



Blended Classes: Expectations vs. Reality

Dr. Susan L. Murray, Missouri University of Science & Technology

Dr. Susan Murray is a Professor of Engineering Management and Systems Engineering at Missouri University of Science and Technology. Dr. Murray received her B.S. and Ph.D. in Industrial Engineering from Texas A&M University. Her M.S. is also in Industrial Engineering from the University of Texas-Arlington. She is a director for the EM Division of ASEE and a ASEM Fellow.

Mrs. Julie Phelps, Missouri University of Science & Technology

Julie Phelps has been an instructional designer at Missouri University of Science and Technology since 2010. She supports faculty in the effective use of technology in the classroom as well as blended/online course development. She holds an M.A. in Information and Learning Technologies from The University of Colorado-Denver and a B.S. Ed. from The University of Missouri, Columbia.

From 2001-2010, Julie was an instructional specialist for the eMINTS National Center providing professional development to K-12 teachers throughout Missouri. Prior to eMINTS, Julie taught elementary grades in Missouri, Texas, and Colorado over a span of 17 years.

Dr. Kelly L. Jones

Kelly L. Jones is an instructional designer, researcher, and consultant with thirteen years' experience in higher education. She completed her Ph.D. in Curriculum and Instruction at Mercer University, and holds an M.Ed. in Educational Technology from Georgia College & State University and a B.S. in Communication and Information Technology from Middle Georgia State College. Kelly teaches courses in academic literacy, writing, and instructional design and technology. Her research interests include e-Learning, new media, new literacies, social learning, adult learning theory, and the digital extracurriculum.

Blended Classes: Expectations vs. Reality

Abstract

Blended courses, also called hybrid, have a portion of the course taught face-to-face in a classroom, and at least one-third of the course work is online. Some instructors consider this format to be “the best of both worlds.” Students receive the personal contact and interaction with the instructor during the classroom portion. They also have flexibility in the pace, access, and repetition of the online content. In this paper, we explore 49 graduate students’ expectations for a required operations management course that was delivered in a blended format. The same students were also surveyed at the completion of the course to determine how their expectations matched with their experiences in the course.

The majority of students had no prior experience with blended (77.6%) or online (55%) courses. The pre-survey showed students were hesitant or unsure about taking a blended course. At the end of the course, the post-survey included the statement “The online content motivated me to do more learning/studying than I would have done otherwise.” Most students “strongly agreed” (21%) or “agreed” (29%) with the statement and fewer “disagreed” (15%) or were “neutral” (35%). The vast majority of students (96%) felt that being able to work the online content at their own pace was beneficial. Only two students (4%) felt they were not able to learn material equally well in the online and traditional portions of the class. Most of the students (85%) expressed the desire to take another blended course based on their experience in this course.

Introduction and Literature Review

There has been an explosion in online courses, both not-for-credit and for-credit. The effectiveness of online courses and the best practice is still not fully understood². Lowenthal & Dunlap⁶ reported that “many students new to online learning report feeling alone and isolated.” Student attitudes towards online learning can be affected by technological issues including Internet speed and access issues¹. Jones & Phelps⁴ showed the level of instructor presence in online classes can significantly affect students’ opinions of an online class.

Early research³ showed most students would not consider taking a course that had a significant amount of web-based content in place of class meetings. Kinney, Liu, & Thornton⁵ summarized engineering students and faculty perceptions of online learning. They explored a variety of opinions of student and faculty members about online learning in general. This paper seeks to determine if there is difference in student perceptions of blended content before and after taking a blended course. Our goal is to explore whether there is a reluctance to take a blended course and to see if these student views change after taking such a course.

Blended Class and Research Design

Attitudes about the structure of the course and the flexibility of the blended model were assessed by pre- and post-surveys. The questions on the pre-survey were revised and repeated on the post-survey. Additional questions were added to evaluate the students' actual experiences. The learning management software (Blackboard) and video analytics (Kaltura – streaming video) were used to track when, how often, and how long students' accessed the educational material (required assignments, video of problem solutions, and bonus materials). The surveys were administered on the first day of class and after the final exam. The pre-survey was on paper and the post-survey was online; the students remained anonymous for both.

The students did not have a choice of class format. It was the first time the class was taught in a blended format and was the first semester in the MS program for all of the students. This limited their prior knowledge and expectations for the blended class structure. All of the other classes in the students' degree program were in a traditional face-to-face format.

The class used for this educational research project is a required course in operations management in the Engineering Management Master's Degree at Missouri University of Science and Technology (Missouri S&T). The class is typically taught multiple times a year, both face-to-face and live streaming over the Internet for distance students. The Engineering Management Master's Degree is a "broadening" degree. Students enter the program with a BS degree in almost any engineering and science focus imaginable. The students received their prior education either domestically or internationally. Some have just finished their BS degree and others have not taken a class in 20 plus years. This results in widely varied levels of preparation among the students and varied instructional needs. The required Master's course is typically taken in the student's first semester. It is often the most difficult course for the students due its quantitative nature. It is a challenging course for faculty due to the wide range of student ability and background. The class was redesigned from a traditional three-credit hour face-to-face format.

