

## **Work in Progress: Faculty Perceptions of Electronic Portfolios as Assessment Tools**

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# **Work in Progress: Faculty Perceptions of Electronic Portfolios as Assessment Tools**

## **Abstract**

This work in progress paper explores faculty perceptions of ePortfolios for assessment with a focus on the barriers to implementation and the possible influences on their instructional approaches. This paper draws on data from a larger in-progress design-based research study on the development of cross-course ePortfolios through an optional experience designed for second-year mechanical engineering students. Through a lens of expectancy value theory, an initial analysis was done on seven faculty interviews to shed light on some of the reasons why ePortfolios have not been widely adopted in engineering education. Preliminary analysis identified both expectancy-related and value-based barriers, which indicates additional groundwork is needed to support faculty in the use of ePortfolios in the classroom. However, faculty predictions of how the implementation of ePortfolios in their classrooms would influence their teaching indicated almost all of them would feel the need to modify core course assignments or instructional approaches. These data support a conclusion that initially implementing ePortfolios at a program-level, before class-level integration, may be an effective strategy to support sustained adoption.

## **Introduction**

Assessment of academic performance through summative exams has long been the standard in undergraduate engineering courses. These exams afford students the opportunity to demonstrate their proficiency with procedural problem-solving skills and conceptual knowledge in a specific sub-area of their engineering discipline. However, these forms of assessment position the instructor as the sole evaluator of proficiency, which leaves little space for students to engage in assessing their own learning [1]. Yet, to prepare for engineering practice and the lifelong learning that necessarily accompanies it, students need to develop strategies to self-evaluate the quality of their knowledge and skills [2]. Students could begin to do so during their undergraduate years. Filling the gap that exams leave behind, “sustainable assessment” methods in undergraduate courses can equip students with these strategies for self-evaluation of their engineering competencies [3]. ePortfolios can facilitate sustainable assessment by encouraging students to reflect on their learning experiences and articulate their knowledge in a public medium [4]–[6]. However, ePortfolios have not been widely adopted in engineering education.

## **Background**

The Department of Mechanical Engineering at a research university in the northeastern United States recently underwent a significant re-envisioning of its course offerings and required curricula for the Bachelor of Science in Mechanical Engineering (BSME) program. A component of this re-design included discussions about incorporating more project-based learning into required courses. Grounded in the constructionist theory that student learning is particularly well supported when students are creating public artifacts with personal meaning [7], the co-authors of this paper developed and implemented an ePortfolio development course to

explore the use of ePortfolios as both a support for project-based learning and a method for sustainable assessment.

Second-year mechanical engineering students were given the opportunity to participate in an optional single credit, pass/fail course on cross-course ePortfolio development taught by the co-authors. Nineteen students participated in the course, and all consented to be part of a still-in-progress design-based research study on their experiences in the course and with ePortfolios. In this course, students were given the opportunity to produce an ePortfolio, that contained artifacts from both academic experiences and extracurricular experiences. Students were encouraged to include artifacts that they felt best showcased their engineering knowledge, but what they chose to include and how they chose to display it was at their discretion.

After the course concluded, seven faculty members participated in an interview protocol that involved reviewing a sample ePortfolio, comparing portfolio entries to traditional assessments, and considering how ePortfolios could be incorporated into their courses. The sample ePortfolio was created by anonymizing and combining six ePortfolio artifact entries produced by students in the course. Of the interviewed faculty, four are tenured and three are non-tenure track teaching faculty. All regularly teach core second-year mechanical engineering courses. While some faculty have tested out variations of ePortfolios in their courses in the past, there has been no program-level or consistent use of ePortfolios within the department previously.

## **Methods**

This work-in-progress study was guided by the research question: What barriers do faculty perceive in implementing ePortfolios in their classes, and what influences do they predict this implementation would have on their instruction? The primary data sources for this study are the faculty interview transcripts. The data used to inform the interview protocol used in this study include student ePortfolios, student reflections on in-class discussions and feedback sessions, and instructor insights from the previously described ePortfolio development course.

All interview transcripts were read, and thematic analysis [8] was performed. Expectancy value theory (EVT) was used as a framework to understand how the perceived barriers to implementation may impact instructor motivation to adopt this new practice. Expectancy value theory states that one's expectation for success multiplied by their subjective value for a given task equals their motivation to attempt that task [9]. This means that faculty must place value on ePortfolios as a tool and must also feel they are able to feasibly use that tool in practice to be sufficiently motivated to integrate ePortfolios into their courses. Identified barrier themes were associated with EVT factors during analysis. This association was done to better understand how the barriers are linked to the components of motivation, which will allow for the construction of targeted interventions aimed at each component in future studies. In this initial analysis, subjective task value (V) was not broken down into attainment value, intrinsic value, utility value, and cost as is sometimes done in EVT analysis [9]. However, future iterations of analysis may warrant further exploration of these sub-values.

