Using ePortfolios to Showcase Student Projects

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Overview

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- Feedback from Students
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- Summary

What is an ePortfolio?

- Digital collection of artifacts
- Stems from paper portfolios
  - Art
  - Architecture
- Collection of creative work
  - Demonstrate proficiency
  - Seek further work

Engineering ePortfolio

- An online collection of student work that exhibits-
  - Student's efforts
  - Progress
  - Achievements

- Demonstrates understanding of technical concepts by showcasing key engineering projects done
  - In various courses
  - Internship experiences

- Sample

For students, an ePortfolio is:

- Opportunity to represent themselves and their education
- Place to collect and save coursework
- Chance to showcase accomplishments and school work
- Tool for creating digital resumes for employment
- Web portal for accessing work and tracking academic growth
- Chance to reflect on their education

LaGuardia Community College: http://eportfolio.lagcc.cuny.edu/students/default.htm

Student Success

- Recent study shows relationship between engineering students' interactions with ePortfolio tools and engagement with academic program and peers
- These metrics were also highly correlated with retention

Aguiar, Chawla, Brockman, Ambrose, and Goodrich. (2014). Engagement vs Performance: Using Electronic Portfolios to Predict First Semester Engineering Student Retention, *Conference of Learning Analytics and Knowledge*.

Implementation

- Authors have implemented in junior/senior level CAD and FEA/CAE courses in ME department for past three semesters
- Students are asked to upload at least 50-60% of their projects/assignments.
- Not a mandatory exercise. 5% extra credit.
- Majority of the students created an ePortfolio

Steps involved in creating an ePortfolio

- Collecting content
  - CAD models and CAE results from course assignments and projects
  - High-quality rendered CAD images
- Organizing content
  - Presentation of projects grouped according to specific skills
  - Aspects from individual projects organized to highlight competencies in:
    - Idea generation,
    - Computer-aided design,
    - Analysis methods,
    - Detailed design results.
  - Write-up to support images
    - Images and text combine to provide the reader an insight into the students' skills and abilities

Steps involved in creating an ePortfolio

- Displaying content
  - Display layout should be:
    - Clear,
    - Engaging,
    - Purposeful, and
    - Stylish
  - Many different free tools that are easy and quick to use are available
    - Google sites
    - WIX
    - For many of these tools the learning curve is very small and it can take as less as 10 minutes for a student with no previous experience to have a site up and running

ePortfolio - SAMPLES

- Sample-1
- Sample-2
- Sample-3
- Sample-4

EDUCATION:

New Jersey Institute of Technology, Newark, New Jersey
Major: Mechanical Engineering; GPA: 3.353
Major Subjects: Computer Simulation & Analysis; Heat Transfer; Vibration Analysis; Mechanical System Design 1/2; Fluid Mechanics; Computer Aided Design; Thermodynamics 1/2; Machine Design; Mechanical Lab 1/2/3; Electrical Engineering Principles; System Dynamics; Stress Analysis; Dynamics; Kinematics of Machinery; Strength of Materials; Engineering Mechanics; Engineering Materials and Processes; Stats and Probability For Engineering; Fundamentals of Engineering Design; Computer Programming/Problem Solving; Differential Equations; Calculus 1/2/3; Physics 1/2; Chemistry 1/2

SKILLS:

Hardware: PC based systems
Software: Windows 2000/XP/Vista/7, MS Office 2010/13, SoftPlan, SolidWorks 2015/16, Creo Parametric 2.0/3.0, Autodesk Inventor 2016, Revit 2016 (Currently learning), ANSYS (Currently learning)

Lab Skills: Technical Drawing, Woodworking, Soldering, Masonry/Concrete Manufacturing Skills, Metal Working, Experience Using Numerous Concrete Compactors, Wet Tile Saws, Large Block Wet Saws, Concrete Jacks, Circular Masonry Saws, Concrete Mixers, Basic Fiberglass Application, MIG and TIG Welding, Forklift Operation, Basic Front End Loader Operation, 3D Printing

WORK EXPERIENCE:

Forterra Building Products, Rome, GA 05/16 - 07/16
Engineering Intern (Concrete Pipe and Precast Manufacturing)

