



Enjoyable Instructional Technology Can Enhance Learning

Dr. Terri M. Lynch-Caris, Kettering University

Terri Lynch-Caris, Ph.D., P.E., is an Associate Professor of Industrial Engineering (IE) and has a half-time appointment as the director of the Center for Excellence in Teaching and Learning (CETL) at Kettering University in Flint, Michigan. She earned her Ph.D. at the University of Michigan, holds an MS Degree from Purdue University and a BS from Kettering University, formerly GMI-Engineering & Management Institute. She serves on the Board of Directors of the ASEE Industrial Engineering Division.

Dr. Mark A. Palmer P.E., Kettering University

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Abstract

The Center for Excellence in Teaching and Learning surveyed a predominantly engineering campus on the many instructional technologies that exist for instruction. The purpose of the survey was to understand the types of instructional technologies that currently exist and identify the technological gaps for future purchases. Three categories of instructional technology were used to group the many technological tools that were found in various classrooms across the campus: (1) seating and room layout, (2) boards and projection and (3) computers and video capture. In addition to the survey data, comments were solicited and compiled for continuous improvement.

A total of 75 students, faculty and staff responded to the survey. Within the three categories of instructional technology, three survey questions were asked to determine: (1) which technologies were used, (2) which technologies did individuals enjoy and (3) which technologies did individuals feel would enhance learning?

There were several conclusions resulting from the data analysis including differences between faculty and student preferences. The most interesting result was the compelling relationship between enjoyment and learning that became evident in a simple scatter plot of the data. This relationship, while not surprising, may influence the types of instructional technologies for the modern classroom.

Background (Introduction)

During the Fall 2011 term, the Center for Excellence in Teaching and Learning (CETL) surveyed their campus community on the many technologies that exist across the campus. The small, private university educates primarily engineers, scientists, mathematicians and business majors, located in an urban Midwest setting.

The survey instrument was developed with input from the CETL Advisory Board and input from the facilities staff regarding the types of instructional technologies that currently exist across the campus. The technologies were categorized into three categories with four to seven specific types of technology included for each category:

- (1) Seating and Room Layout
 - a. Lecture style seating arrangement
 - b. Group tables arrangement
 - c. Pods or node chairs
 - d. Web-based learning – partial face-to-face
 - e. Web-based learning – completely online

- (2) Boards & Projection
 - a. Chalkboards

- b. White boards
- c. Computer projection w/ instructor notes
- d. Document Camera

(3) Video and Lecture Capture.

- a. Mobile computing: handhelds, Smartphones, tablet PCs, laptops, +
- b. Fixed Lab Computing
- c. Video capture of lectures – real time or immediate viewing
- d. Video capture of lectures – on demand or delayed viewing
- e. Software replacement for fundamental learning
- f. Classroom Response System: Clickers +

When discussing the technologies, the survey was intended to determine: (1) which technologies were used, (2) which technologies did individuals enjoy and (3) which technologies did individuals feel would enhance learning? Thus, the three categories of technologies were discussed with students, faculty and staff using three different scales - Use, Enjoy and Learn - each with a unique scale.

#1. How often have you used each of the following? (Use)

Scale:

Used consistently in multiple classes	Used consistently in one class	Used it on multiple occasions	Used once or twice	Never used it
A	B	C	D	E

#2. What is your opinion of each of the following? (Enjoy)

Scale:

Awesome- love it!	I really like it/this technology	No opinion	I don't particularly care for it/this technology	Terrible – I hate it!
A	B	C	D	E

#3. Does each of the following enhance learning? (Learn)

Scale:

Yes. This vastly improves learning	Yes, somewhat	No opinion	Not really	No. This actually detracts from learning
A	B	C	D	E

Two open forums were held with the purpose of explaining each of the specific technologies and where they exist across campus. Further, the open forums provided an opportunity to explain the survey and the intention of its use. A total of 75 students, faculty and staff responded to the survey. All of the respondents had attended the open forums.

The complete data set was analyzed by the university's Statistical Consulting Center and contained a thorough analysis including an analysis of those responses indicating "no opinion." In addition to the survey data, comments were solicited and compiled as part of the full report. Figure 1 shows the survey form.

Survey: Technology Needs in the Classroom

Instructions: Please place one "x" in each row for each of three questions to indicate the option that best describes your use/opinion. Thus, you will have three "x's" in each row when you are finished.

