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iCelebrate Teaching and Learning: Sharing the iPad Experience

Cathy Cavanaugh[1], Jace Hargis, Stephen Munns and Tayeb Kamali[2]

Abstract: The purpose of this overview article is to describe the initial development of iPad pedagogy by analyzing the pre-implementation pedagogical practices shared at a national professional development event for and by iPad faculty. The context, event, data, analysis and results are described, along with implications for the following stages of program implementation. Specifically, the study asks; To what extent do faculty shared practices display technological pedagogical content knowledge (TPCK) prior to implementation of the iPad program in classrooms? The answers to this question will inform further professional development and form a baseline for understanding the path of faculty development in adopting, designing, and applying mobile education practices in a large-scale mobile learning initiative, because TPCK is foundational to effective teaching in a mobile learning environment. The analysis of sessions shows that the initial level of integration of the mobile education innovations into the curriculum was limited, and may require more time and practice in order to move from an emphasis on tools to an emphasis on content. The Technological Knowledge reflected in the abstracts was similarly emerging in that it emphasized "turnkey" apps and media, rather than more complex collaborative and production tools. Pedagogical Knowledge as represented by attributes of meaningful learning was strong in active learning, but included fewer of the more complex and interactive attributes, indicating that faculty members are beginning their adoption of this innovation with familiar and simpler strategies. Regarding their technological pedagogical knowledge, faculty members have progressed beyond entry level and have room to grow toward infusion and transformation.

Keywords: Faculty development, mobile learning, pedagogy

I. Introduction.

In April 2012, the federal higher education system of the United Arab Emirates (UAE) embarked on the path to national adoption of the Apple iPad as the educational computing platform. The core objective of the adoption was improved learning and degree completion among students in academic programs in support of national development goals. From the National Higher Education development document, the goals are to:

- "Achieve individualized student learning consistent with "Post PC Era" trends;
- Introduce challenge-based learning or other progressive classroom pedagogy;
- Increased student participation and motivation;
- Enhance opportunities for cross-institutional collaboration between faculty members;
- Increase faculty collaboration through cross-institutional repositories of learning objects; and
- Facilitate the migration to e-books."

[1] Abu Dhabi Women's College, PO Box 41012, Abu Dhabi, United Arab Emirates, ccavanaugh@hct.ac.ae
[2] Higher Colleges of Technology, PO Box 5464, Abu Dhabi, United Arab Emirates

The UAE has three institutions encompassing 20 campuses serving 41,000 students in its federal higher education system: UAE University provides a research-intensive experience; Zayed University, is a comprehensive liberal arts environment; and the Higher Colleges of Technology (HCT), offers professional programs.

The federal iPad initiative, which will change how students are taught and learn, was the vision of His Excellency Sheikh Nahayan Mabarak Al Nahayan, Minister for Higher Education and Scientific Research, and Chancellor of the three institutions. H.E. Sheikh Nahayan issued the institutions with an innovative challenge and a vision to integrate the concept of mobile learning into the daily lives of those institutions' students and faculty. The institutions were mandated to implement the initiative by the start of the new academic year in September 2012. Dr Tayeb Kamali, HCT Vice Chancellor, was charged with leading the pan-institutional initiative and headed the project's steering committee. This program builds on his history of entrepreneurship and e-learning initiatives, such as integrated wireless campus infrastructures, online learning and knowledge-management programs.

The timeline for the adoption and implementation was ambitious and was undertaken in partnership between federal higher education and Apple leaders. The adoption and planning stage comprised the nine-week period before the summer break in the education calendar when the staff, curriculum, and campuses geared up for the program's launch upon the start of the 2012-2013 year scheduled for 9 September. For faculty, this 9-week period focused on preparing to meet the pedagogical goals of the UAE's iPad program: engaged, student-centered, progressive teaching. The purpose of this overview article is to describe the initial development of iPad pedagogy by analyzing the pre-implementation pedagogical practices shared at a national professional development event for and by iPad faculty. The context, event, data, analysis and results are described, along with implications for the following stages of program implementation. Specifically, the study asks:

To what extent do the faculty's shared practices display technological pedagogical content knowledge (TPCK) (Mishra & Koehler, 2006) prior to implementation of the iPad program in classrooms?