The new blended class provides a face-to-face introduction of each topic, combined with self-paced online practice giving each student an educational experience that better matches the students' needs. The new format replaces half the traditional classroom time with online content. There are multiple benefits to the new design. The university will benefit from having less required classroom time and space. The live-video classroom space for the distance students is expensive and a scarce resource that is difficult to schedule. More importantly, the students benefit having both live classroom interactions with the instructor and flexible online content. Students who are struggling in the class can watch numerical problems online being solved repeatedly with the opportunity to repeat or watch "extra" examples as needed. Students who are excelling in the class can watch the number of problems being solved that they need to master the concept and take advantage of as much "bonus" content as they desire – potentially reducing their level of boredom with the class. All of the students will benefit from the flexibility of the blended course structure.

The new design includes weekly modules covering one or two textbook chapters. The in-class portion continues to be a mixture of lectures and hands-on problem-solving. The out-of-class portion is a mixture of materials. Figure 1 is a screenshot of the first online module in Blackboard learning management software). Each module has:

- In-class content – This includes the PowerPoint slides and examples used in the classroom. Each module is introduced by the instructor and the textbook readings.
- Out-of-class content – This includes video clips generated by the instructor and from other sources focusing on problem solving. Students are encouraged to work interactively with the short videos. They are allowed to work at their own pace and repeat the material as needed.
- Bonus content – This is geared towards the students who are excelling and want more material. This is content that is not covered in a traditional class due to time constraints.
- Assignment – Reading assignments and homework problems continue to be assigned to students in the blended course, similar to what was done in the traditional course.
- Assessment – At the end of each module, students have a graded assessment activity. A multiple-choice quiz is provided and graded by Blackboard providing immediate feedback to the student on their understanding of the material.