	Q 1: How often have you used each of the following? (Use)	Q 2: What is your opinion of each of the following? (Enjoy)	Q 3: Does each of the following enhance learning? (Learn)
I. Seating & Room Layout:	Used consistently in multiple classes	Awesome - I love it!	Yes, this vastly improves learning
a. Lecture style seating arrangement	Used consistently in one class	I really like it in this technology	Yes, somewhat
b. Group tables arrangement	Used it on multiple occasions	No opinion	No opinion
c. Pods or node chairs	Used it once or twice	I don't particularly care for it/in this technology	Not really
d. Web-based learning - partial face-to-face	Never used it	Terrible - I hate it!	No, this actually detracts from learning
e. Web-based learning - completely online			
II. Boards & Projection:			
a. Chalkboards			
b. White boards			
c. Computer projection with instructor notes (Tablet, smartboard, +)			
d. Document Camera			
III. Computers & Video Capture:			
a. Mobile computing: handhelds, smartphones, tablet PCs, laptops +			
b. Fixed Lab Computing			
c. Video capture of lectures - real time or immediate viewing			
d. Video capture of lectures - on demand or delayed viewing			
e. Software replacement for fundamental learning			
f. Classroom Response System: Clickers, text responses +			

Please circle your choice for the following:

Major Dept (Circle One): BUSN CHEM CS ECE IME LS MATH ME PHYS Other _____

Status (Circle One): Freshman Sophomore Junior Senior FACULTY STAFF

Forum Attended: Nov1 Nov8 None

Comments: (Use additional sheets as needed)

Figure 1. Instructional Technology Survey Form

Survey Data - Results

The matrix in Figure 2 shows the data summarized according to the percentage of respondents who use the technology (categories A – D of question #1), percentage of respondents who enjoy it (categories A and B of question #2) and percentage of respondents who think it enhances learning (categories A and B of question #3). Significant differences between use, enjoy, and learn are highlighted. It is also important to note differences between students and faculty. The classifications are intended to provide categories for general interpretation. The asterisk (*) indicates gaps in responses between students and faculty.

Survey Comments

A complete listing of all comments from students, faculty and staff was reviewed and shared with the campus. In an attempt to summarize and prioritize the comments for action, five categories were agreed upon (in no particular order) and a champion was assigned for follow-up:

- (1) Internet access signal speed, login time and reliability needs to be improved
- (2) Existing technology on campus should be effectively utilized
- (3) Facility changes can improve learning
- (4) Instructional design changes can improve learning
- (5) Communication of current events needs to be improved

Data Correlations

There is a great deal of information in this survey data and the CETL Advisory Board will utilize the data for decision-making. For example, Figure 3 shows an X-Y scatterplot of percentage of respondents who enjoy the various technologies (X) versus percentage of respondents who think they enhance learning (Y). The X and Y values were taken from the table in the Survey Data Results. The scatterplot shows a clear correlation between enjoyment and learning for both students and faculty. Please note that this scatterplot was not part of the Statistical Consulting Center Report. It is simply an interesting relationship.

While no causation is implied, it seems to show that faculty and students alike enjoy using technology if they are convinced that the use of that technology enhances learning. Or, perhaps, a technology that enhances learning is more enjoyable. Regardless of the cause and effect, the enjoyment of using technology increases with respect to learning enhancement. This should not be surprising and the data is very compelling. So, let's go have some fun!

	Student	Faculty	Student	Faculty	Student	Faculty	
	Use		Enjoy (X)		Learn (Y)		
I. Seating & room layout:							
a. Lecture style seating arrangement	98%	95%	60%	74%	77%	70%	
b. Group tables arrangement	89%	84%	70%	95%	85%	95%	
c. Pods or node chairs	39%	21%	26%	88%	28%	95%	*
d. Web-based learning – partial face-to-face	36%	39%	24%	100%	28%	100%	
e. Web-based learning – completely online	41%	44%	25%	82%	26%	94%	*
II. Boards & Projection:							
a. Chalkboards	93%	94%	40%	39%	56%	41%	
b. White boards	98%	100%	91%	85%	93%	79%	
c. Computer projection w/ instructor notes	85%	75%	66%	79%	66%	74%	
d. Document Camera	55%	47%	35%	56%	40%	53%	
III. Computers & video capture:							
a. Mobile computing: handhelds, Smartphones, tablet PCs, laptops, +	70%	35%	74%	47%	70%	53%	
b. Fixed Lab Computing	93%	95%	77%	68%	77%	84%	
c. Video capture of lectures – real time or immediate viewing	12%	11%	19%	22%	13%	33%	
d. Video capture of lectures – on demand or delayed viewing	37%	58%	34%	56%	35%	61%	
e. Software replacement for fundamental learning	63%	28%	39%	22%	45%	44%	
f. Classroom Response System: Clickers +	28%	37%	28%	58%	28%	63%	*

