolio initiative?
- What are the activities and process of ePortfolio?
- What technology is needed to support an ePortfolio implementation at UD?
- What worked and what did not work?

This chapter discusses the recommendations for this improvement plan.

Catalyst for Learning Initiative (C2L)

The focus of this improvement plan is exploring how other institutions are approaching the use of ePortfolio on their campuses and identifying ePortfolio technology that has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at UD. Based on the findings in this study, UD's plan

would use ePortfolios to create an initiative that is learner-centered, and also supports assessment at the individual, course, program and institutional levels.

An analysis of the data for the institutions that participated indicated that most of the schools wanted to improve the quality of their students' academic experiences. There was also a strong interest in assessment.

An examination of the data collected from the reports on the University of Delaware's CTL ePortfolio site indicated that the leadership team's goal was to create student-centered ePortfolios at the academic program level that would document evidence of their progress through the curriculum. They also wanted to collect data for assessment at the program and institutional level. This included assessment activities that would support processes for the general education requirements and external accreditation purposes. The leadership team was also interested in supporting the process for students' creation of individual presentation-style ePortfolios, but this was not included in the C2L grant (UD C2L ePortfolio Leadership Team, 2014b, para. 19).

The purpose and audience for these ePortfolio processes are different from each other in crucial ways. These differences meant that the activities and inputs that supported each of these needed to be considered separately. Logic models were developed that made explicit the steps for each type of project. This allowed the determination of what technology was needed to support the processes. When the inquiry focused on the functionality and usability of specific technology that had the potential to support each type of ePortfolio, it was necessary to understand the differences between their processes. On the C2L participants' sites were reports that detailed how the different technologies performed.

The recommendations of this improvement plan were informed by a review of scholarly literature, as well as document analysis. The data for the document analysis was collected from the narratives on the Catalyst for Learning website that were written

by the participants in the C2L project. These reports documented their activities and experiences as they implemented ePortfolios on their campuses. The use of documentary evidence was suitable for this inquiry because of the complexity of the concepts and processes that were to be discovered and described (Bowen, 2009, p. 29). They focus on technology's role in furthering the development of ePortfolio as a component in a learner-centered assessment program. The presentation-style ePortfolios were not included in the C2L grant. Faculty and students continued to request ePortfolios at the individual level that showcased their academic efforts and provided evidence of their learning (UD C2L ePortfolio Leadership Team, 2014b, para. 19). The goal for the UD C2l ePortfolio leadership team was to create a "Programmatic Teaching, and Assessment of Learning (TLA) ePortfolio" (2014b, para. 1) The purpose for this ePortfolio was to assess what students learned at the program level and use this information at the institutional level for General Education requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

Towards this purpose, there are five recommendations (JISC, 2012b):

- Recommendation 1 – Align the efforts for development of the ePortfolio initiative with the goals, resources, and community that are in place at the institution at the individual, program, and institutional level (UD C2L ePortfolio Leadership Team, n.d.-a; JISC, 2012c).

- Recommendation 2 – Define what pedagogical goals should be for the individual, program, and institutional level. Make conscious decisions to align the learning activities with appropriate outcomes at each of those levels (UD C2L ePortfolio Leadership Team, 2014b, para. 9; Siemens, 2004; Penny Light, Chen & Ittelson, 2012, p. 45).

- Recommendation 3 –Understand the activities and inputs that support ePortfolio at the individual, program, and institutional level, and align the technology selections with those processes (Benander, O'Laughlin, Rodrigo, Stevens, & Zaldivar, 2017, UD C2L ePortfolio Leadership Team, 2014b, para. 25).

- Recommendation 4 – Understand the pedagogic role of ePortfolio at the individual, program, and institutional level and consider realignment of existing operational procedures to support the activities and inputs of the ePortfolio at each of these levels (UD C2L ePortfolio Leadership Team, 2013b, para. 11; Zaldivar, Summers, & Watson, 2013).

- Recommendation 5 – Be prepared to support the faculty, students and administration staff through the disruption that occurs when processes and activities undergo changes that are transformative (UD C2L ePortfolio Leadership Team, 2014d, para. 25; Plater, 2006).

Recommendation Overview

In 2004, Siemens spoke of the expanding number of academic communities incorporating ePortfolios into their programs. He recognized this development as a response to "…the dynamics of function in a knowledge economy, the changing nature of learning, and the changing needs of the learner." Now more than a decade later there is evidence that this trend has continued. The proliferation and advancement of tools generated to specifically support the process and activities of ePortfolio is a testimony to the continued interest in this high impact practice in educational settings. At UD, ePortfolios are used in a variety of forms in units scattered throughout the campus at the

individual, course, and program level (UD C2L ePortfolio Leadership Team, 2013a, para. 1-2).

Recommendation 1 - Align Efforts

Align the efforts for development of the ePortfolio initiative with the goals, resources, and community that are in place at the institution (JISC, 2012c).

The technology chosen to support the ePortfolio initiative was the Open Source Portfolio (OSP) component in the Sakai learning management system (LMS). One reason this platform was chosen is because it aligned with the resources on the UD campus. When the UD community started to use ePortfolios, Sakai was the LMS in place. This made it a good fit economically because of its continued use on campus as systems and trained personnel were already in place to support the platform (UD C2L ePortfolio Leadership Team, 2014b, para. 25).

The C2L ePortfolio leadership team wanted to implement learning ePortfolios at the program level that also supported assessment efforts at the institutional level (UD C2L ePortfolio Leadership Team, 2014b, para. 1).

The first recommendation emphasizes the importance of aligning the technology with the purpose and context of the project. One of the strengths of ePortfolios is that they have the potential to fulfill a wide range of uses and roles in an academic setting. This means that determining the purpose for the initiative becomes one of the first challenges in a project. Trying to sort through the wide array of possibilities in available technology can create confusion, and this has the potential to misdirect progress and impede a successful implementation. To counter this effect, it is essential that all stakeholders are recognized at the earliest point in the decision-making process of the initiative. Once they are identified, it is imperative that there exists a clear and consistent

consensus on the goals for the initiative, and an understanding of the activities and processes required to attain them.

Recommendation 2 - Define Pedagogical Goals

Define what pedagogical goals are for the individual, course, program, and institutional level. Make conscious decisions to align the learning activity with those appropriate outcomes at each level (Siemens, 2004; Penny Light, Chen & Ittelson, 2012, p. 45).

The program faculty worked to create organized and comprehensive academic program plans to define the essential and specified outcomes required by the students. The learning activities in the courses were examined and adjustments were made to align them with specific academic objectives. A clear and precise definition of what constitutes successful completion of each requirement was necessary (UD C2L ePortfolio Leadership Team, 2014b, para. 9).

All of the UD stakeholders need to be in agreement about what learning outcomes are to be considered and from this knowledge, develop what learning activities will support the measurement of these learning outcomes. This knowledge will determine what activities and inputs will support the goals of the initiative. There needs to be an understanding for each type of ePortfolio what exactly is being measured. This will determine how the process is designed.

There are different considerations for the activities and inputs that are specific for different types of ePortfolio. This includes knowing the level of the implementation. This level could be individual, course, program, institutional or a mix of these. The stakeholders need to know who the audience is and understand if the feedback and or assessment will be formative or summative.

There is also a stark contrast between what is needed for an individual presentation than if the goal is for individual tracking. It also matters if this learning and/or tracking is limited to the length of the course, or does it encompass an entire program. Different support is needed for an initiative that is for the assessment of general education goals, then a question on how well the curriculum supports the goals of the course or program.

Another factor that will influence the decisions is knowing why the outcome is being measured. There is a specific set of activities needed to support a process that is "for" learning. This includes the consideration of if it will be formative and if it includes ongoing feedback. There is the alternative that the purpose is summative assessment. There is also the option to have components for both a formative and a summative design.

Recommendation 3 – Align Technology Selection with Activities and Inputs

Understand the activities and inputs that support ePortfolio at each level, and align the technology selections with those processes (Benander, O'Laughlin, Rodrigo, Stevens, & Zaldivar, 2017).

The UD C2L ePortfolio leadership team (2014c) received the following feedback from faculty:

> "…ideally, faculty are looking for a user-friendly platform to obtain actionable assessment data to achieve the ultimate goals of the TLA ePortfolio. Several issues related to the OSP Sakai platform such as navigation, speed, ability to modify, and the need for data retrieval and reporting emerged during these interviews" (para. 26).

The focus for this improvement plan is specifically the technology component of the entire process. But, a central principle of implementing ePortfolio initiatives in academic settings is that the pedagogy comes before all other considerations, especially decisions about what technology to use. This attention to the pedagogy is a feature in many of the implementation guides that are available today (Penny Light, Chen, & Ittelson, J. C., 2012; Beetham, 2005; Aalderink, W & Veugelers, M., 2006).

In the numbered list below, Penny Light, Chen & Ittelson (2012) suggest the order of activities necessary to support a successful ePortfolio implementation. The process of identifying the technology is placed near the bottom of the list of items to address for an implementation. In this version, the pedagogy is the first item to be considered in their "ePortfolio Implementation Framework."

ePortfolio Implementation Framework (Penny Light, Chen, & Ittelson, 2012)

Implementation Steps

1. Defining learning Outcomes
2. Identifying and understanding learners and stakeholders
3. Designing learning activities
4. Informing assessment of student learning
5. Using ePortfolio tools and technologies
6. Evaluating the impact of your ePortfolio initiative

The academic activities that support a presentation-style ePortfolio at the individual level, generally start for the student at the beginning of a course or a program (UD C2L ePortfolio Leadership Team, 2014B, para. 56-58).

- The instructor introduces the assignment of a presentation-style ePortfolio as a component of the course.

- During the course or program of study the student collects course items that represent their learning of a course objective.
- The student composes a relevant and thoughtful reflection about the assignment that indicates their understanding of the objective.
- When the student submits the assignment with the reflection, the instructor evaluates both.
- If the assessment is formative, the student receives the instructor's comments, uses the feedback from the instructor to make changes, then resubmits.
- If the assessment is summative, the student submits the original assignment and reflection together.
- The instructor assesses the work and assigns a grade.
- The student may receive written feedback on the assignment, but a grade is also included.

For the programmatic ePortfolio there is a different approach to the process.

