



Using ePortfolios to Facilitate Transfer Student Success

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Abstract

This paper describes the use of an ePortfolio to facilitate success as students transfer from a community college system to baccalaureate engineering technology programs as juniors. The ePortfolio is created as part of a transfer seminar course that meets just before and during their first semester at university. The course has three purposes:

1. Orient to the university
2. Synthesize learning from Associate of Science (AS)
3. Identify and complete any prerequisite knowledge for junior level courses.

Some material may be included in the university freshman and sophomore course, but not included in associate of science courses at community college. The creation of an ePortfolio during the transfer seminar assists with the synthesis of previous learning and filling in any gaps in knowledge needed for rest of the BS plan of study.

To guide the artifact selection for the ePortfolio, university faculty reviewed the state-wide core competencies and compared them to the pre-requisite knowledge required for junior level courses. The most important competencies were targeted for use in the ePortfolio. During the seminar class, students identify artifacts from their AS classes that demonstrate the competency, upload an electronic representation of the work, and write a reflection about how the artifact demonstrates their competence. The reflections are assessed by the faculty using rubrics published in the course management system.

The ePortfolio tool is part of the CourseNetworking (CN) platform. CN has many advantages as an ePortfolio for this application, but the most important is that CN lets individual users own their ePortfolio for their lifetime; the site is not owned by the college or the university. Even after graduation or transferring to a new school, users may continue to access and maintain their CN ePortfolio, free of charge. This enables community college students to begin their artifact collection while taking their associate degree classes, and then complete their reflections after they transfer to the university.

The use of ePortfolios and reflection on learning is an effective way to give students confidence as they begin a new program and to bridge any gaps in prerequisite knowledge.

History of Transfer Single Articulation Pathway Engineering Technology

The state of Indiana has a variety of universities and four-year colleges, many of which offer STEM degrees. Indiana has one state-wide community college: Ivy Tech Community College of Indiana. Ivy Tech started as a vocational school during the 1960's, but over the decades has

become a system of approximately 40 campuses offering more than 150 programs including certificates, associate degrees, and apprenticeship programs. [1]

In 2013, the Indiana state legislature enacted Senate Enrolled Act 182. This bill required state colleges to create a single articulation pathway (commonly known as the Transfer Single Articulation Pathway or TSAP) for programs with significant numbers of students who first achieve an associate of science or arts degree with the intent of obtaining a related baccalaureate degree. The Statewide Leadership Team identified Electrical Engineering Technology (EET) and Mechanical Engineering Technology (MET) as two of the initial eleven pathways developed. Other pathways include Mechanical Engineering, Education, Criminal Justice, Business, Computer Science, Nursing, and Social Work. [2]

Faculty from each identified program met to determine core competencies for their program. For both MET and EET, the state-wide panel included faculty from Ivy Tech, Ball State, Indiana State, University of Southern Indiana, Vincennes University, and multiple Purdue University locations, and Indiana University Purdue University Indianapolis (IUPUI). Since 2013, these faculty members have met repeatedly to refine the core competencies to ensure that students who graduate with an Associates of Science degree from Ivy Tech can successfully complete a Bachelor of Science Degree in Indiana. The list of core competencies can be found on the Indiana Commission for Higher Education Website. [2]

The engineering technology faculty at IUPUI had long history of helping students from Ivy Tech transfer into the EET and MET programs. Based on this experience, they determined two things:

- Although students who earned an AS degree met the core competencies, it was not appropriate to certify that particular Ivy Tech courses were equivalent to specific courses at IUPUI (i.e. course 101 at Ivy Tech does not transfer as course 101 at IUPUI).
- There were topics included in the first two years at IUPUI that were in addition to the statewide core competencies.

To facilitate TSAP students in completing the BS within 60 credit hours and not repeating any identified core competencies, IUPUI faculty decided to create a two-year, 60 credit hour plan of study specifically for TSAP students. The first course in this plan of study is TECH 31000, Seminar for Technology Transfer Students. The purpose of this course is three-fold: to orient technology TSAP students to IUPUI, to synthesize learning from Associate of Science, and to reinforce proficiencies necessary for junior and senior students engineering technology students at IUPUI. The course is three credit hours, and is required for both EET and MET TSAP transfer students.