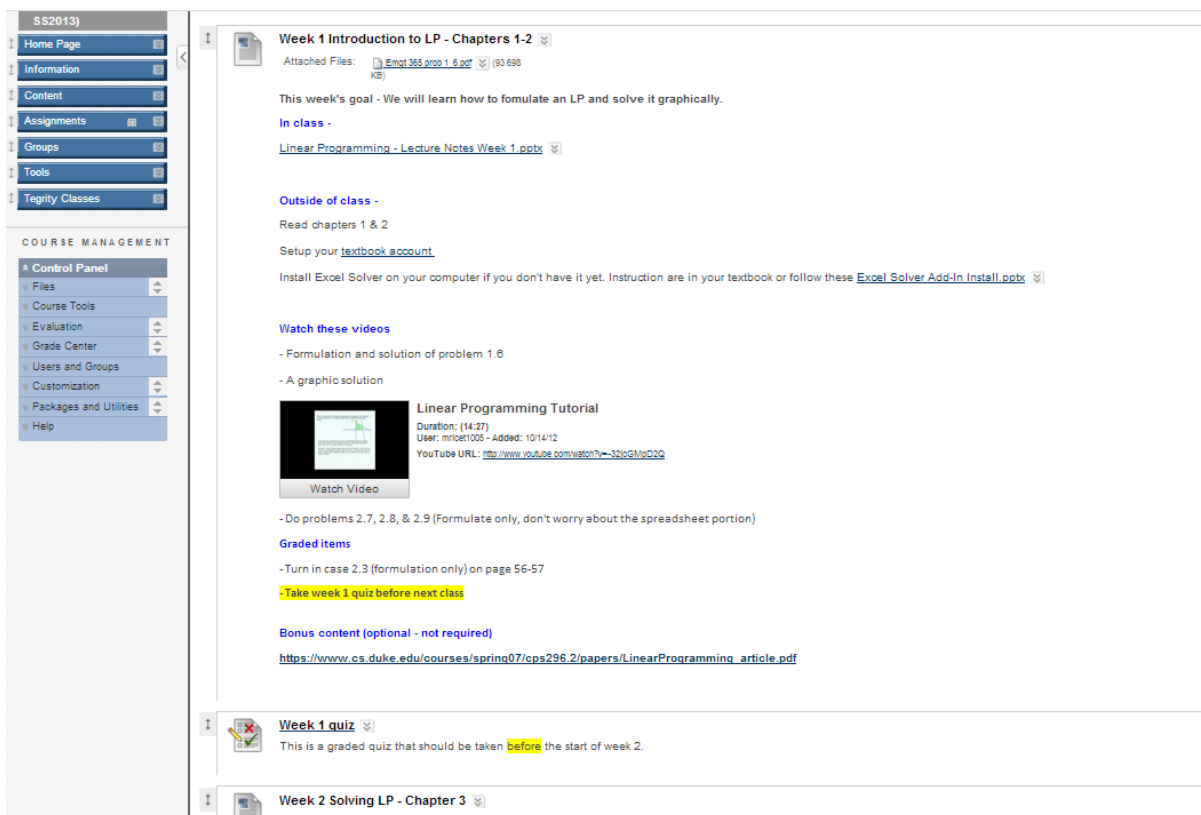


Figure 1 – Screenshot of Module 1

Research Methodology

The class enrollment was 49 graduate students. 100% participated in the survey and of that seven (14%) were female. They rated their level of computer expertise as *Novice* (6%), *Intermediate* (76%), and *Expert* (18%). 77% had not taken a blended class prior to this course. Their experience with online class varied: 0 (55%), 1 (6%), 2 (14%), 3(12%), 4 (8%), 5 or greater (4%). Based on previous coursework their self-perceived level of preparation varied: *Strongly Prepared* (8%), *Prepared* (20%), *Somewhat Prepared* (31%), *Unprepared* (39%), and *Strongly Unprepared* (2%).

Figure 2 summarizes the students' expectations of the blended course prior to taking the class. It shows a combination of uncertainty and reservation about participating in a blended course. These numbers indicate that as engineering educators, we need to educate students about blended courses and expect reservations among students in blended courses compared to those in traditional face-to-face courses. Figure 3 summarizes the students' experiences taking the blended course.

Opinion	1 – Strongly Agree	2 – Agree	3 – Unsure / Neutral	4 – Disagree	5 – Strongly Disagree
<i>A blended class will be beneficial</i>	0%	5%	26%	45%	24%
<i>A blended class will allow be to be successful</i>	0%	5%	52%	33%	10%
<i>I would prefer to take a traditional class instead of a blended one</i>	0%	5%	51%	34%	10%
<i>A blended and traditional course will be equally effective ways to learn</i>	2%	5%	57%	29%	7%

Figure 2 – Pre-Survey Student Opinions

Opinion	1 – Strongly Agree	2 – Agree	3 – Unsure / Neutral	4 – Disagree	5 – Strongly Disagree
<i>Being able to work through online material at my own pace was beneficial</i>	67%	29%	2%	2%	0%
<i>A blended class helped me to be <u>more</u> successful in learning course material</i>	48%	35%	15%	2%	0%
<i>The online content motivated me to learn/study <u>more than I</u> would have otherwise</i>	21%	29%	36%	15%	0%
<i>I would like to take another blended in the future</i>	65%	21%	20%	2%	2%
<i>I was able to learn through the online and classroom components equally well</i>	56%	31%	8%	4%	0%

Figure 3 – Post-Survey Student Opinions

Conclusions and Recommendations

The differences between the pre- and post-surveys are striking. The graduate students had uncertainty and reluctance to participate in a blended course. However, having experienced the benefits in flexibility and work pace, the vast majority of students stated positive views about the experience and the concept of blended education in general.

The course was repeated in the blended format in 2015. The students’ performance and grades were comparable to sections of the class taught face-to-face by the instructor previously. The instructor’s teaching evaluations were slightly higher for the blended class than prior evaluations.

For instructors and instructional designers developing a blended course, we would offer the following recommendations:

- Make the explicit, implicit – You will see the students less often. Deadlines, policies, and the like must be clear to the students as they work alone.
- Determine what material is best suited for in-class and out-of-class – A great deal of thought should be given to what material students will want and need personal interaction with the instructor. What material will students wish to see repeated (detailed problem solving, steps using computer software, etc.).
- Be very organized – The students need to clearly understand what they are expected to do outside of class.
- Be consistent – Where is material located? Is the offline content formatted consistently?
- Be aware of instructor presence – The instructional development literature on this is significant. Ensure the instructor is present in the offline content.
- Make the material easy to update – The first time a class is offered in the blended format, it will be very labor intensive. Minimize what needs to be changed when the class is offered repeatedly. Referring students to the schedule rather than giving specific dates or chapters can prevent the need to record a video again.

References

1. Alghazo, I. (2006). Students Attitudes toward Web-Enhanced Instruction in an Educational Technology Course. *College Student Journal*, 40, 3, (620-630).
2. Ally, M., (2008). "Foundations of Educational Theory for Online Learning". *The Theory and Practice of Online Learning*, 2nd Edition.
3. Angulo, A. & Bruce, M. (1999) "Student Perceptions of Supplemental Web-Based Instruction" 24, 2, 121-129.
4. Jones, K, & Phelps, J., (2014) "Powerful Instructor Presence via Video: Intros, Bios, and Digital Stories".
5. Kinney, L.; Liu, M. & Thornton, M. (2012) "Faculty and Student Perceptions of Online Learning in Engineering Education", ASEE 2012 Annual Conference.
6. Lowenthal, P. & Dunlap, J.C. (2010). From pixel on a screen to real person in your students' lives: Establishing social presence using digital storytelling. *The Internet and Higher Education*, (13), 70-72.