- The program faculty work to create organized and comprehensive academic program plans to define the essential and specified outcomes for degree requirements.
- The learning activities in the courses are examined and adjustments are made to align them with specific academic objectives.
- These curriculum mapping efforts require a clear and precise definition of what constitutes successful completion of each requirement.
- The information from the alignment process is to enter individual academic program plans into the Sakai platform so that each academic program had an individualized plan in the system.

- The technology supports the collection of the students' work, the formative and summative evaluation process, and the communication for the cycle of feedback on the assignment.

The results of the inquiry indicate that UD would be well served to consider Ravet's approach to ePortfolio. His concept has three components that include the student's ePortfolio, the ePortfolio organizer, and the ePortfolio manager.

Ravet (2007) indicates that the individual student's presentation ePortfolio is owned by the student. Students are encouraged to use authoring tools that allow them to be creative. They should be directed to and instructed how to use programs that function to give them control over the look and feel of their project. Students can use Google Apps, WordPress or others to create their ePortfolios as needed by different audiences.

The second component is the ePortfolio manager. This is the platform that is owned and managed by the institution. This is where the student's academic program is constructed. The academic record within the institution's ePortfolio manager protects the student because the institution can verify this as official. The institution also uses the record of the student's evidence of learning to improve the academic experience for future learners. Programs such as Taskstream can track student progress and collect data for aggregation and reporting in evaluation and accreditation efforts.

The third piece is the ePortfolio Organizer. This can be any storage drive that provides large amounts of storage and excellent security. Good choices include Google Drive, Microsoft OneDrive, or others like this. Everything that the student produces including course work or multimedia projects is stored in this location. The accompanying reflection also is stored with the artifact and goes forward with the student. This is the repository and future source for the student to pull from when creating ePortfolios for other audiences and purposes. All that the students experienced and then documented during their time in the programs at the institution will be available.

The Joint Information Systems Committee (now identified as the JISC) is a "not-for-profit" company in the United Kingdom. This organization conducts studies, and reports recommendations about their research on technology, that supports the goals of institutions of higher education (JISC, 2011). They conducted a major study that collected data from the experiences of educators from multiple academic institutions as they implemented campus wide ePortfolio initiatives. The researchers used case studies located on universities in the United Kingdom, Australia, and New Zealand (JISC, 2011). Their research resulted in an "e-portfolio implementation model." There were five principles in this framework and they are represented in the following numbered list (Joyes, & Smallwood, 2011, p. 3):

1. Purpose needs to be aligned to context to maximize benefits.
2. Learning activity needs to be designed to suit the purpose.
3. Processes need to be supported technologically and pedagogically.
4. Ownership needs to be student-centered.
5. Transformation (disruption) needs to be planned for.

The "e-portfolio Implementation Model" that evolved from the JISC study on ePortfolio initiatives in higher education, also emphasized that technology selection is not the first consideration in planning an implementation (Joyes & Smallwood, 2011, p. 3). This perspective appears to be a central theme of the literature on ePortfolios in academic settings. In fact, many sources introduce the topic of the technology used in ePortfolio projects with the declaration that though the technology is critical, the pedagogy must always come first (Cambridge, 2010, p. 188; Penny Light, Chen, & Ittelson, 2012. p. 121).

There needs to be a clear understanding of what has to happen for the pedagogy to succeed. How can the technology support this and keep in mind the tenets of what makes the ePortfolio student-centered? A precise picture of the activities and inputs is necessary

to identify the technology. The students, staff, and faculty will need support throughout the implementation and beyond with the technology.

There is also the need to provide professional development opportunities for the faculty as they work to integrate ePortfolio processes into their courses in authentic ways. Students will need to learn how to use reflection in their learning. Staff who support the courses, programs, faculty and students will need instruction and guidance.

The learner-centered ePortfolio is meant to showcase accomplishments and present evidence of learning with artifacts and reflections. It can also be used by the student when they are applying for internships, graduate programs, or looking for employment.

The ePortfolio that is developed for assessment for Learning for academic programs can support curriculum improvement, track student progress towards graduation and provide data for institutional planning and reporting.

It is recommended that UD establish a centralized service as a resource for student and faculty as they use ePortfolio. This can prove to be a vital source for learning materials that can scaffold them throughout the process. Locating the resources for ePortfolio in centralized support units that were long-standing within the university would assure that the activities for the ePortfolio would be aligned with processes that preexisted. This would increase the longevity of the program.

The students, staff, and faculty will need support throughout the implementation and beyond with the technology. Support the development of a community of users that share their knowledge and experiences with each other across the campus. Create opportunities for peer to peer support. This includes development and delivery of relevant learning tools, help via email, telephone, and in person. There is also the need to provide professional development opportunities for the faculty as they work to integrate ePortfolio processes into their courses in authentic ways. Students will need to learn how

to use reflection in their learning. Staff who support the courses, programs, faculty and students will need instruction and guidance.

Recommendation 4 – Align Procedures to Support the Activities of ePortfolio at the Specific Level of the Implementation

Presentation, Process, Product

It is important for all stakeholders to understand the pedagogical role of ePortfolio at the individual, program, and institutional level. If the faculty and student have a clear understanding of the steps in the process there is a better chance for success of the project (Zaldivar, Summers, & Watson, 2013). There can be challenges that relate to the ePortfolio activities that conflict with procedures and practices that are already in place. These include issues that may require faculty, evaluators, and other stakeholders to openly share concerns. It is helpful when academic communities are open to changes that have the potential to improve the learning experience for students. These changes may involve integrating appropriate protocols for students and faculty to support the cyclical nature of formative assessment. Another example is a change that opens the opportunity for integrative learning within and across the academic programs. There may need to be adjustments in learning activities and communication arrangements that will support the reflection process. When the conflicts come to the attention of program faculty, they can initiate discussions to seek solutions that accommodate the ePortfolio process at the specific level of the implementation.

As an example, in one program within the C2L ePortfolio initiative the timing for the submission deadlines for the reflection assignments did not allow enough time for the faculty to give timely feedback to the students. This seriously limited the effectiveness of the reflection process (UD C2L ePortfolio Leadership Team, 2013b, para. 11).

As an example of unforeseen impact at the program level the UD C2L ePortfolio leadership team (2013b) found the following:

> When there was strong mentorship and orientation for faculty members new to implementing ePortfolio, a smooth transition resulted in increased faculty buy-in which in turn, enhanced student commitment to participate. (para. 12)

Learner-centered Presentation ePortfolio

An ePortfolio that is student-centered works best when the system is designed to create an opportunity for the learner to gain ownership of their learning process. The C2L has defined this process with the guidance of folio thinking and the guiding framework of the Catalyst for Learning model. For this goal to be realized stakeholders must have a clear understanding of the concept of folio thinking and ensure that its consideration is embedded and central to the planning.

The Learner-centered ePortfolio as the Process of ePortfolio

When aspects of inquiry, reflection, and integration define the content and direction of pedagogy, the process of ePortfolio brings opportunities for learning that go beyond fulfilling the requirements for their field of study. Chen identifies this process as "Folio thinking" (2012, p. 8). Folio thinking creates learner-centered academic environments that encourage pedagogical approaches that begin with inquiry. When inquiry is central to curriculums, learners engage actively with their programs of study at a deep level. Through reflection, learners discover how to connect their new knowledge with their previous understandings about the world and their place in it. In the process of creating these new connections and meanings, the student learns to make conscious decisions that include the act of being the master of their own academic journey (Cambridge, 2010, p. ix).

This integrative approach supports and enriches the development of their identity. It informs their role as a responsible and responsive citizen of the world that exists today. Folio thinking creates the conditions and the culture that increase opportunity for the learner to become an individual who is engaged with the world with an informed, reflective, and critical perspective (Cambridge, 2010, p. 61; Chen, 2012, p. 17; Eynon & Gambino, 2017, p. 20).

The Administration's Goals with ePortfolio as the Product

The ePortfolio experience that is defined by folio thinking is most effective when it begins early in a learner's academic program, and continues through to graduation (Parker, Ndoye & Ritzhaupt, 2012). This means that the process produces a record of learning and proof that prescribed outcomes were accomplished. Initiatives can be planned and implemented to collect, curate, and maintain data about student progress. This data can be transformed into information for reports that inform recommendations for program improvements, or towards accreditation of an institution.

There were challenges that impacted the level of success towards using the C2L ePortfolio project in Sakai to collect data for assessment at an institutional level.

- There was a limited number of academic programs that actually went through the entire process of creating a matrix that represented the learning objective for their program of study. This meant there was not enough data that was useful for assessment activities.
- In Sakai each program's matrix was different because it was developed to map the specific curriculum of only that academic plan. This did not support data comparison between programs.

- Faculty had also adapted rubrics to meet the needs of their curriculums within the same matrix and this limited the data that could be used for assessment activities within the same programs.
- Because the Sakai matrix was used for a short length of time, not enough data was available to assess completion of General Education requirements (UD C2L ePortfolio Leadership Team, 2014b, para. 46).

ePortfolio initiatives can be designed to support assessment efforts and accreditation goals and the research that has produced rubrics such as the VALUE initiative from the AAC&U has created a pathway to follow (AAC&U, 2013). The technology that exists today brings new possibilities to designing curriculums with learning outcomes that support student success. These outcomes are built around the student's academic experiences. They can serve as benchmarks that represent an opportunity to consider both the goals of an integrative academic experience for learners, as well as inform curriculum improvement or assessment requirements of the institution.

Recommendation 5: Prepare for the Reaction to Changes in Procedures

Be prepared for the disruption that occurs when processes and activities undergo changes that are transformative (Plater, 2006). Scaffold the stakeholders through these transitions by understanding and identifying where in the process more assistance is needed. Target those vulnerable points with appropriate action. Develop methods and tools that engage, educate, and include the stakeholders actively and authentically in the process. Development has been described as a response to "An event constituting a new stage in a changing situation" (Development, n.d.).

Due to the nature of ePortfolios, when an implementation is done well, the changes may occur at levels that impact how faculty and students perceive their roles in the classroom. This can disrupt routines and activities that were comfortable for students

and faculty. These alterations can challenge a community as decisions need to be made on the best way to move forward to support these new directions. The community that is open to feedback, and works together to create a culture that accepts an openness to change will have a better chance of success. This is not a single event. It is an iterative process and the transition will go smoother if everyone involved understands the goals. Stakeholders need scaffolding beyond what one would expect. Prepare to listen, inform, educate, and listen again. Have systems in place that support stakeholders.