The answers to this question will inform further professional development and form a baseline for understanding the path of faculty development in adopting, designing, and applying mobile education practices in a large-scale mobile learning initiative, because TPK is foundational to effective teaching in a mobile learning environment.

In addition to the national development and planning activities, structured iPad training sessions and informal faculty sharing activities occurred at every institution. These activities addressed topics such as drivers and factors that are influencing the Post-Laptop Era; teaching and learning with the iPad; demonstrations of recommended apps for Foundation Math and English courses; and demonstrations of eBook creation using iBooks Author.

Guiding the faculty development efforts in iPad pedagogy were the Apple stages of technology adoption: Entry, Adoption, Adaptation, Infusion and Transformation. These stages are described as developmental, with greater change required and greater impact expected at higher levels (Apple Computer, 1995). For the new pedagogy to be appropriate and active in UAE courses, faculty need to Adopt and Adapt the technology as a teaching and learning tool in their practice. These changes depend on a sustained faculty development and access to devices, appropriate apps, and evaluation rubrics. For the iPads to be infused fully into higher education, support is needed for accompanying new paradigms of learning. Ultimately, the iPad and student-centered tool-based teaching and learning can transform the higher education student

learning experience, and post-graduate results in the UAE. Such transformation is about the people. Transforming a national higher education culture requires intense focus in order to capitalize and build on the richness of ideas and people to realize our vision of optimizing meaningful, relevant learning for all students. Apple's stages of technology adoption form an element of framework for the study's question.

A heuristic teaching approach aligns well with the iPad implementation because it is flexible, personalized, and student-centered. Heuristic serves to indicate or point out; stimulating interest as a means of furthering investigation. Heuristic in Greek means 'I find out'. In heuristic teaching, students drive learning as discoverers. The iPad can be their vehicle as they explore and propose responses to real-world course-contextualized challenges posed by faculty. In challenge-based learning (CBL), a difficult challenge is scaffolded by tasks that build upon each other. The challenge can be gamified so that students progress level by level as they accomplish each task. A proposed support for CBL is a project planning app that maps course objectives to tasks and suggested resources, formative assessments, collaboration tools, media creation tools, authentic portfolios, and other elements of the learning environment. In addition, a CBL design template is recommended based on Design Thinking practices to guide faculty in their course development. A heuristic teaching approach instantiated in design projects and challenge-based learning is a student-centered approach that is expected to be meaningful to students. Characteristics of the meaningful learning environment form an element of the framework for the study's question.

Attributes of a meaningful learning environment were selected to represent pedagogical knowledge because these attributes align well with the 2011-2013 UAE Government Strategy for a "first-rate education system" (UAE Cabinet, 2011) and with the Higher Colleges of Technology Graduate Learning Outcomes, as shown in Table 1.

Table 1. Alignment of meaningful learning with UAE education strategies and outcomes.

Meaningful learning environments	UAE first-rate education strategy	HCT graduate learning outcomes
Active	Self-education	Critical thinking
Authentic	Work values, Matching education with labor market requirements	Information literacy, Technological literacy
Collaborative	Sport and competitions	Communication, Global awareness and citizenship
Constructive	Readiness for higher education	Creative thinking
Goal-directed	Empirically-focused curriculum and teaching	Self-management and independent learning

The complete framework for examining the faculty initial status with regard to iPad pedagogy is shown in Table 2.