TECH 31000 is divided into two segments: a pre-semester “bridge” course, and a weekly class meeting during the semester. The first segment meets the week before fall classes begin. This is when freshmen orientation occurs, and meeting this week affords the transfer students to take advantage of many campus familiarization activities. It is also during this week that students prepare the ePortfolio described in this paper. During the rest of the semester, the TSAP students meet once a week to learn the material that is unique to the first two years of IUPUI engineering

technology programs. TECH 31000 has been identified by the first cohort of TSAP students as an important component in their success at IUPUI.

The first class of TSAP students graduated from Ivy Tech in 2017. Since then, IUPUI has had three cohorts of IvyTech students transfer in as engineering technology juniors (Figure 1). As more students successfully complete the TSAP degrees at Ivy Tech, the number of students transferring to IUPUI has increased. Based on enrollment at Ivy Tech, IUPUI faculty expect the numbers to hold steady over the next few years.

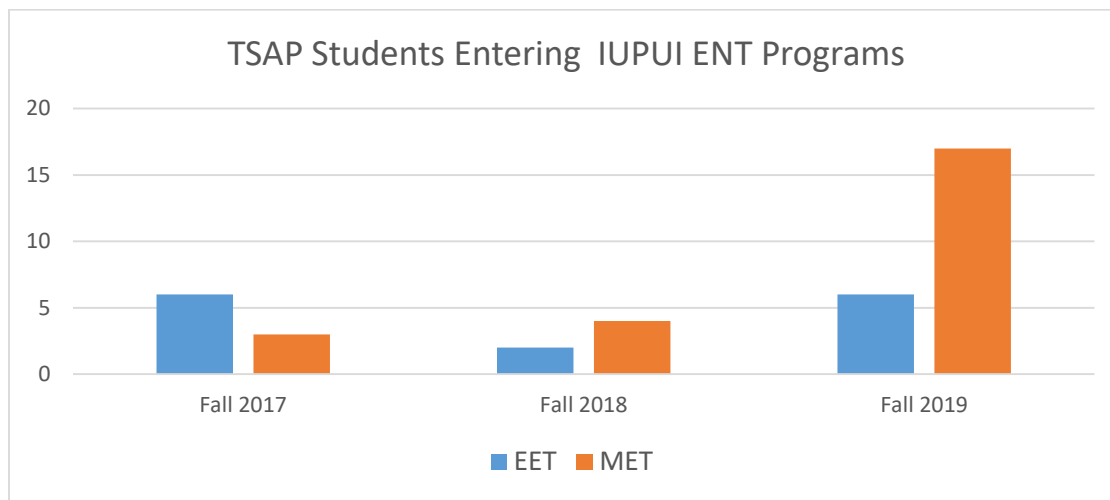


Figure 1: Number of TSAP Students entering EET and MET programs at IUPUI

Using ePortfolio for Competency Reflection with Transfer Students

ePortfolio is short for electronic portfolio, which serves as a digital repository for the collection, selection, reflection, and connection of learning [3] [4]. The Association of American Colleges and Universities (AAC&U) has identified ePortfolio as a High-Impact Practice (HIP). On this webpage (<https://www.aacu.org/eportfolios>), AAC&U recognized the value of ePortfolio in collecting evidence for learning outcomes that are “not amenable or appropriate for standardized measurement” and in helping students reflect on their learning “across multiyear degree programs” and “across different institutions.” [5]

Many educators and researchers have advocated ePortfolio as an effective tool for learning reflection. Reid (1993) defined ePortfolio-based reflection as students reviewing their existing experiences by describing, analyzing, and evaluating them in order to inform future practice. Doig, Illsley, McLuckie, and Parsons (2006) stressed that more profound levels of reflection are more likely to generate positive learning outcomes and that students must be carefully guided to develop their reflective thinking and writing skills. In a recent paper, Melles, Leger, and Covell (2018) studied the use of ePortfolio to demonstrate and develop core competencies in a Professional Master of Public Health program at Queen’s University in Kingston, Ontario, Canada. They found that the graduate students of their study recognized the value of ePortfolio as a reflection tool, and the ePortfolio helped them reflect on their learning and competencies.