All of these are essential considerations towards a successful implementation. This improvement plan focuses primarily on the role of technology. Due to the complex relationships between the inputs and activities of ePortfolios, an understanding of the overall process is necessary.

- a clear understanding of what is wanted from this initiative.
- awareness of what inputs and activities are necessary to achieve the goals.
- Familiarity with technology that supports these processes, and what is already available that will work for these goals.

It is possible to have an ePortfolio implementation that is student-centered and also allows the administration to collect and aggregate necessary assessment data to continue to improve the institution's mission.

Summary of Interpretation of Findings

The process and activities required for the goals of an ePortfolio implementation are supported and yet challenged by many factors that include the possibilities as well as the limitations of technology.

The limitations and weaknesses of this improvement plan are important to consider. The limitations of the inquiry include the reality that technology evolves quickly. The information that is collected about what technology is available that can or

cannot support the goals of these stakeholders can change often. This process also means that there is the real possibility that the technology that is available is new. This means that it may not have been evaluated by researchers in the field yet to determine its usefulness and functionality. This can present a challenge when considering if it is an appropriate fit for the goals of this academic institution.

Another limitation of this project is that throughout the process of analyzing the data presented in this EPP, this author served as the sole coder of the data. Instead of having a single person do this, institutions that decide to replicate this model by creating their own instance of the QWS analysis presented above in Table 17 (see page 116) should have at least three appropriate stakeholders work on the coding so as to help insure that it is truly representative of institutional needs.

It is essential to understand how people learn in order to influence decisions about the selection and implementation of technology in educational settings. ePortfolios have the potential to be valuable learning tools. Once the processes of ePortfolios are understood, it becomes possible to identify the technology's role. The technology choices are crucial to the success of the project. The functionality and usability of the technology influences the effectiveness of the implementation at almost every level of the process.

An ePortfolio implementation at an institutional level is not an isolated event that occurs within one group on a campus. It is a process that is more than just the use of another technology to support grading and collecting data. When ePortfolios are integrated into the pedagogical activities on a campus, they have the potential to bring changes to the academic community that alter the learning experience for both students and faculty. The assignments, artifacts, and grades that are contained in an ePortfolio are the products of the process, and that is a good thing. But with the guidance of the faculty, it is the act of creating ePortfolios that makes them more than just a learning tool. The

process of inquiry, reflection, and integration can be transformational. These approaches to learning require the students to question and think critically, connect their new knowledge to the world that they live in, and take charge of their learning. ePortfolios have the potential to support the integration of other high impact practices into coherent, comprehensive, and meaningful learning experiences.

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Appendix A

INSTITUTIONS PARTICIPATING IN C2L

Participating Institutions Information about Level of Programs and Technology for C2L

ID	Institution	Programs	Technology (TECH) Platform
UNIT 00	University of Delaware (UD)	Doctoral/Research University	Sakai OSP
UNIT 01	Boston University	Doctoral/Research University	Digication
UNIT 02	Guttman Community College	Associates's/ 2-year College	Digication
UNIT 03	Hunter College	Master's College or University	Digication
UNIT 04	Indiana University-Purdue Univ(IUPUI)	Doctoral/Research University	Sakai OSP Onecourse
UNIT 05	LaGuardia Community College	Associate's/2-year College	Temp - Concord MF - Digication
UNIT 06	Lehman College	Master's College or University	Digication (phased out 2011) - Taskstream
UNIT 07	Manhattanville College	Baccalaureate/4-year College	Digication
UNIT 08	Northeastern University	Doctoral/Research University	Sakai OSP - Taskstream - Digication
UNIT 09	Pace University	Doctoral/Research University	Mahara
UNIT 10	Queensborough Community College	Associate's/2-year College	X - Epsilen
UNIT 11	Salt Lake Community College	Associate's/2-year College	Web 2.0 Platforms (Weebly, Word Press, Google Sites)
UNIT 12	San Francisco State University	Doctoral/Research University	eFolio
UNIT 13	CUNY School of Professional Studies	We are a Baccalaureate/4-year College.	Digication
UNIT 14	Three Rivers Community College	We are an Associate's/2-year College	CTDLC - Digication
UNIT 15	Tunxis Community College	Associate's/2-year College	CTDLC - Digication
UNIT 16	Virginia Tech	Doctoral/Research University	Sakai OS - And Others
UNIT 17	Empire State College	Associate, bachelor's and master's degrees.	Digication - Mahara
UNIT 18	Georgetown University	Doctoral/Research University	Word Press, Blogs, Digication
UNIT 19	Northwestern CCC	Associate's/2-year College	CTDLC - Digication
UNIT 20	Norwalk Community College	Associate's/2 years college	CTDLC - Digication
UNIT 21	Rutgers	Doctoral/Research University	Sakai OSP
UNIT 22	St. John's University	Doctoral/Research University	Taskstream - Digication
UNIT 23	Stony Brook University	Undergraduate/Graduate Research I University	Digication

Appendix B

IMPROVEMENT PLAN DESIGN

Document Analysis Protocol

Introduction

As described by Yin, (2009), a "Document Analysis Protocol" is to maintain the focus on the questions in the plan. The plan for this "Improvement Plan Protocol" will refer to the "Document Analysis Protocol" as explained by Yin (2009, p. 81).

This will add to the reliability of the improvement plan design by providing a clear and logical description of how the inquiry will go forward. The process of creating the protocol makes visible obstacles and requirements that may arise during the inquiry.

The following major questions guided the inquiry:

1) How are institutions across the country approaching ePortfolio initiatives?
2) What available technology has the potential to support the creation, submission, assessment, documentation, and pedagogical goals of a sustainable ePortfolio component in a campus-wide assessment program at the University of Delaware?

1. The first major question required the collection of data that identified what other institutions were doing to support ePortfolios at their schools. This data was cleaned and analyzed to determine
   a. what items represented the different institutions' requirements and

b. what technology was in place on their campuses. A graphic will be created to represent the results.

2. The second major question will require four steps to determine what technology qualified.

   a. What is the purpose of UD's ePortfolio initiative, as stated in the Catalyst for Learning data?

   b. What is the process necessary to accomplish this specific purpose as defined in the Catalyst for Learning data?

   c. What are the technological requirements necessary to accomplish this specific purpose as defined in the Catalyst for Learning data?

   d. What ePortfolio technology has the potential to support UD's goals for an ePortfolio implementation as stated in the Catalyst for Learning data (what worked and what did not work)?

This improvement plan will utilize data collected from Catalyst for Learning, a grant-funded project, which chronicled experiences from 24 institutions as they introduced ePortfolios to their campuses (Connect to Learning, 2014a). Participants from the 24 institutions were partners from the Connect to Learning (C2) group. This organization of individuals collaborate on campuses across the country to share their knowledge and experience with ePortfolio.

The C2L group used the Catalyst for Learning Framework to explore how components of ePortfolios could support user-centered learning experiences on their campuses and play a role in their institution's accountability and accreditation requirements (Eynon, Gambino & Török, 2014).

Data Collection

The method used to collect the data for this plan:

- Documentary evidence: This consisted of first-hand reports in narrative form from the Connect to Learning (C2L) website that included background information for the project and its conceptual framework.

The data sources, methods for data collection, and a description of the collected data are discussed in this section. The following section, includes information on how the data was managed for this plan.

The qualitative approach and the use of Improvement Plan indicated that there would be a great deal of data collected.

- Documents: There were 24 institutions of higher education who participated in the Connect to Learning (C2L) project. Participants from each of the 24 institutions submitted first-hand individual reports based on each of the five components of the C2L framework. These topics included Pedagogy, Professional Development, Technology, Outcome Assessment, and Scaling Up.

Notes and Improvement Plan Document

Notes that describe the activities will be kept from the beginning of the inquiry. This process started as the improvement design was created and will continue through to the end of the plan. This is an important part of the improvement plan document and will help guide the decisions that will be made in data collection and analysis throughout the phases of the inquiry. There will be a reflective component that will contribute to an understanding of the intentions for the decisions that are made. The features in the Word

and Excel programs will allow these notes to be searchable by topic and date in a document (Yin, 2009, p. 120).

Systematic Collection and Management of Data

It is essential to consider the collection and management of the data from the beginning of the planning for the design of the improvement plan. There are some activities that will assist in a systematic collection and efficient management of the data. During the data collection stage of the plan, there will be recorded notes and these will be included in a searchable improvement plan document (Yin, 2009, p. 41). This will be carefully created and establish a "audit trail" (Merriam & Tisdell, 2016).

Construct Validity during Data Collection

Construct validity means that the concept that is the focus of the plan is what is actually being evaluated in the process of data collection and that criteria used to measure those concepts are valid. This is an important component to consider during the data collection stage of the research plan (Yin, 2009, p. 41).

Merriam and Tisdell, 2016 also suggests the creation and maintenance of a "chain of evidence" during data collection process in the plan as a way to increase the "construct validity" and the "reliability" of the research plan. This was incorporated into the 'audit trail' available on this link https://sites.google.com/site/trimbleeportfoliotechnology/.

Reliability During Data Collection

To increase the reliability of the improvement plan means that the steps and activities that are evident in the plan report could be replicated with the same results by another person. During the data collection stage of the improvement plan design

reliability of the plan will be increased by the creation of the "Improvement Plan Protocol" (Yin, 2009, p. 40).

The purpose of the "Improvement Plan Protocol" is to maintain the researcher's focus on the questions in the plan. The process of creating the protocol alerts the researcher to obstacles and requirements that may arise during the Improvement Plan. A "Improvement Plan Protocol" will add to the reliability of the plan design by providing a clear and logical description of how the research plan will go forward. It begins with the introduction of the title, purpose, goals, and background for the plan. Next is the information specific to the collection of the evidence "Field Procedures". Then is the section of the "Improvement Plan Protocol: that contains the "Questions" that are being asked in the plan and where the answers might be located to these questions. Finally, there is a descriptive section that outlines the format for the report and includes a section for the details of the documentation and bibliographical information for the Improvement Plan. (Yin, 2009, p. 81).