General Interpretation:

	These are the tried and true instructional technologies. Most students and faculty have used them, enjoyed them and feel that they enhance learning.
	These instructional technologies have the opportunity to enhance learning across many disciplines if applied properly. In general, they are believed to enhance learning but have not been widely used.
	These technologies are not broadly accepted as enhancing learning and should be used with care in unique applications.
*	The gap between student and faculty perceptions about the use of these technologies needs further investigation.

Figure 2. Matrix of Positive Responses by Technology

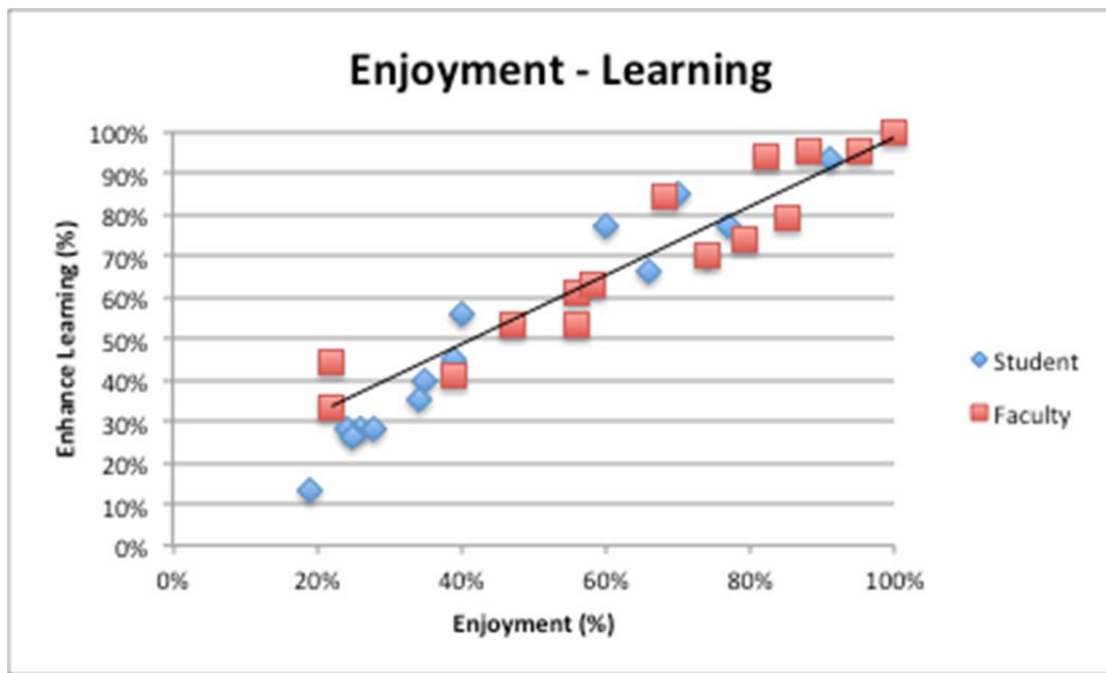


Figure 3. Scatterplot of Percentage of Respondents by Technology

Note: This is a preliminary assessment and technology needs will continue to be a focus of CETL and university decision-makers

Conclusions

This survey provides a glimpse into the complex decisions associated with instructional technology. The clear relationship between learning and enjoyment provides data evidence to an opinion that many educators know instinctively – students learn more when they are having fun. Another interpretation of the data may imply that educators bestow knowledge more effectively if they are having fun. In either case, enjoyable instructional technology can enhance learning.

Acknowledgements

This survey was the collective result of many individuals at the university. The CETL Advisory Board was instrumental in discussing the appropriate categories of technology and to identify those that exist across the campus. The survey was developed through many hours of deliberation. The Statistical Consulting Center within the university collected the survey responses and provided an in-depth analysis of the results.