## Preliminary Results and Future Work

### *Barriers to Implementation*

In our initial analysis, seven themes related to barriers to the implementation of ePortfolios have been identified (Table 1). Both expectancy and value-related barriers present clear challenges that would need to be addressed in order to successfully incorporate ePortfolios into individual courses.

TABLE 1: Themes and associated EVT factors related to barriers to the implementation of ePortfolios

<b>EVT Factor</b>	<b>Barrier Themes</b>	<b>Example Excerpt</b>
Expectancy	Grading Experience/Training	You know, we have to assign grades to the students, and we need to put a number on something. And so, I would feel much more comfortable about grading things like this if I had some experience from [a colleague] that has done this before.
Expectancy	Grading Subjectivity	And I've done [portfolios] within a class and I've had some limited success there because I find it hard to give meaningful grades or assessment of those because they're highly subjective in from the way I look at them...
Expectancy	Providing Feedback	My main barrier is that if you have a class with 100 students it's impossible to give feedback in a timely fashion. And it becomes very hard to stay on top of giving feedback.
Value	Limitations on Detail	It's really like resume versus CV, so portfolio is the resume, and I want the CV. So no, I don't think I would use portfolio for assessing how people did a project because I don't think that I would be able to see clearly enough what they actually did.
Value	Planning Time	Time, you know it's, it's a, we spend a lot of time making our courses. And you know, if we are going to revamp assessments in some way, you know, it's not just change, change, the whole change the exam problems each year. It's well, now we have to really change the course... You know, and we have to allocate time for the faculty to rethink how, how, these will get incorporated, how they'll get physically done, how they're going to get graded.
Value	In-class Time	I don't want to spend my class time teaching people how to make a portfolio.
Value	Student Preference	As I was saying before, a lot of students, some students, every students have a preferred way of, of being tested of their knowledge. Some students love the idea of portfolios, some students hate the idea of portfolios. So, how do you balance? Because if I, if I

		only do a portfolio, there will be people that say “Oh, but I like to solve problems and just showing you the equation, and I don't enjoy putting together documents or writing about whatever.” It's always a balance.
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Grading experience/training, grading subjectivity, and providing feedback were categorized as expectancy-related themes because they represent concerns that impact whether faculty feel they can be successful in incorporating ePortfolios into their courses. Limitations on detail, planning time, in-class time, and student preference were categorized as value-related themes because they reflect an evaluation of how valuable incorporating ePortfolios into their courses would be. For example, the quote provided as an example of in-class time indicates the faculty member does not place a high value on spending in-class time on portfolios.

### *Influence on Teaching*

After discussing potential barriers, faculty were asked to think about how the incorporation of ePortfolios into their classes would influence their teaching, if they were to take that step. The themes we have identified in their responses range widely from predictions of no influence to visions of adding projects to provide suitable material for ePortfolio entries (Table 2). All participant names are pseudonyms. The two participants who stated ePortfolios would not influence their teaching shared sentiments that ePortfolios were valuable for the students as “enrichment” activities but would not represent a large portion of the grade in their course, if incorporated according to their current understanding of ePortfolios.

TABLE 2: Individual faculty perceptions of how ePortfolios would influence their teaching

<b>Participant</b>	<b>Influence on Teaching</b>
Professor Collins	Would use for assessment of student progress and understanding
Professor Foster	Would push Professor Foster to add projects and scrutinize the quality of projects being assigned
Professor Liliana	No influence
Professor Nelson	Would need to take the place of some reading assignments and homework
Professor Plum	No influence
Professor Taylor	Would incorporate more open-ended problem solving
Professor Williams	Would need to have projects that are suitable for portfolios

From a project-based learning perspective, Professor Foster’s response is of particular interest in indicating that perhaps ePortfolios can act as a change agent for encouraging more hands-on and project-based learning. While Professor Collins did not remark on changes to instructional methods, they did indicate an openness to taking up ePortfolios as pivotal tools for alternative assessment.

The initial analysis of these data indicates motivating faculty to incorporate ePortfolios into individual courses will require improving both faculty expectancy and value for ePortfolios in individual classes. However, the perceptions of how ePortfolios may influence teaching indicate

ePortfolios are a tool that is worth continuing to explore. Based on these data, our future work will approach the implementation challenges by first incorporating ePortfolios at the program level. Positive outcomes from program-wide ePortfolios may support faculty in increasing perceptions of expectancy and value without requiring the upfront investment at the course level.

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