A good number of studies have focused on ePortfolio for engineering education. Some of them documented using ePortfolio as a reflection tool [6] [7] and some recorded how to leverage ePortfolio to facilitate competence development [8] [6]. Khoo, Maor, and Schibeci (2011), for instance, investigated student perception and experience of building an engineering ePortfolio to develop their communication, critical thinking, problem solving, and collaboration skills. However, we noticed that studies on transfer students' use of ePortfolio in engineering education, particularly in engineering technology, can rarely be found. Therefore, we are writing this paper to contribute to the understanding of this topic with a focus on using ePortfolio as a reflection tool to help transfer students articulate and build TSAP core competencies.

CourseNetworking (CN) ePortfolio

The TECH 31000 course selected CourseNetworking (or "CN") as the student ePortfolio platform. CN is an academic, social networking based learning platform invented at IUPUI. The platform was first created in 2012, and as of this moment, educators and students from more than 160 countries are using it. The CN ePortfolio offers features such as visual resume, skill tags, badges, documents and folders, and Showcases. These features give students a variety of opportunities to document and reflect on their learning and demonstrate their competencies.

We selected CN as the ePortfolio tool for the class due to several reasons. First, the CN ePortfolio is lifelong and free of charge to individual students. These characteristics enable transfer students to start accumulating learning artifacts while they are still at the community college and allows them to continue to build the same ePortfolio after their transfer and beyond. Second, as a technology product invented and supported by our university, we were able to receive local support. The CN ePortfolio is integrated with the university's Canvas Learning Management System (LMS), which means with only a few clicks, students can directly access their ePortfolio on CN from Canvas. What also needs to be highlighted is that the one-page format of CN ePortfolio requires no web programming or wireframe design efforts from students. The students were able to quickly populate the basic sections of their ePortfolio at the beginning of the semester and follow detailed instructions to create Showcases to reflect on the TSAP identified knowledge and competencies.

Implementing Reflective ePortfolio with Canvas Assignment

Setting the quality for reflective analysis is a vital component in the creation of ePortfolio assignments. The ePortfolio reflective assignments require the engineering technology student to analyze their previous AS course learning and allow them to self-assess their level of prerequisite knowledge required for junior level courses. Emphasis is placed on the student to identify and analyze previous AS course work by applying critical thinking skills to what they did, why they did it, and how well they did it.

The week prior to the start of class, engineering technology transfer students are guided through a series of ePortfolio reflective assignments targeted to help the student succeed in their transition from AS to BS plan of study. Twenty-five "most important" competencies are identified and organized into twenty-five "key" competency ePortfolio assignments. These 25 "key" competencies are categorized into subsections within seven Main Categories. Each of the

seven Main Categories contain two to four unique “key” competencies targeted for ePortfolio reflective assignment. For example: The Main Category is an ePortfolio Showcase creation assignment and the associated “key” Competencies are individual ePortfolio assignments to populate the Showcase with targeted artifacts and associated reflections. Figure 2 is an example of a Main Category and “key” Competencies outline. Figure 2 shows an example outline of one Main Category and associated “key” Competencies that required specific artifacts. Figure 3 shows a completed ePortfolio Showcase Main Category title card and subsections submitted artifacts and associated reflections. The identified Main Categories comprise the following: *Technical Communications, Problem Solving, Basic Circuits, Math & Physics Competencies, AC Circuits (EET Students), Digital & Programming (EET Students), and Manufacturing Foundations (MET Students).*

Figure 2 Example outline of one Main Category and associated "key" Competencies

Example ePortfolio organization for "key" Competencies	
Main Category:	Technical Communication
"key" competencies:	<ul style="list-style-type: none"> a. Written Technical Communication: <ul style="list-style-type: none"> Formal Lab Report b. Display Data in MS Word table: <ul style="list-style-type: none"> Formal Lab report that best demonstrates your ability to display data in a word document table. c. Display Graphs of Data: <ul style="list-style-type: none"> Select a project report that best demonstrates your ability to process given information to define a problem and provide a solution. d. Formulas & Equations in Excel: <ul style="list-style-type: none"> Select an Excel spreadsheet that best demonstrates your ability to use MS Excel to perform calculations. You should select an Excel spreadsheet that represents your "best work."