II. Literature Review.

Increasingly, students, employers, and community leaders expect colleges and universities to adopt technology tools in education. Education organizations respond in a variety of ways to change in technology, from avoiding it to embracing it. Adoption of technology-supported education innovations by an educator is an adaptation to changes in the conditions in which

students live, the conditions in which they will be expected to succeed beyond their education, and our knowledge about the nature of learning (Liu, Cavanaugh, & Ritzhaupt, in press). Mobile technology integration is an organizational shift and a form of innovation that involves openness and responsiveness to new learning environments. The quality of organizational change is a factor of an education organization's culture (Whetten & Cameron, 1994) and capacity for change facilitation (McDermott & Dell, 2001). In organizations where change facilitation is especially effective, leaders take explicit steps to enable the innovation to occur, playing an important role in the adoption of technology-supported education in learning environments (Hew & Brush, 2007). Such leadership influences the educational technology integration (Fox & Henri, 2005; Hew & Brush, 2007). An important step for leaders of educational technology change is professional development at the outset and continuing through the implementation of the innovation. Such organizational learning is facilitated by leaders who encourage creative ideas, nurture promising practices in their initial stages, provide resources needed to develop new ideas, encourage experimentation with new approaches, and use reflection to analyze new processes (Yukl, 2009).

Table 2. Criteria for analysis of faculty pedagogy.

TPCK Construct	Review Criteria	Supporting Literature
Content	Academic Content Area	
Technological Knowledge (TK)	Software and Digital Resources	Hogarty, Lang & Kromrey, 2003; Lowther, Ross & Morrison, 2001
Pedagogical Knowledge (PK)	Attributes of Meaningful Learning Environments	Jonassen, Howland, Moore & Marra, 2003
Technological Pedagogical Knowledge (TPK)	Level of Integration (ACOT Continuum)	Sanholtz, Ringstaff & Dwyer, (1997)

Past mobile education research has shown that teaching practices change with the infusion of technology resources, professional development, and support (Dawson, Cavanaugh, & Ritzhaupt, 2008). Mobile teaching practices fall within a continuum of technology integration strategies. In order for new approaches, tools, resources, and environments to transform pedagogy in ways that facilitate student-centered, engaged, meaningful learning, they must be adopted, adapted, and infused in practice by education institutions. The connection between professional development and effective use of classroom technology has been documented in large-scale studies (Ritzhaupt, Dawson, & Cavanaugh, 2012):

- A teacher's level of education and experience teaching with technology positively and significantly influence his/her use of technology;
- Teacher use of technology strongly and positively explains classroom technology integration; and
- How a teacher integrates technology explains how frequently students use technology in a school setting.

Team-oriented approaches to the professional development such as professional learning communities support changes in teaching practices including the use of technology (Seels, Campbell, & Talsma, 2003). The UAE's national approach to professional development for the

iPad program has been to bring campus-based teams of faculty and support staff together in face-to-face and virtual collaborative learning communities for activities that promoted mobile technology integration and developing technological-pedagogical skills.

In the UAE program, the iPad was adopted as the platform because it has been shown to facilitate the desired pedagogy and learning environments. Apple mobile devices have been on college campuses for almost a decade. The first mobile device, the iPod has been shown to engage students in active, inquiry-based learning, shown to be a critical element of sustained learning (Hargis, et al, 2008). One of the main advantages of using the iPad in the context of teaching and learning is its ease of use and relatively low background knowledge for operation. Yee and Hargis (2012) have shown that people display a wide range of assumptions about how intuitive technology has to be before it becomes a useful investment of time and mental energy. Teachers being able to quickly move past the technology and onto the pedagogy are an essential game-changer unseen in prior emerging technology. Mayberry and Hargis (2012) have determined that using a device such as the iPod Touch, faculty members can embed useful low threshold learning and engage in meaningful scholarship of teaching and learning. Effective meaningful teaching with mobile technology is underpinned by developing intersecting knowledge of teaching, the technology, and the content (TPCK). The following sections examine the level of TPCK detected in the teaching practices shared by faculty who facilitated sessions in the UAE's iCelebrate Teaching and Learning event during the planning stage of the iPad program.

III. iCelebrate Teaching and Learning.

The UAE's iPad program for higher education was steered by a committee of educators and leaders who guided the broad organizational adoption of mobile education innovations through a comprehensive program of professional development activities designed to scaffold technological pedagogical growth. One of these activities was a faculty members' sharing event that occurred 8 weeks into the program planning stages prior to the start of classes. This event, iCelebrate Teaching and Learning, was held at a central location in the country.