Constructing a "Improvement Plan Protocol" that could be part of a "Improvement Plan Document" reinforces the reliability of the plan by creating a location for all of the data, notes, and references that would allow another researcher to recreate the plan (Yin, 2009, p. 118). This is done in the data collection stage of the plan and can be referenced throughout the entire process of the data collection, data analysis, and reporting stages of the plan.

This process creates a single location where all of the activities of the plan can be sorted, cataloged, and made searchable so that it can be accessed by the researcher and any others that want to see the details that support the findings of the plan. This needs to consist of "notes, documents, tabular materials, and narratives" (Merriam & Tisdell, 2016).

The first section of the "Improvement Plan Document" is the Table of Contents and this will be an "organized, categorized, complete, set up so that it is available for

later access" (Yin, 2009, p. 120). The contents of this document will be made searchable. There will also be the "Tabular materials" such as graphs, charts, or diagrams and these also need to be searchable and retrievable if needed.

Having a formal, comprehensive, and searchable "Improvement Plan Document" as described by Yin, is an indication that the inquiry was approached with meticulous and careful attention to the concept of reliability (2009, p. 122).

Appendix C

SELECTION OF RELEVANT INSTITUTIONS PROTOCOL

Linked To

Document: Choosing Categories - Created 11/30/2015

Linked To

Excel Spreadsheet: CategoryCrazy.xlsx on Sheet 'CrazyChoice3' and Sheet 'CrazyCut1' Created 11/30/2015

Column Headings

- Cut Reason: Reason institution is originally Cut
- Consideration After Cut#: Has potential to influence Cut Reason
- First Consideration: Has potential to influence Cut Reason and Consideration After Cut# factors
- Desired Information For Decision
- What Priority the Cut and Consideration Decision
- Information Labels
- Description of 'Information Labels'
- Explanation of Colors used in Shading and Font
- University of Delaware Campus Metrics From

  http://c2l.mcnrc.org/category/university-of-delaware/

Cut#1 Programs

- Community Colleges because 2-year academic programs have a different structure that effects what technology priorities are.
- Consideration: Institutions that have other than Research, or only bestow Undergraduate degree programs may be close enough due to other factors to be a good representative if ePortfolio Platform is of interest. These include Master's College or University, Associate's/Bachelor's/Master's Degrees, Baccalaureate/4-year College.
- First consideration is if the institution grants degrees to the Doctoral level and is a Research University: Doctoral/Research University, Undergraduate/Graduate/Research University. Consideration may include institutions that grant 4-year degrees: Master's College or University, Associate's/Bachelor's/Master's Degrees, Baccalaureate/4-year College.
- First because the degrees and focus of the Institution influences all other variables and most useful comparison when similar to UD.

Cut#2 Headcount

Institutions that do not have approximately 20,000 students.

- Consideration: Institutions with less than 20,000 students may be close enough due to other factors to be a good representative if ePortfolio Platform is of interest.
- 20,000 students or more is ideal.
- Consideration may include institutions that have 15,000 or more.

- Second because the number of students impact the complexity of change on a campus and this is comparable to UD.

Cut#3 Purpose of Initiative

- Institutions who are not using the ePortfolio for assessment will have different needs for their technology choice.
- Consideration: The purpose may be close enough due to other factors to be a good representative if ePortfolio Platform is of interest.
- General Education or Institutional Outcomes Level Assessment with Level of Implementation that is campus wide. Institutions who have only 'Assessment' in this section may be included if they indicate in the 'Level of eP Use on Campus' that the effort is at an 'Institutional' level.
- Third because the purpose of an ePortfolio determines the stakeholders and technology used. The most useful comparison are institutions that are similar to UD.

Cut#4 Level of ePortfolio Initiative

- Institutions who are not using ePortfolios in an institutional initiative will not have comparable needs to UD for technology.
- Consideration: The level of implementation may be close enough due to other factors to be a good representative if ePortfolio Platform is of interest.
- General Education or Institutional Outcomes Level are similar to UD's interest and a major focus of this study.

- Fourth because the Level of Implementation determines what technology will work and a major focus of this study is institution wide implementation for assessment of General Education Outcomes.

This process above will answer the question:

What institutions in the C2L initiative are 'appropriate to consider' for comparison to UD?

What factors indicate that an institution is 'appropriate to consider' for the purposes of this study?

Why are these factors important for the purposes of this study?

12/1/2015

UD Tech data to determine a template

The next step is to look at the UD Tech data and determine a template that represents what the UD C2L team found to be a "priority" for selecting an ePortfolio technology.

First Consideration

The UD site reports more than one level of ePortfolio implementation.

- This will be the first consideration

Second Consideration

Each of these levels includes a different set of stakeholders with specific needs

- This will be the second consideration

Data reports UD's experience

The data reports UD's experience with specific eP technologies (ie. Sakai, Google Apps, and a comment about Canvas)

The responses are in direct reference to the team's specific and unique experience with the need and the technology's ability to meet that need.

These will be listed –

Listed as "Neutral" (No Platform Named) for this step

- but, for the purposes of this step in the coding process these need to be expressed as neutral and not mention specific ePortfolio technologies such as Sakai.

So the responses will be grouped by

Level of Implementation

Stakeholders needs at each level of implementation

Neutral description – not Specific Software

This list represents what UD's team sees as priorities for each level of implementation and stakeholders

This will give two 'variables' which should frame the matrix to answer the question:

What are the priorities for ePortfolio implementation at UD?

Looking Forward – But, Open To Reconsideration:

Once there is a 'template' of 'priorities then Ask:

for ePortfolio implementation at UD, the next question looks at the technology that is available.

What technology is available

Does the technology match up to the priorities for UD?

What are other Institution experiences in similar levels of implementation and Stakeholder's needs.

Appendix D

EPORTFOLIO TECHNOLOGY REQUIREMENTS DEFINITIONS

Requirement: Criteria	**Definition**
Showcase Accomplishments	Showcase Accomplishments for Academic and Non-Academic Projects and Activities.
Document Achievement	Evidence of Learning as a Product Created for Courses, Programs, Projects to be assessed and evaluated as proof.
Path through Curriculum	Makes it clear the order of courses necessary to complete academic program.
Career/ Professional/Employment as Representation of Knowledge and Skills	Supports creation of professional and career ePortfolios.
Level of Learner Control over Look and Feel,	Higher level of control over look and feel increases engagement and sense of ownership with the process.
Level of Learner Control over Access	Higher level of control over who has access and at what point others have access to ePortfolio increases sense of ownership for learners.
Multiple versions for different Audiences	Supports creation of different versions of ePortfolio for more than one purpose and audience.
Portability after graduation	A higher level of portability increases student' sense of ownership. Exporting and access after graduation increases value of ePortlolio for student.
Supports ReflectionText	Reflection supported with connection between narrative and artifact; and text authoring tools.
Evaluation and Assessment	Supports evaluator access to students' work.
Accreditation	Supports the processes necessary to produce the evidence for accreditation by external organizations.
Access for Evaluators	Supports access for internal and external evaluators to students' work.
Supports with Rubrics,	Supports evaluation of students' work with learning outcomes that are aligned with standards and the use of rubrics.
Supports Formative Assessment	Supports process of formative assessment with feedback functions.
Supports Summative Assessment	Supports evaluation of students' work as evidence of fulfilling academic requirements for courses and degree programs

Supports Roles that are Specific to Student, Instructor, and Evaluators' Access to Course Materials	Provides functions that support the specific and unique activities that instructors, evaluators, students and administrators perform.
Supports "Evidence of Learning" for Updating and Improving Curriculum in Courses	Provides functions that track students' records of course completion through the curriculum for the purpose of improving the program that includes benchmarking, tracking and documenting progress of students.
Assessment for Institutional Goals	Provides functions that support the assessment process activities needed for collecting consistent data for institutions to use in management of resources, planning, improving academic opportunities for students, and mission alignment.
Supports Accreditation	Provides functions that support activities that result in evaluation by External Organizations for accreditation purposes.
Evaluation of Progress for Learners in Courses, Programs, Certification, Professional Development	Provides functions that support the process of tracking students progress and completion rates in courses and programs.
Company Responsiveness	Was the vendor responsive to requests in a timely and helpful manner.
"Hosted Service?" (Miles, 2014)	Was the technology hosted by the vendor?
Functions that Collect Data	Functions that collect data.
Functions that Manage Data	Functions that support the management of data.
Functions that Document learning	Functions that support the documentation of student learning and progress through academic programs.
Functions that Support Reporting	Functions that support the creation of reports with the collected data.
Archive Functions for Data	Does the system support the archiving of the data collected.
Accepted artifacts/media	There are functions to support uploading or attaching multiple media supported including pictures, video, audio, text, html, and documents (Miles, 2014).
"Storage space per owner account" (myefolio, 2013-b)	There is adequate storage space at the student account level for artifacts.
Supports Collaboration between students, Instructors, Evaluators	Supports Collaboration between students, Instructors, Evaluators and external organizations.
Interoperability with systems in place (Daim et al., 2016)	Platform is interoperable with systems already in use.
Section 508 compliance: (Miles, 2014)	Section 508
Security	Systems in place to protect the students' data.
Usability	The interface is easy to work with.
Tutorials, Learning Instruments and Products	There are resources available that support users' questions about the technology and training options.