- In-depth exposure into the concrete manufacturing industry, (Pipe and Precast)
- Improved inventory analysis spreadsheets
- Learned fundamentals regarding on-site inventory management
- Assisted in machine maintenance /repairs
- Hands-on experience with machine operation for numerous cage rollers, cage expanders, welders and the Hawkeye pipe machine
- Learned regulations for class 3, 5 and 7 cage wire and the applications they serve
- Assisted in machine maintenance /repairs as well as general machine care (re-greasing, adjusting for new parameters)
- MIG welding, TIG welding, forklift operation, front end loader operation, numerous pneumatic tools etc.
- Visited precast plant in Florida to gain visual knowledge on how specific components are manufactured
- Traveled to pipe plant in Alabama for overhead crane repair
- Collaborated with sales representatives from rubber gasket company to test and approve new pipe O-ring for

Feedback from Students - Quantitative

QUESTION	AVERAGE SCORE (1-5)
ePortfolio helped me market my talent to potential employers and/or to graduate programs.	4.03
ePortfolio provided me an opportunity to demonstrate my understanding of technical concepts by showcasing key engineering projects I did for various courses across the curriculum.	4.16
The creation of ePortfolio helped me to develop skills such as website creation which adds to my professional development.	4.1
ePortfolio helped me in making a connection among the courses I have taken.	3.83

Feedback from Students - Qualitative

- I put a fair amount of effort into making mine look professional. I was able to add it on a job application and it was referenced during the interview. I wouldn't have made one if not for this class. I'm glad I did.
- This was a great idea and I feel that the things I learned in this course will stay with me beyond my undergraduate career. Thanks for everything!
- ePortfolios should be added to the curriculum, it provides a great interactive class summary. Other students could take advantage of this great feature. Overall, this has been a great experience and I plan to use it for job interviews and even for career fairs.
- Final product displays how the class was a success and how you progressed, giving you a feeling of satisfaction.
- ePortfolios were a good add-on to the course as it allowed me to place my work in one spot. It also forced me to think about the process I took to make certain parts and assemblies which gave me a better understanding of CAD/CAE programs. I haven't yet but will most likely in the future use this ePortfolio to show potential employers what I know.

Feedback from Students - Qualitative

- ePortfolios should always be a part of all CAD classes.
- Great idea to create ePortfolio! You can include a web-link on your resume and it goes directly to the website designed by you. I have mine broken down into each sub-program and specific examples in each to showcase my ability to use these systems effectively.
- It can be improved by adding a general guideline for students to follow.
- Make half of it due in the middle of the semester and the second half at the end of the semester. Many students (including myself) tend to put something like this off to the last minute and it lowers the quality of our portfolios. Although it is a students' responsibility to do it in a timely fashion, many students work better when there are more prompt deadlines.
- Showing past examples might have been nice.
- Perhaps dedicating a class in starting up. There was a learning curve and getting a proper format was a hassle