One of the largest higher education campuses in the UAE is the Abu Dhabi Women's College (ADWC), which employed educational technologists and educational researchers who had experience in leading large-scale education innovation initiatives. Soon after the iPad program was announced, the leaders of ADWC conceived of the national iCelebrate Teaching and Learning event as a culmination of the academic year and a venue for sharing what faculty have learned and planned for their teaching in the following fall, based on the understanding that peer interaction and collegial sharing can contribute in significant ways to learning new innovations and strategies (Nicolle & Lou, 2008).

> The call for proposals for iCelebrate can be found at www.adwc.hct.ac.ae/icelebrate.
>
> In order to further the instructional developments that have taken place over the last two months, this event will provide an occasion for teachers to share their experiences and ideas about using the iPad for teaching and learning. The day will offer concurrent sessions running from 9 am until 3 pm with lunch provided. There will also be an Idea Zone where participants can reflect, brainstorm, and continue conversations started during the sessions. You are requested to submit abstracts for 15 minute or 45 minute interactive conversations centered on the integration of the iPad into teaching and learning. Facilitators are encouraged to

> explore effective teaching approaches in ways that engage participants and give them many concrete ideas, which they can implement in their courses in September. Sessions should be created with the purpose of sharing ideas and experiences surrounding teaching and learning with the iPad. They may be for exploratory discussion and need not be fully formed. Please submit your bio of not more than 300 words, and short abstract(s) of not more than 500 words.

The event attracted 68 presenters who facilitated 51 sessions for 450 participants from all federal higher education institutions across the country. The section below describes the nature of the sessions, which represent faculty learning in the first month of the iPad program preparation period. The data for this study are the abstracts of the faculty sharing sessions, because the abstracts represent a broad sample of pedagogical practice.

VI. Descriptive Analysis of Session Abstracts.

Each presenter submitted an abstract session description, which served as the data set for the following analysis. The analysis entailed review of each abstract by a rater with experience in educational technology and one-to-one computing research. The analysis was conducted in four phases in order to characterize the sessions and to construct a baseline of faculty iPad pedagogy just prior to classroom implementation. The reviewer evaluated the lesson for evidence of technological pedagogical content knowledge (Mishra & Koehler, 2006). Data were exported into an Excel spreadsheet. We conducted descriptive statistical analysis, including frequencies. We calculated the number of content topics, the number of each level of technology integration, and the percentage of specific technologies used in the sessions.

Phases of abstract analysis:

1. Content
2. Technological Knowledge (TK)
3. Pedagogical Knowledge (PK)
4. Technological Pedagogical Knowledge (TPK)

A. Content.

Each abstract was open-coded to identify the academic Content area application of the session. The codes were categorized into logical categories reflective of the college curriculum. The list below shows the percentage of the sessions that were placed in each category.

Content categories:
16% English
12% Math
58% General
2% ICT
6% Faculty development
8% Instructional design

Faculty members were speaking to a broad and mixed audience of colleagues, which was reflected in the session topics. The majority of sessions had a general, cross-discipline application, while some focused specifically on Mathematic or English, those being the predominant teaching areas of participants in the iPad program. A few sessions addressed instructional design principles, faculty development approaches, and the ICT area.

B. Technological Knowledge (TK).

The broad realm of Technological Knowledge was represented by the types of apps and other digital resources used in the sessions (Hogarty, Lang, & Kromrey, 2003; Lowther & Ross, 2001). Each abstract was open-coded to identify the predominant technological emphasis of the session. The codes were categorized into logical categories. The list below shows the percentage of the sessions that were placed in each category.

