

# Hybrid Course Development – EDSGN100

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Design: Summer 2011 – Fall 2011  
Implementation: Spring 2012  
Final Report: Summer 2012

## Introduction

The main objective for the EDSGN100 hybrid course was to increase student engagement while utilizing online resources and activities to fulfill the following course objectives:

- virtual team collaboration tools
- use software tools relevant to engineering practice

Within this freshman level course there are many students who already have prior knowledge and experience with software tools relevant to engineering practice and virtual team collaboration from high school or work experience. During in class activities these students would finish drastically ahead of their fellow students. Furthermore, the students lacking prior knowledge with software tools relevant to engineering practice were rushing through the material to keep up with the classroom pace.

By addressing the need of enriching students who had previous experience with software tools relevant to engineering practice it allowed the instructor to set aside more quality time for learners needed a little more individual attention during the Spring 2012 section where students “opted” in to taking the class as a hybrid or still meet for the entire class time. In the spring course sections in the future, the course will be conducted as a hybrid for all students. Using the hybrid method, it will encourage the learners who need more time-on-task to work at their “own pace” independently with the various course components and prevent them from rushing through the material to keep up with the classroom pace.

## Hybrid Course Explanation

For this hybrid course, after students decided if they would take the course as a hybrid, they were placed within their semester long teams. For the teams that chose to take the class as a hybrid, class time was decreased by 110 minutes / week. The online equivalent included several aspects including:

- Used ANGEL to:
  - deliver course material through weekly schedules that listed what needed to occur in the classroom and outside of the classroom.
  - share files via team file storage space
  - collect deliverables via drop boxes
  - discussion board
  - quiz
  - gradebook
- In-depth use of SolidWorks Tutorials with tutorial completion submissions.
- Interaction with Team Dynamics Modules to establish good practices when being involved with teams.
- PSU Lynda.com Tutorials to learn how to use Google Docs.

- SolidWorks activities to create sketches of models for design projects.
- Google Docs to complete the reports and presentations.
- Videos and online activities for the Ethics Case Study.
- Researching topics that concept/proposed solution must address.
- Concept generation by creating functional block models, a sketch and a 3D CAD model within SolidWorks for each generated concept.
- Prototype building after evaluation and selection one of the concepts in class.
- Integration of all aspects above within a research document for the groups' own use and the formal report document located in Google Docs.

Students who chose to take the class as a non-hybrid version would utilize the aspects and complete these tasks with instructor guidance within the classroom and would have more individual attention of the instructor. The use of online components in a class that does not reduce seat time is called a web-enhanced class and the terminology will be used in the rest of the report.

## **Project Design Timeline**

Summer and Fall 2011 - Utilized Google Docs during the entire process of the course redesign with the Instructional Designer. This virtual team collaboration first included revising the syllabus, revising course outcomes, establishing course objectives, and creating a course schedule. The next phase was creating a detailed course outline for each class session whether it was in the classroom or virtual that included the objectives, reading/resources, class learning activities, homework assignments, and discussion questions. These detailed course outlines became the basis of weekly schedules that were created in ANGEL to give more guidance to the students. The detailed course outlines also were used to identify course chapter presentations, activity instructions, etc. that needed to be created and/or revised.

Fall 2011 - Implemented weekly schedules and other components in two web-enhanced course sections.

Spring 2012 - Hybrid course implementation two course sections where students decided if they would take the course as a hybrid.

## **Learning Outcomes & Discussion**

During the end of the semester Spring 2012, students in the two course sections were surveyed. The results were segmented into those who took the course as a hybrid and those who took the course as web-enhanced. For Section 001: n=4; end-of-semester enrollment = 18; and for Section 002: n=5; end-of-semester enrollment = 19. Tables 1 and 2 summarize the responses for all course sections where hybrid students n=3 are labeled (H) and web-enhanced students n=6 are labeled (W).

**Table 1. Student satisfaction with hybrid component based assignments / course content**

Response	Weekly schedules were valuable.	SolidWorks Tutorials were valuable.	Team Dynamics Modules were valuable.	PSU Lynda.com Tutorials were valuable.	Google Docs was valuable.
Strongly Agree	33.3% (H) 33.33 (W)	66.6% (H) 66.6% (W)	33.3% (H) 16.6% (W)	33.3% (H) 16.6% (W)	33.3% (H) 50.0% (W)
Agree	66.6% (H) 50.0% (W)	33.3% (H) 33.3% (W)	66.6% (H) 33.3% (W)	33.3% (H) 16.6% (W)	33.3% (H) 16.6% (W)
Neutral	00.0% (H) 16.6% (W)	00.0% (H) 00.0% (W)	00.0% (H) 33.3% (W)	33.3% (H) 50.0% (W)	33.3% (H) 33.3% (W)
Disagree	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 16.6% (W)	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)
Strongly Disagree	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 16.6% (W)	00.0% (H) 00.0% (W)
Not Applicable	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)	00.0% (H) 00.0% (W)

As identified in Table 1, the majority of students found four of the five main hybrid component based assignments / course content favorable while the minority of students found them neutral or less favorable. For the PSU Lynda.com tutorials, the majority found them neutral or favorable, while one student found it less favorable. There is the possibility that this may have been due to students prior use of Google Docs and the survey instrument will be modified to incorporate this aspect in the future.