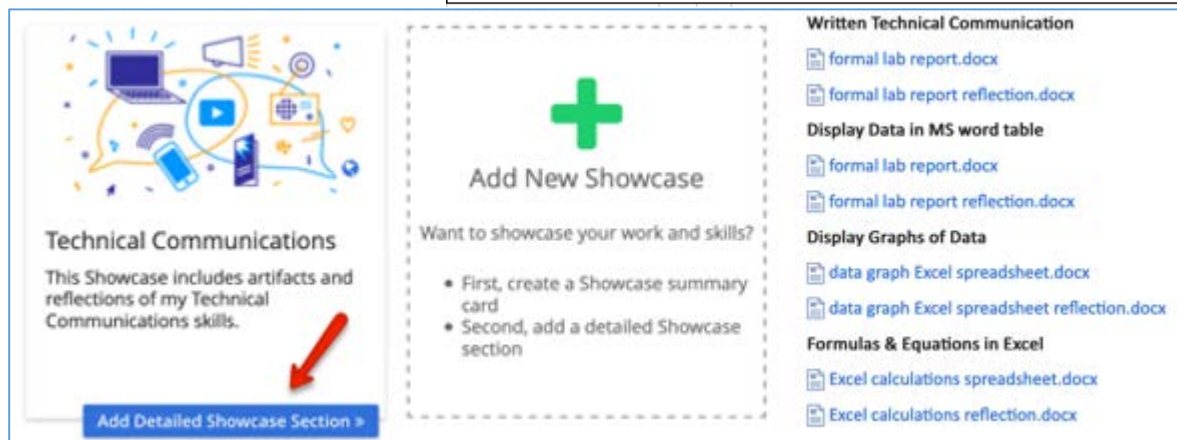


Figure 3 Completed Showcase Main category card and subsections with submitted artifacts and reflections

Ease of assignment access and assessment is paramount to assignment success; both for the student experience and the instructor assessment experience. To achieve a seamless integration for the courses CN ePortfolio assignments and graded assessment, the CN ePortfolio assignments are linked into Canvas Assignments tool. Each Canvas Assignment incorporates an identified “key” competency, with detailed assignment instructions for ePortfolio Showcase creation/edit and an analytic rubric for student guidance and instructor feedback. First day of class, students are introduced to course material, assignment expectations, supporting documents

and given hand-on instructions on how to complete their first ePortfolio reflective assignment. The seven Main Categories and their associated “key” competencies assignments are distributed across four days. Instructor(s) are available to assist the student with assignment details and questions. By entering the course Canvas portal, the student can access and submit each ePortfolio assignment via Showcase URL and the instructor can grade and provide feedback through course assignment rubrics.

Assignment rubrics play an important role in student success and for instructor feedback and guidance. All assignment rubrics are developed to complement student reflections and achievement for targeted “key” competency and aid the instructor in developing strategies for future assignments. Figure 4 shows ePortfolio assignment linked with Canvas Assignment with associated rubric. This guided structure allows students to identify their competencies and “gaps” and instructors to develop strategies to fill-in any identified “gaps”. The “gaps” are identified, when a student is unable to demonstrate competency for an ePortfolio assignment. Either the student is unable to provide an artifact of previous work and/or reflection on targeted artifact is lacking or missing. Another method a “gap” is identified is when a student provides artifact reflection stating they need help in the targeted “key” competency. Each ePortfolio assignment is assessed by the instructor(s) and at the end of the first week’s assignments all “key” competency “gaps” are identified and a plan for “gap-filling” assignments is created and implemented through-out the remaining semester. By the end of the first week, the student uses their ePortfolio reflections to develop a plan for success moving forward.