Scalability	The system has the functions and platform features to scale with the institution's needs.
Multiple levels of ePortfolio	The system has the functions to create multiple levels of ePortfolios including at the individual, course, academic program and institution.
Flexibility	The systems' interface and functions are flexible and can accommodate changes.
Cost	“Cost, Initial Cost, Maintenance Cost, Internal Support Cost, Licensing Cost, Training Cost, Ongoing Professional Development” (Daim et al, 2016)
Price Model	

Appendix E

QUALITATIVE WEIGHT & SUM (QWS) EVALUATION EXPANDED

Individual Presentation Level ePortfolio Information on Technology Used in Catalyst for Learning Initiative

Individual Presentation Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Showcase Accomplishments	*	+	+	+	*	+	+	+	#
Career/ Professional/Employment	#	+	+	+	#	+	+	+	#
Level of Learner Control over Look and Feel	*	+	+	+	*	+	+	+	#
Level of Learner Control over Access	*	*	*	*	*	*	*	*	*
Supports Reflection	*	*	*	#	*	+	#	*	*
Multiple versions for different Audiences	#	+	+	+	#	+	+	+	+
Portability after graduation	*	+	+	+	*	#	#	#	*
Access for Evaluators	*	*	#	#	*	#	#	*	*
Usability	#	#	+	+	#	+	+	+	#
Tutorials, Learning Instruments and Products	#	#	+	+	#	+	+	+	+
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 4 6	5 2 3	7 1 2	7 2 1	0 4 6	7 2 1	6 3 1	6 1 3	2 4 4

Course and/or Academic Program Level ePortfolio Information on Technology Used in Catalyst for Learning Initiative

Course and or Academic Program Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Document Achievement	*	*	#	+	0	+	#	*	0
Path through Curriculum	#	#	+	#	0	+	+	#	0
Evaluation and Assessment	*	*	*	+	#	#	#	*	+
Supports with Rubrics	*	*	*	0	0	+	*	*	0
Supports Formative Assessment	*	*	*	+	*	*	*	*	*
Supports Summative Assessment	*	*	#	+	*	#	*	*	*
Supports Roles that are Specific to users	*	*	*	+	+	*	*	*	0
Supports "Evidence of Learning"	*	*	#	0	0	+	#	*	#
Evaluation of Progress for Learners	#	#	#	0	0	+	+	#	0
Functions that Collect Data	*	*	*	0	0	+	#	*	0
Functions that Document learning	*	*	*	0	0	+	+	*	0
Supports Collaboration between all users	*	*	*	*	*	*	#	*	#
Flexibility	#	+	+	+	+	#	+	+	+
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 3 10	1 2 10	2 4 7	6 1 1	2 1 3	7 3 3	4 5 4	1 2 10	2 2 2

Resource Information on Technology Used in Catalyst for Learning Initiative

Institution Level	Requirement Weighting	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Accreditation	*	#	#	+	0	+	#	*	0
Assessment for Institutional Goals	*	*	#	0	0	#	#	*	0
Supports Accreditation	*	*	#	+	+	#	#	*	0
Functions that Manage Data	*	*	#	0	0	+	+	*	0
Functions that Support Reporting	*	*	*	0	0	+	+	*	0
Archive Functions for Data	#	*	*	0	0	+	+	*	0
Interoperability with systems in place	*	#	+	+	0	+	#	#	0
Scalability	*	*	#	0	0	+	*	*	0
Multiple levels of ePortfolio	#	#	#	0	+	+	#	#	0
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 2 6	0 3 5	1 6 1	2 0 0	2 0 0	6 2 0	3 4 1	0 2 6	0 0 0

Vendor and Administration Information on Technology Used in Catalyst for Learning Initiative

Vendor and Admin Information	Requirement Weighting.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Company Responsiveness	*	*	*	*	0	0	0	*	0
Storage space per owner account	#	+	+	+	#	#	+	#	#
Security	*	*	*	*	*	*	*	*	*
Privacy	*	*	*	*	*	*	*	*	*
Section 508	*	+	*	*	+	+	+	*	+
Migration	#	#	#	+	#	#	+	+	*
Systems Integration	*	#	+	+	+	#	#	#	+
Accepted artifacts/media	*	*	*	#	*	*	*	*	*
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *
Rating Total (Sub-Total)	0 2 5	2 2 4	2 1 5	3 1 4	2 2 3	1 3 3	3 1 3	1 2 5	2 2 3

Resource Information on Technology Used in Catalyst for Learning Initiative

Resource Information	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress
Required System by Institution	Internet w/browser	Hosted web service	Internet Connection	Internet	Internet Browser, JavaScript, etc	Browser, Linux, JDK 8, Apache Tomcat 8, MySql or Oracle	Browser	
Hosted Service (Software as a Service)	Hosted	Hosted	Hosted	Hosted	Institution	Institution	Hosted	Hosted
Student Pricing	Google Apps for Educ (Free), per account $+9.95 per year	Sliding Scale	Free to student for life	Free	Open Source	Open Source	Per Student	
Institutional Pricing	Range $5 to +*$ per user per year	Per Module	FTE Basis Model	per student license	Open Source	Open Source	Based on Student Pricing	
Alumni	Free with Instit model in place/or +9.95 per year	Fee with Institutional	Free for life		Export as HTML/Leap+A XML	Zip File	Zip Files	
Institutional Support	Free online and email/Fee based other	Negotiated as needed	No service Fees	Free online	Institution provides support	Institution determines	None	
IT Staff	No IT staff required (+0-+0 hrs initial installation/integration)	No IT staff required (unless requested)	No IT staff required	No IT Staff required	Institution determines	Institution determines	No IT Staff required	
Additional Services	(*integration, consulting etc.)	Hourly basis	Free	Fee	Institution can pay Partners	Institution determines	Free*	

(Miles, 2012)

Technology Identification with Platform Description (Coded) and Notes on Details

Technology	Platform	Code	Notes
Digication	Hosted	eP	Design to Support ePortfolio
eFolio	Hosted	eP	Design to Support ePortfolio
Taskstream	Hosted	eP/CMS	Design to Support ePortfolio & Features of CMS (Integrated Course Management System)
Epsilen	Hosted	eP/LT	Design as eLearning tool & Support ePortfolio
Mahara	Open Source	eP	Design to Support ePorfolio
Sakai, OSPI	Open Source	eP/LMS	Design Learning Management System (LMS) with integrated ePortfolio Option
Google Apps	Hosted	O	Other Web Options
Creative Tools	Not Online	O	Other Options: Word, PowerPoint, etc…
WordPress, et al	Open Source/Web 2.0	O	Other Web Options

(QWS) Qualitative Weighted Sum Final Weighting Evaluation

Technology	Presentation			Course			Institution			Vendor		
Rating	+	#	*	+	#	*	+	#	*	+	#	*
Weight Rate	0	4	6	0	3	10	0	2	6	0	2	5
Digication	5	2	3	1	2	10	0	3	5	2	2	4
eFolio	7	1	2	2	4	7	1	6	1	2	1	5
Epsilen	7	2	1	6	1	1	2	0	0	3	1	4
Google	0	4	6	2	1	3	2	0	0	2	2	3
Mahara	7	2	1	7	3	3	6	2	0	1	3	3
Sakai	6	3	1	4	5	4	3	4	1	3	1	3
Taskstream	6	1	3	1	2	10	0	2	6	1	2	5
WordPress	2	4	4	2	2	2	0	0	0	2	2	3

QWS Total Evaluation Table Individual Presentation Level

Individual Presentation Level	Wt.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress	Requirement Weighting
Showcase Accomplishments	*	+	+	+	*	+	+	+	#	Extremely Important
Career/ Professional/Employment	#	+	+	+	#	+	+	+	#	Very Important
Level of Learner Control over Look and Feel	*	+	+	+	*	+	+	+	#	Extremely Important
Level of Learner Control over Access	*	*	*	*	*	*	*	*	*	Extremely Important
Supports Reflection	*	*	*	#	*	+	#	*	*	Extremely Important
Multiple versions for different Audiences	#	+	+	+	#	+	+	+	+	Very Important
Portability after graduation	*	+	+	+	*	#	#	#	*	Extremely Important
Access for Evaluators	*	*	#	#	*	#	#	*	*	Extremely Important
Usability	#	#	+	+	#	+	+	+	#	Very Important
Tutorials, Learning Instruments and Products	#	#	+	+	#	+	+	+	+	Very Important
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	
Rating Total (Sub-Total)	0 4 6	5 2 3	7 1 2	7 2 1	0 4 6	7 2 1	6 3 1	6 1 3	2 4 4	

QWS Total Evaluation Table Expanded Academic Course or Program Level

Academic Course or Program Level	Wt.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress	Requirement Weighting
Document Achievement	*	*	#	+	0	+	#	*	0	Extremely Important
Path through Curriculum	#	#	+	#	0	+	+	#	0	Important
Evaluation and Assessment	*	*	*	+	#	#	#	*	+	Extremely Important
Supports with Rubrics	*	*	*	0	0	+	*	*	0	Extremely Important
Supports Formative Assessment	*	*	*	+	*	*	*	*	*	Extremely Important
Supports Summative Assessment	*	*	#	+	*	#	*	*	*	Extremely Important
Supports Roles that are Specific to users	*	*	*	+	+	*	*	*	0	Extremely Important
Supports "Evidence of Learning"	*	*	#	0	0	+	#	*	#	Extremely Important
Evaluation of Progress for Learners	#	#	#	0	0	+	+	#	0	Very Important
Functions that Collect Data	*	*	*	0	0	+	#	*	0	Extremely Important
Functions that Document learning	*	*	*	0	0	+	+	*	0	Extremely Important
Supports Collaboration between all users	*	*	*	*	*	*	#	*	#	Extremely Important
Flexibility	#	+	+	+	+	#	+	+	+	Important
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	
Rating Total (Sub-Total)	0 3 10	1 2 10	2 4 7	6 1 1	2 1 3	7 3 3	4 5 4	1 2 10	2 2 2	

QWS Total Evaluation Table Expanded Institutional Level

Institution Level	Wt.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress	Requirement Weighting
Accreditation	*	#	#	+	0	+	#	*	0	Extremely Important
Assessment for Institutional Goals	*	*	#	0	0	#	#	*	0	Extremely Important
Supports Accreditation	*	*	#	+	+	#	#	*	0	Extremely Important
Functions that Manage Data	*	*	#	0	0	+	+	*	0	Extremely Important
Functions that Support Reporting	*	*	*	0	0	+	+	*	0	Extremely Important
Archive Functions for Data	#	*	*	0	0	+	+	*	0	Important
Interoperability with systems in place	*	#	+	+	0	+	#	#	0	Extremely Important
Scalability	*	*	#	0	0	+	*	*	0	Very Important
Multiple levels of ePortfolio	#	#	#	0	+	+	#	#	0	Very Important
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	
Rating Total (Sub-Total)	0 2 6	0 3 5	1 6 1	2 0 0	2 0 0	6 2 0	3 4 1	0 2 6	0 0 0	