Technology focus categories:
80% Apps
10% Media
10% Web resources
2% Collaboration, communication
6% Operating System
4% Productivity
2% Games

The vast majority of sessions focused on specific apps, while a small number addressed media and other web resources. Few sessions addressed the mobile operating system, general productivity tools, communication and collaboration, or games. Given the early stage of educational technology use for many faculty members and the very early point in the iPad program, this pragmatic approach is understandable. Using technology as a tool that aligns to specific course objectives is aligns with early stages of technology adoption, which are addressed in the third phase of this analysis. Using technology for higher cognitive level transactions like participation in social environments and games aligns with more advanced stages of adoption that may be seen more frequently as this program continues (Sandholtz, Ringstaff, & Dwyer, 1997).

C. Pedagogical Knowledge (PK).

PK was documented in the abstracts according to the attributes of meaningful learning environments – active, constructive, authentic and cooperative (Jonassen et. al., 2003). Each abstract was rated using a rubric with indicators of the meaningful learning environment.

The list below shows the percentage of the sessions that were placed in each category.
92% Active
36% Authentic
38% Constructive
14% Collaborative
14% Goal-directed

Because the ubiquitous iPad lends itself to active and engaged learning (Dale & Pymm, 2009; Martinez, 2011), most sessions showed characteristics of active learning, such as hands-on mathematics, note taking, media authoring, and using augmented reality. Between 35 and 38 sessions referred to authentic or constructive approaches such as creating professional presentations, participating in communities, developing portfolios, and designing e-books. Fourteen percent of sessions made reference to collaborative or goal-directed approaches like practice to reach specific language levels, using games to develop specific skills, and networking with social media. Higher education in the UAE stresses authentic, workforce-oriented course experiences and student-constructed projects, making those approaches more ingrained in teaching practice. However, collaborative learning approaches have been rarer in the entry-level courses targeted by the iPad program because of concerns about online communication and because of the traditional nature of secondary education.

D. Technological Pedagogical Knowledge.

We represented TPK using the five-level continuum for technology integration initially developed during the Apple Classrooms of Tomorrow (ACOT) study (Sandholtz, Ringstaff, & Dwyer, 1997): entry, adoption, adaptation, infusion and transformation. These levels represent a continuum of technology integration from entry level, which involves teachers using technology to present to students to adoption and adaptation levels which involve students using single technology tool (adoption) or choice of technology tools (adaptation) to create a digital product to infusion and transformation where the technology becomes an integral part of supporting student autonomy and learning (infusion) or becomes an essential tool in carrying out a lesson that would not be possible without its use (transformation). As shown below, more than 90% of the sessions were found on the first three levels of the ACOT continuum: entry, adoption, and adaptation

The list below shows the percentage of the sessions that were placed in each category.
2% Entry
52% Adoption
38% Adaptation
4% Infusion
2% Transformation

The Bridge/Foundations faculty members have an average six years' experience in the UAE and teaching experience is required to begin as a faculty member here. , Thus they are likely to have at least an entry level of technology experience. However, teaching with the iPad and its resources was very new to most, who received their iPads a few days or weeks prior to the iCelebrate event. The iPads were not distributed to students at that time, so very few had taught with an iPad. Therefore, it was laudable that only one of the sessions was limited to the Entry level of technology integration and 54% reached the Adoption level. Examples of adoption were identification of tools for mathematics and language skills, as well as tools for digitizing teaching materials.

Over one-third of sessions reached Adaptation level, judging by the sessions focused on new formats and sources for teaching materials such as news feeds, and tools that add capability to current teaching practice such as collaborative note taking and other forms of sharing and

feedback. Admirably, three sessions reached Infusion or Transformation levels, in which technology was used to significantly gamify a program and replace static media with student-created and social media. Future events and other classroom data collection are likely to reveal development of teaching practices at higher levels as the devices and resources are infused throughout each campus (Cavanaugh, Dawson, & Ritzhaupt, 2011; Ritzhaupt, Dawson, & Cavanaugh, 2012).

V. Discussion and Conclusions.

Given the short timeline between the decision to adopt iPads for the federal institutions in April 2012 and the iCelebrate event on 20 June, the willingness of faculty to commit to implementation was essential. At ADWC for instance, faculty were supported by a fast-track training program that combined input from professionals in educational technology with a heuristic approach in which they were encouraged to 'discover and share' learning opportunities in small and large-group sessions.