Artifact collection and analysis, delivered in ePortfolio assignments and incorporated into the Canvas learning management system (LMS) in conjunction with Assignment reflection rubrics, provides a structured tool by which students can create, demonstrate and articulate their ability to assess and improve their competencies. It is observed, however, to implement a series of 25 ePortfolio reflective assignments in a week’s time and maintain the learning objectives designed in the ePortfolio assignments, the students need ample time to collect required artifacts. Otherwise, the student becomes stressed spending considerable time trying to find previous completed artifacts and worrying they cannot provide an adequate reflection by assignment due date. The stress of ineffectual activities negates the learning benefits of reflective ePortfolio assignments. It is strongly suggested, that the students be provided a clear and well defined list of required artifacts in advance. Providing a list in advance facilitates student preparedness and awareness which supports reflective ePortfolio assignment timely completion and achievement. With early planning of identified targeted topics and subtopics and consideration for student artifact procurement, incorporating CN ePortfolio reflective assignment into Canvas LMS with rubrics proves to facilitate transfer student success.

Canvas Assignments tool

READ:

- Introduction to Core Competencies
- Create your CN ePortfolio

Assignments:

Technical Communications Showcase

- Written Technical Communication**
Aug 19, 2019 | 10 pts
- Display Data in MS word table
Aug 19, 2019 | 12 pt
- Display Graph c
Aug 19, 2019 | 12 pt
- Formulas & Equ
Multiple Due Dates

ePortfolio Assignment

Written Technical Communication

Published

This is a CN ePortfolio "Showcase" assignment

If you have not created your ePortfolio, you must return to Modules: [Key Competencies: Monday](#) and complete the instructions found in [Create your CN ePortfolio](#).
If you have created your CN ePortfolio:

ePortfolio Assignment rubric

Description:

You will select a Formal Lab report that best demonstrates your technical communication skills. In your CN ePortfolio, you will critique your abi

Instructions:

- Select a formal lab report that best demonstrates your technical communication skills.
 - The formal lab report:
 - Must be authored by you (your name)
 - Must be work you submitted as a requirement and required by your associate degree
 - Should include all sections as required
 - Reflection: In a well-formatted word document, describe how your formal lab report

Written Technical Communication		Ratings			Pts
Criteria					
Attached Formal Lab Report: Clearly identifies author Submitted Lab Report must be authored by the student	3.0 pts Lab Report authored name matches student	2.0 pts Lab Report does not contain an authored name	0.0 pts Lab Report authored name does not match student		3.0 pts
Attached Formal Lab Report: Clearly identifies the date, class and assignment Submitted Lab Report must be work you originally submitted as a required, graded assignment from a course taken your sophomore year and required by your associate degree	1.0 pts Clearly identifies the date, class and assignment		0.0 pts Does not provided the date, class and assignment		1.0 pts
Reflection: discuss formal report template Reflection: Describe how your formal lab report maps into the ECET/MET formal report template	3.0 pts Clearly articulates format similarities and differences. Includes specific details and examples	2.0 pts Articulates format similarities and differences, but is vague on details and/or examples	0.0 pts Fails to articulate format similarities and/or differences, and lacks details and/or examples		3.0 pts
Reflection: evaluate formal lab report sections Reflection: Critically evaluate your summary, procedure and conclusions sections of your formal lab report	3.0 pts Evaluates all three requested lab sections. Critique is reflective and provides supporting details and/or examples	2.0 pts Evaluates all three requested lab sections. But, critique lacks reflective thought and/or supporting details and/or examples	0.0 pts Did not Evaluate all three requested lab sections.		3.0 pts
Submission on time	0.0 pts Late submission (20% off earned points and 10% each day thereafter)		0.0 pts Submit on time (no loss of earned points)		0.0 pts
Total Points: 10.0					

Figure 4 ePortfolio assignment linked to Canvas Assignment w/rubric

Conclusions

Transfer students can be supported in success by using ePortfolios to identify work that demonstrates core competencies and reflect on their proficiencies. CourseNetworking ePortfolio is well suited for students to curate and reflect on their work. Instructors must employ advanced planning and correlate assignments to competencies. CN ePortfolios can be integrated in a university's learning management system, which facilitates guidance, feedback, and grading of

student work. For students to have the most benefit from the ePortfolio experience, they need advanced notice of suggested artifacts, instruction on navigating the interface, and feedback on their reflections.

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