QWS Total Evaluation Table Expanded Vendor and Administrative Detail

Vendor and Admin	Wt.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress	Requirement Weighting
Company Responsiveness	*	*	*	*	0	0	0	*	0	Important
Storage space per owner account	#	+	+	+	#	#	+	#	#	Important
Security	*	*	*	*	*	*	*	*	*	Extremely Important
Privacy	*	*	*	*	*	*	*	*	*	Extremely Important
Section 508	*	+	*	*	+	+	+	*	+	Extremely Important
Migration	#	#	#	+	#	#	+	+	*	Important
Systems Integration	*	#	+	+	+	#	#	#	+	Important
Accepted artifacts/media	*	*	*	#	*	*	*	*	*	Extremely Important
Rating (Sub-Total)	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	+ # *	
Rating Total (Sub-Total)	0 2 5	2 2 4	2 1 5	3 1 4	2 2 3	1 3 3	3 1 3	1 2 5	2 2 3	

QWS Total Evaluation Table Expanded Resources Required

Resources	Wt.	Digication	eFolio	Epsilen	Google	Mahara	Sakai	Taskstream	WordPress	Requirement Weighting
Required System by Institution	*	Internet w/browser	Hosted web service	Internet Connection	Internet	Internet Browser, JavaScript, etc	Browser, Linux, JDK 8, Apache Tomcat 8, MySql or Oracle	Browser		Important
Hosted Service (Software as a Service)	*	Hosted	Hosted	Hosted	Hosted	Institution	Institution	Hosted	Hosted	Important
Student Pricing	*	Google Apps for Educ (Free), per account $	Sliding Scale	Free to student for life	Free	Open Source	Open Source	Per Student		Important
Institutional Pricing	*	Range $5 to +*$ per user per year	Per Module	FTE Basis Model	per student license	Open Source	Open Source	Based on Student Pricing		Important
Additional Services (integration, consulting etc)	*		Hourly basis	Free	Fee	Institution can pay Partners	Institution determines	Free (except integration)		Important
Alumni	#	Free with Instit model in place/or +9.95 per year	Fee with Institutional	Free for life		Export as HTML/Leap+A XML	Zip File	Zip Files		Important
Institutional Support	*	Free online and email/Fee based other	Negotiated as needed	No service Fees	Free online	Institution provides support	Institution determines	None		Important
IT Staff	*	No IT staff req initial install/integra-tion)	No IT staff required	No IT staff required	No IT Staff required	Institution determines	Institution determines	No IT Staff required		Important

Appendix F

TABLE OF REQUIREMENTS FOR EACH TECHNOLOGY

- 12/01/2015

What are the requirements of an ePortfolio (Page 6)

List of requirements Sorted by Area of Use and includes description from

Cut2Stakeholder.xml in

I/12012015/Coding Analysis/12/282015MatrixWork file

access control for student with people outside of the institution
access for faculty to student work user friendly
access for student and portability
access for student to their corrected artifact and feedback provided by a reviewer or evaluator
access for students
access for students to their work while enrolled in program
access support for faculty to student work
access support for faculty to student work user friendly
access tiered
access tiered
access tiered security concerns for Student Access to lMS after Graduation
access to student submissions and data of "evaluators who are internal or external to the university"

artifact storage ample
artifact storage dependable
artifact storage user friendly
artifacts needs supported

assessment customizable to support creation of customizable forms to connect "rubrics, reflections, and feedback" to the academic outcomes, learning outcomes and specifics of each unique program
assessment data access to, use, analysis, and reporting for program and institutional purposes beyond graduation
assessment for faculty user friendly (2)
assessment Gen Ed comparative analysis
assessment institutional function and design support

assessment interface user friendly
assessment rubrics feature flexible to support updates yet support comparative analysis of GenEd
assessment rubrics support for Gen Ed assessment
assessment supported by uniform comparative analysis for assessment for Gen Ed across institution

collecting student submissions function and design
communication cross-reference feedback cycle for student and reviewers
communication mechanism for notification and feedback for evaluation process
communication social networking features for student and faculty
communication support Gen Ed for notification of student submission artifacts for to evaluators
communication supports evaluation formative feedback cycle for student
communication supports evaluation formative feedback cycle for student
communication within alerts student when their assignment is evaluated and ready for revision or is completed

comparative analysis for Gen Ed support student submission of assignments and connect reflection for successful comparative analysis of skills

cost

cross-reference assessment connect student to data
cross-reference assessment connect student to evaluation results
cross-reference assessment learning outcomes to assignments
cross-reference assessment rubrics connect elements (courses, experiences and other academic experiences) of
cross-reference assessment to support creation of customizable forms to to connect "rubrics, reflections, and feedback" to the academic outcomes, learning outcomes and specifics of each unique program
cross-reference collect and connect reflections to competencies
cross-reference comparative analysis of Gen Ed supports rubrics flexible to support each uniqueprogram curriculum yet preserves the successful
cross-reference connect student assignments to reflection
cross-reference connect student work to reflections
cross-reference data collection for creation of reports on connected outcomes, assignments, and tests at selected points in the process
cross-reference feature supports assessment tools
cross-reference feature supports evaluation of artifacts
cross-reference organizing student artifacts
cross-reference student artifact connect to reflection
cross-reference student artifact connect to submissions
cross-reference student work connect to reflections
cross-reference supports learning outcomes for reviewers
cross-reference supports reflection process for reviewers

cross-reference supports reflection process for reviewers
cross-reference supports rubrics and connection to work assessment
cross-reference to support collecting student work and reflections
cross-reference to support collecting, organizing and managing examples of student submissions and connect these to learning outcomes
cross-referene to support collecting student reflections connect to the competencies in their program

curriculum mapping function support program faculty the flexibility and ability to customize
curriculum mapping function to display the course to finish the degree program
curriculum mapping support design that displays how individual courses connect and support the academic program
curriculum mapping support student customizing appearance (2)
curriculum mapping support transparency of curriculum and requirements
curriculum mapping supports "rubrics and the measure for assessment"
curriculum mapping supports a user friendly interface for faculty to efficiently map the learning outcomes to the curriculum
curriculum mapping to represent the academic program curriculum map that makes Visible how the courses, instruction, and goals connect and support the learning outcomes
curriculum mapping visualization of how the composition of the courses, the order that the courses are offered, and the outcomes align with the curriculum

data collecting and data use interface at program level user friendly that will inform a programs success
data collection
data collection for assessment
data collection functions and design support secure access
data collection functions support institutional assessment Gen Ed
data collection interface for program level assessment user friendly
data collection longitudinal for assessment Gen Ed
data collection program assessment Gen Ed
data collection qualitative
data collection quantitative
data collection reporting
data collection student tracking across programs and transfers
data collection tracks student progress entry level to completion of academic program

data evaluation process queries specific to unique needs
data evaluation process support access and security (3)

data hosting process for access reliable
data hosting process for access secure
data hosting process for security reliable
data hosting process secure

data reporting
data reporting aggregating "raw data extraction" to create useful assessment reports
data reporting aggregation
data reporting analysis, aggregation to create useful assessment reports
data reporting and collecting
data reporting cross-reference at selected points connect outcomes, assignments, and tests to create useful assement reports
data reporting customizable ease of use and efficient specific to assessment process academic program curriculum, rubrics, and learning outcomes to create useful assement reports
data reporting customizable process user friendly specific to assessment process academic program curriculum, rubrics, and learning outcomes to create useful assement reports
data reporting integration technology on campus with enterprise wystems on campus
data reporting interface efficient
data reporting interface user friendly
data reporting of assessment create reports user friendly
data reporting user friendly

data security compliance reliable
data security for NCATE data

data storage centrality for NCATE

data tracking preserves comparative analysis assessment for Gen Ed with flexibility and accuracy for tracking student progress

function support tracking student progress for assessment of outcomes for Gen Ed
function support student tracking
function support student tracking and documenting student progress through multiple institutional units (ie. college, dePt, etc.)
function support student tracking and status reporting of student process through the completion of requirements for the academic program
function support student tracking through and across programs

help and guidance features for faculty
help and guidance features for student and faculty
help and guidance usability-navigation/initial training for student, faculty, reviewers, and evaluators

integration with current campus technologies (4)

interface ease of use and user friendly
interface user friendly for student

level of implementation program assessment

multimedia presentation supported to indicate learning of outcomes
multimedia support for student and faculty
multimedia support for student and faculty

multiple file type support for student and faculty

organize artifacts for assessment of student work
organize students with in programs

platform reliable platform
platform dependable function and design
platform robust function and design

portability and support for (FERPA)
portability for student

presentation ePortfolio adaptable for multi-audiences
presentation ePortfolio adaptable for multi-purposes
presentation ePortfolio data collection integration with current campus technology that facilitates data collection and data reporting
presentation ePortfolio data reporting tech integration with current campus technology that facilitates data collection and data reporting
presentation ePortfolio display flexibility for student
presentation ePortfolio for student
presentation ePortfolio supported for student to present work digitally
presentation ePortfolio supported for student to showcase work
presentation ePortfolio supports creation of professional showcase for student and faculty
presentation ePortfolio supports creation of professional showcase for student and faculty
presentation ePortfolio user friendly for student and faculty
presentation ePortfolios creation and function digitally
presentation ePortfolios multiple uses and audiences

rubrics function to support formative feedback for student and faculty
rubrics function to support tracking student progress

scalability
scalability
scalability to adapt to large sites storage demands of campus-wide assessment of Gen Ed
scalability to large site speed demands of campus-wide assessment of Gen Ed
scalability to large sites usability demands of campus-wide assessment of Gen Ed

security and control access
security and control permissions
security and permission control specific and selective

security and timing control on access and permissions
security concerns with data evaluation process
security of assessment data of student ' work

student and faculty assessment process support "written" formative feedback for student reflections
student assessment cycle of feedback formative user friendly
Student design work Function and design
submission of work for student user friendly

technical functions support development of elements specific to ePortfolios and the unique demands of UD campus-wide assessment of Gen Ed

user friendly with initial ease of use for student and faculty

Vendor "aware, engaged, and proactive" to stay relevant and updated as technology evolves Vendor
Vendor durability over time and maintains updates platform as technology evolves
Vendor engaged, proactive, and responsive to changes in evolving technology
Vendor has reputation of long term commitment and dependability for institutional level implementation
Vendor reliability and reputation long term commitment and dependability for institutional level implementation Vendor
Vendor reliability, dependability and conscientious accurate processes
Vendor responsive to institutions' "defined and definite" requests for design the successful comparative analysis of Gen Ed skills
Vendor responsive to requests for customization to meet demands of campus-wide assessment of Gen Ed
Vendor responsive to requests for features
Vendor responsive to requests for features vendor
Vendor responsive to requests within reasonable time frame
Vendor who is responsive, flexible, and ready to act on stakeholders concerns about disposition of student data after graduation

- 03/192016

What are UD requirements for Presentation Style ePortfolios?