Long Term Goal

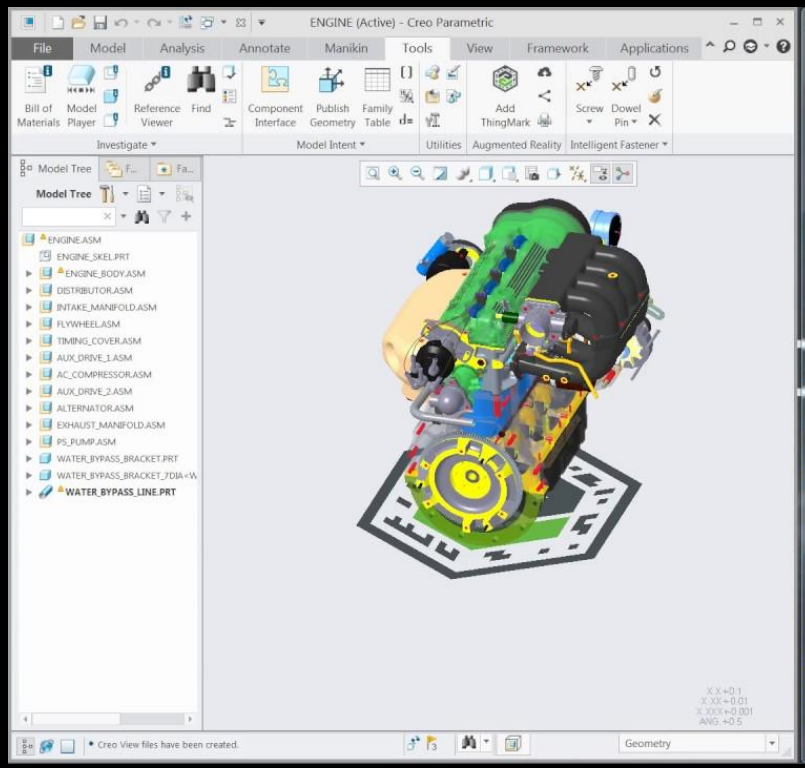
Challenges

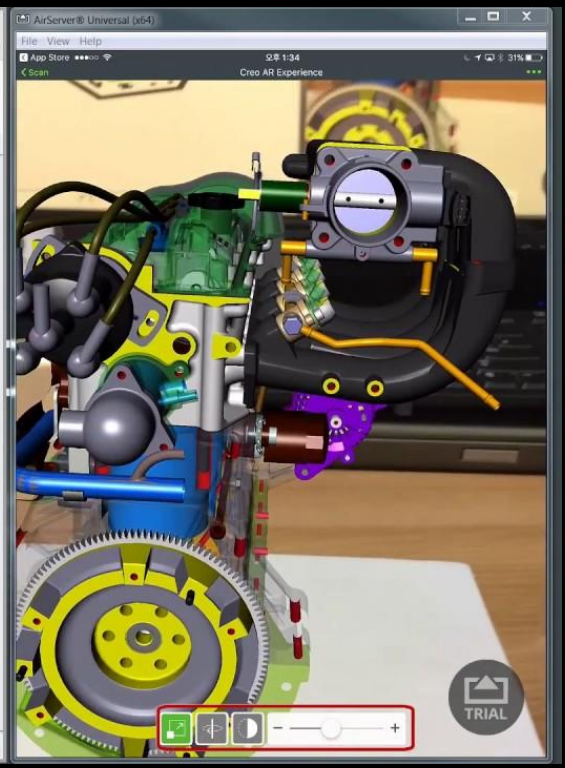
- **Reviewers do not necessarily know details or context of assignment**
  (Can be addressed through effective rubrics)

- **Compliance of faculty and students**
  (Requires cultural shift)

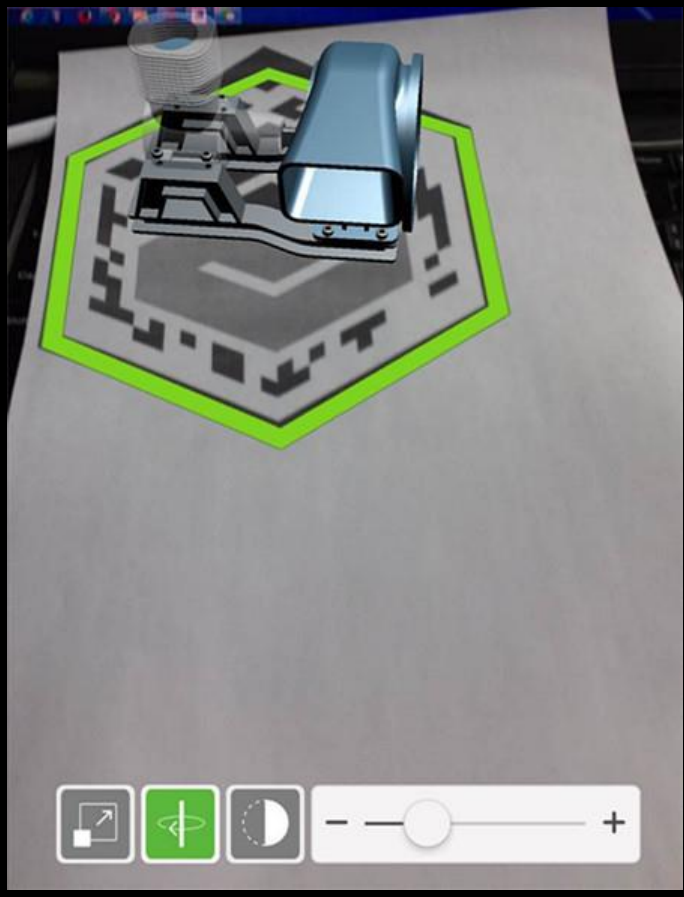
Augmented Reality ePortfolio

- **Thingmark can be attached with the CAD file and then scanned by an Android or IOS app (View) to generate the model at any location**





Augmented Reality ePortfolio



Summary

- ePortfolios are a great tool and provide an opportunity to students to effectively showcase themselves as well as their work including accomplishments and achievements on a web portal.
- It can act as a digital resume supplementing their paper resume which reflects that the student has an ability to communicate effectively.
- It can be started in students' first year at college itself such that it can also be a tool for tracking academic growth and helping students make a connection between courses and self-reflect on their education.

Questions? or Comments!

How can you integrate ePortfolios into your course?