The data from iCelebrate suggests that faculty responded positively, with 56 presenters, 51 from HCT, including 33 from the host College, 4 from ZU and 1 from UAEU. In addition to the presenters, there were 284 attendees. As noted earlier, 80% of the technology focus was on apps. While the timeline and perhaps the level of faculty expertise made this a predictable outcome, faculty preparedness to engage with the iPad initiative remained an unknown prior to the iCelebrate event. The TPCK analysis of sessions facilitated by the faculty who had the confidence to submit an abstract shows that the initial level of integration of the mobile education innovations into the curriculum was limited, and may require more time and practice in order to move from an emphasis on tools to an emphasis on content. The Technological Knowledge reflected in the abstracts was similarly emerging in that it emphasized "turnkey" apps and media, rather than more complex collaborative and production tools. Pedagogical Knowledge as represented by attributes of meaningful learning was strong in active learning, but included fewer of the more complex and interactive attributes, indicating that faculty members are beginning their adoption of this innovation with familiar and simpler strategies. Regarding their technological pedagogical knowledge, faculty members have progressed beyond entry level and have room to grow toward infusion and transformation.

The effective integration of iPads into the federal institutions' educational programs, coupled with a sustainable development plan, requires not only recognition of faculty engagement as indicated by iCelebrate, but also a response. One task of managers and policy-makers will be to ensure that faculty engagement, professional development and the quality of course delivery are consistent and monitored not only in regard to the three institutions, but more significantly the twenty campuses that fall within their purview. One method for measuring the consistency of faculty engagement and the quality of teaching and learning would be to adopt the Substitution, Augmentation, Modification and Redefinition (SAMR) model (Puentedura, 2010), which would enable the categorization of teaching and learning at individual campuses and therefore record emergent trends at a local level.

The SAMR model reflects the transformative potential of teaching and learning, which is in turn a primary aim of iPadagogy. Strategically applying the SAMR model at a local level would provide a categorization measurement indicating the extent to which teaching and learning tasks are transformative, for example, and so map 'iPadagogy in practice'. It would also assist policy-makers in arriving at informed decisions in the ongoing process of improved education in

areas such as research, professional development, shared practice, comparative analysis, creativity and quality of educational delivery.

It seems reasonable to ask what 'iPadagogy in practice' will look like. Although currently in its nascent and quite possibly most dynamic stage of development, iPadagogy envisions the creation of eLearning Objects (eLO) that support Challenge-Based Learning (CBL) and Inquiry-Based Learning (IBL). This is aligned to a heuristic approach to teaching and learning, which is highly student-centered and asserts trial and error or rational decision making as underlying the cognitive action of discovery and problem solving. The educational affordances of the iPad and the predilection of iPadagogy for heuristics suggest that while there is a great deal of creative scope in the development of eLOs, iPadagogy is also based upon well-founded educational practice. In order to sustain iPadagogy, the UAE's higher education federal institutions will need to fully commit to its heuristic philosophy, not only in Foundations/Bridge programs but all programs and not only thorough eLOs, but also through the development of Challenge-Based eAssessment Objects (eAO). Successful implementation of iPadagogy will help ensure that the next iCelebrate event will focus less on Apps than eLOs and eAOs that generate Challenge-Based Learning opportunities through games and productivity-based activities.

While iPadagogy builds from the foundation of general educational technology and learning with mobile technology in particular, many differences distinguish today's learners, tools, and learning environments from those of previous decades. One difference is in the pace of development, introduction, and adoption of new learning resources. These conditions require amplification of the educators' and leaders' mindsets that value innovation (Reimers-Hild, 2009) and recognize that education must change because of technologies (Lankshear & Knobel, 2006). The iCelebrate event is a step in building communities based on these mindsets, and is a recommended approach for other large-scale, diverse mobile education initiatives.

References

Apple Computer, Inc. (1995). *Changing the conversation about teaching, learning, & technology: A report on 10 years of ACOT Research*. Cupertino, CA: Apple Computer, Inc.