**Table 2. Student perception of active learning in the course**

Response	This course required the students to be active participants in the teaching and learning process.
Always	33.3% (H); 16.6% (W)
Very Often	33.3% (H); 66.6% (W)
Often	33.3% (H); 00.0% (W)
Occasionally	00.0% (H); 16.6% (W)
Rarely or Never	00.0% (H); 00.0% (W)

As identified in Table 2, the majority of students (100% in the hybrid and 83.3% in the web-enhanced) found this course format required active learning as part of their course progression.

From both tables, it was found that the students in the hybrid course and web-enhanced course had the same opinions with the material. The survey instrument will be used in future semesters so that data and results can further be analyzed. In addition to qualitative data, quantitative data including exam scores and final grades were collected and are illustrated in the following tables:

**Table 3. Students' Exam 1 grade outcome by grade distribution for hybrid and web-enhanced course implementation for Fall 2012**

Grade distribution in percentages	Web-enhanced Section 01	Web-enhanced Section 02	Hybrid Section 02
Raw Average	71.41%	71.21%	77%
A (A; A-)	22.22%	00.00%	60.00%
B (B+; B; B-)	22.22%	28.57%	20.00%
C (C+; C)	27.78%	50.00%	00.00%
D	00.00%	07.14%	20.00%
F	27.78%	14.29%	00.00%
Total amount of students who took exam	18	14	5

**Table 4. Students' Exam 2 grade outcome by grade distribution for hybrid and web-enhanced course implementation for Fall 2012**

Grade distribution in percentages	Web-enhanced Section 01	Web-enhanced Section 02	Hybrid Section 02
Raw Average	84.18%	85.50%	91.40%
A (A; A-)	50.00%	78.57%	80.00%
B (B+; B; B-)	27.78%	07.14%	20.00%
C (C+; C)	11.11%	07.14%	00.00%
D	00.00%	00.00%	00.00%
F	11.11%	07.14%	00.00%
Total amount of students who took exam	18	14	5

**Table 5. Students' final grade outcome by grade distribution for hybrid and web-enhanced course implementation for Fall 2012**

Grade distribution in percentages	Web-enhanced Section 01	Web-enhanced Section 02	Hybrid Section 02
Raw Average	80.13%	81.41%	88.16%
A (A; A-)	33.33%	50.00%	60.00%
B (B+; B; B-)	44.44%	21.43%	20.00%
C (C+; C)	00.00%	14.29%	20.00%
D	55.56%	07.14%	00.00%
F	16.67%	07.14%	00.00%
Total amount of students who took exam	18	14	5

Although the amount of students in the hybrid section is smaller in comparison, this group of students fared better than both sections of web-enhanced for Exam 1, Exam 2, and Exam 3. This might be associated to the hybrid students consisting of a majority of students with attributes good for hybrid courses. Due to the sample size being so small, comparing the results to other research available about hybrid courses may be too premature. The quantitative data collection will continue in future semesters to continue evaluating the effectiveness of hybrid courses.

The instructor's experiences within the class found additional qualitative observations. These observations included that the previous experiences of the student both identified if they enjoyed the hybrid course and if they did well within the hybrid course. Traits that identify students who are well prepared for the hybrid include students who are self starters, independent, mature and experienced using CAD & spreadsheet software, willing to take responsibility for their own learning, and have good time management skills. Traits that identify students who are less prepared for the hybrid include international students, as well as, students who do not own personal computers/laptops, do not take responsibility for their own learning, and do not work well collaboratively with their classmates.

During implementation, it was identified that students who have a Mac must have additional software to run required programs. These requirements will be listed as part of the system requirements in the course syllabus. In addition, for future semesters the course will be listed as "and Web" so that it is a hybrid course for everyone within the class. There are additional course sections by other instructors so students will have a choice of taking EDSGN100 as a hybrid course.

## Recommendations

1. It is recommended that for any given course there are options for the student to be enrolled in a hybrid course section or a traditional course section. By limiting a course, especially a 100 level or 200 level course, to only hybrid course sections it will prevent Penn State Berks from accommodating students who may not find the hybrid model to fit their learning needs.
2. Work with the Instructional Designer for support and hybrid / online pedagogy expertise during the design and development of the course and every time the course is run to ensure the quality of the hybrid / online course.
3. Work with the Center for Learning & Teaching to adhere to proper PSU Policies such as Course Policy 42-43, copyright and intellectual property, accessibility, PSU Quality Assurance Standards, etc.
4. Start early and dedicate enough time to the design and development of hybrid / online courses. Most faculty underestimate the total amount of time that they will need to spend on this process.

## Conclusion

In conclusion, a hybrid pedagogy was a successful method of delivery for EDSGN 100; however, the student traits and experience were important factors in the success for the student. Additionally, the system requirements were critical for student success.

The EDSGN 100 hybrid has increased the flexibility of fitting classes into the busy schedules of students. Examples from the Spring 2012 semester included a student who had a job, a student who had in depth CAD and spreadsheet software experience, and a student who was not of traditional age.

## Acknowledgements

The investigator gratefully acknowledges:

- Dr. Paul Esqueda, Sr. Associate Dean for Academic Affairs, John Shank, Associate Director for the Center for Learning & Teaching, and the TLI grant selection committee for the opportunity to create a hybrid version of EDSGN100.
- Amy Roche, Instructional Designer, for her work in the design and development of the hybrid course.
- Mary Ann Mengel, Multimedia Specialist, and Tricia Clark, Instructional Technologist, for the availability of their help.

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