UD Requirements for Presentation style ePortfolios from 03/19/2016 Excel file:

03192016Matrix2nd.xml with short description (Page 10)

User friendly for student: assessment cycle of formative feedback, submission of work, artifact

storage, interface, and initial ease of use.

Notes for Matrix work: 03/19/2016 Excel file: 03192016Matrix2nd.xml

User friendly data reporting interface, data reporting, data reporting of assessment create reports, data collecting and data use interface at program level that will inform a program's success, data reporting customizable ease of use and efficient specific to assessment process academic program curriculum, rubrics, and learning outcomes to create useful assessment reports, data collection interface for program level assessment, data collection interface for program level assessment User friendly for faculty: curriculum mapping supports a user friendly interface to efficiently map the learning outcomes to the curriculum, access for faculty to student work, assessment for faculty, access support for faculty to student work.

UD Requirements for Presentation style ePortfolios from 03/19/2016 Excel file: 03192016Matrix2nd.xml	
Platform	platform dependable and robust function and design
Presentation ePortfolios	presentation ePortfolio adaptable for multi-audiences
presentation ePortfolio adaptable for multi-audiences	presentation ePortfolio adaptable for multi-purposes
presentation ePortfolio adaptable for multi-purposes	presentation ePortfolio data collection integration with current campus technology that facilitates data collection and data reporting
presentation ePortfolio data collection integration with current campus technology that facilitates data collection and data reporting	presentation ePortfolio data reporting tech integration with current campus technology that facilitates data collection and data reporting
presentation ePortfolio data reporting tech integration with current campus technology that facilitates data collection and data reporting	presentation ePortfolio display flexibility for student
presentation ePortfolio display flexibility for student	presentation ePortfolio for student
presentation ePortfolio for student	presentation ePortfolio supported for student to present work digitally
presentation ePortfolio supported for student to present work digitally	presentation ePortfolio supported for student to showcase work
presentation ePortfolio supported for student to showcase work	presentation ePortfolio supports creation of professional showcase for student and faculty
presentation ePortfolio supports creation of	presentation ePortfolio supports creation of

professional showcase for student and faculty	professional showcase for student and faculty
presentation ePortfolio supports creation of professional showcase for student and faculty	presentation ePortfolio user friendly for student and faculty
presentation ePortfolio user friendly for student and faculty	presentation ePortfolios creation and function digitally
presentation ePortfolios creation and function digitally	presentation ePortfolios multiple uses and audiences
presentation ePortfolios multiple uses and audiences	

Appendix G

PARTICIPANT EXPERIENCES WITH TECHNOLOGY EXCERPTS

UD/Sakai/Con

31	UD/TECHQ00/Sakai/Doctoral	**Ideally, faculty are looking for a user-friendly platform to obtain actionable assessment data to achieve the ultimate goals of the TLA ePortfolio.**
32	UD/TECHQ00/Sakai/Doctoral	**Currently, OSP does not provide a process to access custom reports through a web interface or dashboard within our installation of the platform.**
33	UD/TECHQ00/Sakai/Doctoral	**However, IT can create a customized extraction of the raw data in a .csv file which can be manipulated in programs like Excel or SPSS.**
34	UD/TECHQ00/Sakai/Doctoral	**Unfortunately, this data needs to undergo specific customized aggregation.**
35	UD/TECHQ00/Sakai/Doctoral	**Other Sakai institutions have customized the Reports tool to provide some basic reporting needs.**
36	UD/TECHQ00/Sakai/Doctoral	**We do not currently have the resources to engage in such customization.**
39	UD/TECHQ00/Sakai/Doctoral	**Faculty modified various facets of the program TLA ePortfolio to better meet their academic program needs and work within the platform constraints.**
40	UD/TECHQ00/Sakai/Doctoral	**For example, faculty in Fashion & Apparel studies reduced the number of learning goals as well as the number of learning experiences included in the ePortfolio matrix as they found the information obtained overwhelming, somewhat redundant, and confusing.**
41	UD/TECHQ00/Sakai/Doctoral	**Faculty in Sport Management refined the number of reflections per artifact and the content of the reflections to focus more on providing students with ongoing, formative feedback.**
42	UD/TECHQ00/Sakai/Doctoral	**Also, they modified assignments to more appropriately align them with articulated learning goals.data.**
43	UD/TECHQ00/Sakai/Doctoral	**Faculty in business management transferred to a LMS, Sakai Project site, to better administer the grading of student reflections as well as manage the extensive qualitative assessment**
44	UD/TECHQ00/Sakai/Doctoral	**Faculty grantees also mentioned platform usability challenges, such as navigation, speed, and ability to modify instructions and assignments.**
45	UD/TECHQ00/Sakai/Doctoral	**Modifications to the matrix require IT expertise and cannot be conducted by most faculty.**
46	UD/TECHQ00/Sakai/Doctoral	**Due to the current resources available within the OSP development community, it is our understanding that such issues may not be addressed along with new feature development; the University is not equipped to staff such development.**
47	UD/TECHQ00/Sakai/Doctoral	**Consequently, our users should not expect major enhancements to the OSP tools at this time.**
48	UD/TECHQ00/Sakai/Doctoral	**IT has been exploring other vendor solutions through the Vendor webinars, yet given the divergent platform needs of student presentation and program assessment portfolios, none of the current platforms seem to address all our needs.**
49	UD/TECHQ00/Sakai/Doctoral	**Sakai OSP use without any modifications, can only provide an interim solution for the TLA ePortfolio.**
50	UD/TECHQ00/Sakai/Doctoral	**Google Sites (GoogleApps@UD)**
53	UD/TECHQ00/Sakai/Doctoral	**As a result of the interviews with the ePortfolio grantees, the ePortfolio team developed a program ePortfolio template in Google Sites (Home, Sample Proficiency) as an alternative to the OSP Sakai ePortfolio platform.**

Boston/Digication/Con

34	Bost/02Tech/Digi/Dr	**Its greatest weakness overall has been a cumbersome interface that required far more clicks than necessary,**
48	Bost/02Tech/Digi/Dr	**One continuing weakness is the lack of a revision-history feature that would allow instructors to see what changes were made and when.**

49	Bost/02Tech/Digi/Dr	**This is particularly important for group work, but also matters for more basic assignments.**
50	Bost/02Tech/Digi/Dr	**Currently, in order to make sure students haven't tried to change their assignments to challenge their grade, faculty must use the very cumbersome Assignments tool.**
63	Bost/02Tech/Digi/Dr	**While we have used ePortfolios to collect evidence about the effectiveness of our teaching, we have had less chance to collect evidence about the effectiveness of ePortfolios themselves.**
64	Bost/02Tech/Digi/Dr	**To some extent, this is because we have not had a fully integrated setup that would allow us to exchange student data with Digication; currently the system receives only students' name, email and student ID.**

IUPUI/Sakai/Con

15	IUPUI/TECH04/Sakai/DR	**Despite its advantages, the platform looks and feels dated.**
16	IUPUI/TECH04/Sakai/DR	**Its complexity is both beneficial and daunting, and users' expectations today are colored more by Facebook and Twitter than by the first LMS platforms.**
17	IUPUI/TECH04/Sakai/DR	**Thus, IU is exploring future technology options, and ePortfolio users at IUPUI are providing leadership in articulating requirements.**
29	IUPUI/TECH04/Sakai/DR	**Two or three IUPUI programs have chosen alternate portfolio platforms that they believe better meet their needs and those of their students, though one of those is converting to the current system.**
35	IUPUI/TECH04/Sakai/DR	**The institutional ability to add and customize functionality to meet local users' needs has been an advantage of our eportfolio platform, …**
35.5	IUPUI/TECH04/Sakai/DR	**...but has resulted in an abundance of features that can be daunting.**
36	IUPUI/TECH04/Sakai/DR	**For example, to create forms necessary to build portfolio templates, users must manipulate SML files.**
37	IUPUI/TECH04/Sakai/DR	**Most faculty thus need help from technical staff to create a basic portfolio template.**
38	IUPUI/TECH04/Sakai/DR	**Users have commented that the LMS, including the portfolio tools, requires too many clicks to accomplish basic tasks.**
39	IUPUI/TECH04/Sakai/DR	**Embedding media files can be difficult.**
40	IUPUI/TECH04/Sakai/DR	**Since the portfolios are in the LMS, a secure system, some students who wish to share their ePortfolios beyond the campus community find that process difficult.**
41	IUPUI/TECH04/Sakai/DR	**University Information Technology Services (UITS) allows students access to their portfolios for five years after the most recent enrollment, and students can download or save their portfolios for longer-term use; however, many students find it complicated to edit and update their portfolios outside the LMS.**
42	IUPUI/TECH04/Sakai/DR	**A frequent complaint among both faculty and students is that the platform is not "intuitive" or is otherwise "difficult to learn."**
44	IUPUI/TECH04/Sakai/DR	**Our current platform, Sakai, was selected by UITS, which at the time was seeking open-source solutions to learning management and other functions.**
45	IUPUI/TECH04/Sakai/DR	**The Sakai Project ultimately merged with the Open Source Portfolio Initiative.**
46	IUPUI/TECH04/Sakai/DR	**As far as we know, there was no particular selection process focused on ePortfolio tools, and IUPUI constituents had little opportunity for input.**
47	IUPUI/TECH04/Sakai/DR	**IUPUI's initial ePortfolio pilot implementation in 2004-05 revealed numerous flaws in the platform.**
48	IUPUI/TECH04/Sakai/DR	**We considered moving the campus to a different platform, but UITS committed to work closely with us to make needed improvements.**
49	IUPUI/TECH04/Sakai/DR	**In collaboration with campus academic units using the ePortfolio, we drew up specifications for software development in 2007, and UITS dedicated developer time to improve performance, resolve problems, and add new features.**

Northeastern/Digication/Con

NEU/TECHQ1/Digi/Dr	**In Fall 2012 the rest of the University transitioned from Taskstream to Digication.**
NEU/TECHQ1/Digi/Dr	**In the beginning this account did not authenticate with the University's information system. Digication**
NEU/TECHQ1/Digi/Dr	**In addition, it was not centrally funded and therefore programs were reluctant to formally integrate ePortfolios into the curriculum, given uncertainty about ongoing access. Digication**
NEU/TECHQ1/Digi/Dr	***As of Fall 2013 funding has now been centralized, authentication is supported, and it is expected that program-level use will increase.Digication***

NEU/TECHQ1/Digi/Dr	**The University has two sites, one for the undergraduate day school and another for the College of Professional Studies (http://myneufolio.digication.com andhttp://northeastern.digication.com).**
NEU/TECHQ1/Digi/Dr	**At times this has proved challenging, because the authentication does not function properly if a student or faculty member tries to login at the wrong site portal. The University has two sites,**
NEU/TECHQ1/Digi/Dr	**In addition, the current installations of Digication are not integrated with the University's system for enrollment.**
NEU/TECHQ1/Digi/Dr	**This makes it difficult to access the portfolios of students in a given course.**
NEU/TECHQ1/Digi/Dr	**That raises the bar for faculty who want to use portfolios on the course level,**
NEU/TECHQ1/Digi/Dr	**and for programs that want to access the portfolios of all active students.**
NEU/TECHQ1/Digi/Dr	**On the plus side, this emphasizes the point that the ePortfolio is separate from the learning management system — and that creates an opportunity to talk about the difference between "learning within courses" and "learning across courses."**

Pace/Mahara/Con

32	Pace/TechQ09/Mahara/Dr	**One of our first eTerns was savvy in web design and was able to create a customized Pace theme for our Mahara instance.**
33	Pace/TechQ09/Mahara/Dr	**While it's not perfect in every way,**
34	Pace/TechQ09/Mahara/Dr	**Mahara has really made it possible for Pace to make the leap from scattered ePortfolio usage to a more university wide acceptance of ePortfolios.**
35	Pace/TechQ09/Mahara/Dr	**Our c2L team credits Mahara with being one of the key pieces to our scaling up success story,**
36	Pace/TechQ09/Mahara/Dr	**yet there are still some issues that we grapple with.**
37	Pace/TechQ09/Mahara/Dr	**Because Mahara is a robust ePortfolio tool, outside of our LMS, some users complain about having to learn and deal with a separate system.**
38	Pace/TechQ09/Mahara/Dr	**In an ideal world, the LMS and ePortfolio platforms would be closely linked and would allow for file sharing**
39	Pace/TechQ09/Mahara/Dr	**and evaluation to happen between both.**
40	Pace/TechQ09/Mahara/Dr	***We have worked around this issue as best as can by providing a way to access Mahara through Blackboard***
41	Pace/TechQ09/Mahara/Dr	***and by providing training for faculty***
42	Pace/TechQ09/Mahara/Dr	***and students on the best uses of both tools.***
43	Pace/TechQ09/Mahara/Dr	***Our Pace programmers were able to install an ePortfolio tab within Blackboard, enabling easy-access.***
44	Pace/TechQ09/Mahara/Dr	**The other main weakness is the lack of a back end**
45	Pace/TechQ09/Mahara/Dr	**or assessment area.**

SFSU/eFolio/Con

173	SFSU/TECHQ12/eFolio/Dr	**Overall we have been happy with our platform.**
174	SFSU/TECHQ12/eFolio/Dr	***We would change a few things if we could. These include:***
175	SFSU/TECHQ12/eFolio/Dr	***Improve its mobile functionality (editing on tablets, smart phones) with additional editing functionally***
176	SFSU/TECHQ12/eFolio/Dr	***Improve web 2.0 capacity***
177	SFSU/TECHQ12/eFolio/Dr	***Build ability to aggregate and view multiple portfolios (for faculty and campus use)***
178	SFSU/TECHQ12/eFolio/Dr	***Update design templates or be able to modify them***
179	SFSU/TECHQ12/eFolio/Dr	***Create a clearer assessment tool, one that is easier to use and meets our needs***
180	SFSU/TECHQ12/eFolio/Dr	***We hope that the platform is alive and well 10 years from now!***

VT/Sakai/Con

65	VT/TECHQ16/OSP/Dr	**As we expand our usage, we're recognizing the need to continuously evaluate the ePortfolio technologies that are available and consider them against recommended offerings at Virginia Tech.**
66	VT/TECHQ16/OSP/Dr	**We have a wide, diverse level of ePortfolio usage, and that implies a wide, diverse array of technologies to support those efforts.**
67	VT/TECHQ16/OSP/Dr	***With growth of other free, web-based technologies, especially those being adopted by higher education, e.g. WordPress and Google, we're opening our sights to a wider array of potential ePortfolio technologies for a variety of purposes.***
68	VT/TECHQ16/OSP/Dr	***Our campus is continuously evaluating, piloting, and supporting emerging technologies, and the same holds true for our ePortfolio work.***
91	VT/TECHQ16/OSP/Dr	***We currently have a primary set of ePortfolio tools that are open source,***
92	VT/TECHQ16/OSP/Dr	***which technically is "free," but which we all know is not cheap.***

93	VT/TECHQ16/OSP/Dr	*The platform includes costs for our own development and support teams, as well as owning our own infrastructure.*
94	VT/TECHQ16/OSP/Dr	*Our portfolio tools are embedded within our CLE,*
111	VT/TECHQ16/OSP/Dr	*The Sakai portfolio tools are a part of our CLE; however, integration is always a continuing and critical concern.*
112	VT/TECHQ16/OSP/Dr	*Even though the eP tools are a part of the CLE, they are not entirely integrated with all of the functions and features of the CLE, such as the Gradebook tool for instance.*
113	VT/TECHQ16/OSP/Dr	*Additionally, our eP tools do not connect with other college applications, such as the assessment system that is available college-wide (WEAVE) or our student information system (Banner).*
114	VT/TECHQ16/OSP/Dr	*We certainly have had various faculty, at one time or another, say that they would greatly appreciate ePortfolio integration with WEAVE, and Banner.*
115	VT/TECHQ16/OSP/Dr	*Because we focus primarily on pedagogy and ePortfolio process first, and technology platform second, the nature of our platform has contributed to our scaling up effort.*

Rutgers/Sakai/Con

16	Rutg/TECHQ21/Sakai/Dr	**We structured the Sakai platform to serve as an integrative, reflective tool that would allow students space for describing themselves and their interests, a matrix that would capture transferable skills, places for uploading artifacts, and a "My Path" page in which students are prompted to describe the ways in which their skills and experiences are interconnected.**
17	Rutg/TECHQ21/Sakai/Dr	**At the same time, the OSP platform is not as user-friendly as the various social media that students use in their day-to-day interactions with digital technology.**
18	Rutg/TECHQ21/Sakai/Dr	***Therefore, we are beginning to train students to transfer OSP content to other sites of their choice; in this way, they can choose new or familiar platforms while they deepen their thinking around learning and, borrowing from Sakai, re-create a structure that captures their learning experiences.***
29	Rutg/TECHQ21/Sakai/Dr	**We requested multiple changes to the Sakai ePortfolio features, and once the consultant completed programming, the Office of Instructional Research and Technology took over the program and made final changes.**
30	Rutg/TECHQ21/Sakai/Dr	**However, they have very few staff to manage the ePortfolio (literally, two people are currently able to address our concerns as they arise.)**
31	Rutg/TECHQ21/Sakai/Dr	**Most of their time and energy go into the course management system, which is used by thousands of university students and faculty.**
32	Rutg/TECHQ21/Sakai/Dr	
33	Rutg/TECHQ21/Sakai/Dr	**Many schools manipulate Sakai quite effectively, and have managed to adapt it to departmental demands.**
34	Rutg/TECHQ21/Sakai/Dr	**Our shortage of technical staff and resources limits not only the upkeep of the program, but innovation and design.**
35	Rutg/TECHQ21/Sakai/Dr	**In addition, students are willing to work with the program, but do not see it as a career showcase tool because it does not resemble anything they would use to create a website or blog (or any form of social media).**
36	Rutg/TECHQ21/Sakai/Dr	**Even the url's for their ePortfolio sites are terrifically long (we recommend using "tiny url" to create more manageable hyperlinks).**
37	Rutg/TECHQ21/Sakai/Dr	
38	Rutg/TECHQ21/Sakai/Dr	**Most of our pages allow students to complete text and upload media in the Rich Text Editor, a format that students find reasonably intuitive,**
39	Rutg/TECHQ21/Sakai/Dr	**although they need to "click" a lot to get there and the pages often take a long time to load.**
40	Rutg/TECHQ21/Sakai/Dr	**Brief instructional videos demonstrate the process as well.**

StJohn/Taskstream/Con

10	**St. John's University**	**Originally when ePortfolios were just starting to be used at St. John's University we utilized Taskstream. Taskstream**
11	**St. John's University**	This tool was selected after reviewing comparable tools on the market at the time like Livetext, Digication and Sakai.
12	**St. John's University**	**With limited resources and a list of demands from administrator focused on assessment we made a good decision at that time. Taskstream**
13	**St. John's University**	**We found the Taskstream platform to be extremely focused on assessment... Taskstream**
14	**St. John's University**	**at that time with less flexibility on the front end as it related to the interface…Taskstream**
15	**St. John's University**	**and social components. Taskstream**
16	**St. John's University**	**Students found it difficult to use ...Taskstream**
17	**St. John's University**	**and did not like the final look of their portfolio after they invested time with the tool. Taskstream**
18	**St. John's University**	**So we began the process of considering other tools in 2010….Taskstream**

StonyBrook_Northeastern_St.John's/Taskstream/Con

		Taskstream
330	Stony/TECHQ23/Digi/GradRsrch	Task Stream and other assessment-driven eportfolio systems were dropped from our list because the focus was more on institutional assessment, rather than integrative and lifelong learning. They were too expensive and didn't fit our campus learning culture.
115	NEU/TECHQ1/Digi/Dr	However, Taskstream proved difficult for faculty and students to use.
7	StJohn/TECHQ18/Digi+/Doctoral	We found the Taskstream platform to be extremely focused on assessment at that time with less flexibility on the front end as it related to the interface and social components. Students found it difficult to use and did not like the final look of their portfolio after they invested time with the tool. So we began the process of considering other tools in 2010.