Cavanaugh, C., Dawson, K., & Ritzhaupt, A. D. (2011). An evaluation of the conditions, processes and consequences of laptop computing in K-12 classrooms. *Journal of Educational Computing Research, 45*(3), 359-378. http://baywood.metapress.com/link.asp?id=g01m85m746u4r15q

Dale, C., & Pymm, J. (January, 2009). Podagogy. *Active Learning in Higher Education, 10*(1), 84-96. http://alh.sagepub.com/content/10/1/84.abstract?etoc

Dawson, K., Cavanaugh, C., & Ritzhaupt, A. (2008). Florida's Leveraging Laptops initiative and its impact on teaching practices. *Journal of Research on Technology in Education. 41*(2), 143-159.

Fox, R., & Henri, J. (2005). Understanding teacher mindsets: IT and change in Hong Kong schools. *Educational Technology & Society, 8*(2), 161–169.

Hargis, J., Jensen, S., Kohn, C., Normand, M., & Schooler, D. (2008). Providing faculty iPods to explore innovative teaching and learning. *Journal of Effective Teaching, 8* (2), 19-29. http://uncw.edu/cte/ET/articles/Vol8_2/Hargis.htm

Hew, K.F., & Brush, T. (2007). Integrating technology in k-12 teaching and learning: current knowledge gaps and recommendations for future research. *Education Technology Research & Development, 55*, 223-252.

Hogarty, K.Y., Lang, T.R., & Kromrey, J.D. (2003). Another look at technology use in classrooms: The development and validation of an instrument to measure teachers' perceptions. *Educational and Psychological Measurement, 63*(1), 139-162.

Jonassen, D., Howland J., Moore, J., & Marra, R. (2003). *Learning to Solve Problems with Technology: A Constructivist Perspective* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Lankshear, C., & Knobel, M. (2006). *New Literacies: Everyday Practices and Classroom Learning*. Maidenhead: Open University Press.

Liu, F., Cavanaugh, C., & Ritzhaupt, A.D. (In press). Leaders of school technology innovation: A confirmatory factor analysis of the Change Facilitator Style Questionnaire (CFSQ). *Journal of Educational Administration.*

Lowther, D.L., Ross, S.M., & Morrison, G.M. (2003). When each one has one: The influences on teaching strategies and student achievement of using laptops in the classroom. *Educational Technology Research and Development, 51*(3), 23-44.

Martinez, J.E. (2011). *A Performatory Approach to Teaching, Learning, and Technology.* Rotterdam: Sense. https://www.sensepublishers.com/files/9789460916663PR.pdf

Mayberry, J., Hargis, J., Meler, M., Boles, L., Dugas, A., O'Neill, D., & Rivera, A. (2012). New faculty explore teaching and learning in higher education using an iTouch. *Journal of Active Learning in Higher Education, 13* (3), 45-61.

McDermott, R., & O'Dell, C. (2001). Overcoming cultural barriers to sharing knowledge. *Journal of Knowledge Management, 5*(1) 76-85.

Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *The Teachers College Record, 108*(6), 1017-1054.

Nicolle, P., & Lou, Y. (January 2008). Technology adoption into teaching and learning by mainstream university faculty: A mixed methodology study revealing the how, when, why, and why not. *Journal of Educational Computing Research, 39* (3), 235-265. http://baywood.metapress.com/link.asp?id=3q8284r2227xq521

Project Tomorrow National Findings. (April 2011). The new 3 E's of education: enabled, engaged, empowered - how today's students are leveraging emerging technologies for learning. http://www.tomorrow.org/speakup/pdfs/SU10_3EofEducation(Students).pdf

Puentedura, R. (2010). SAMR and TPCK: intro to advanced practice. http://hippasus.com/resources/sweden2010/SAMR_TPCK_IntroToAdvancedPractice.pdf (accessed May 2012)

Reimers-Hild, C. I., & King, J.W. (2009). Six questions for entrepreneurial leadership and innovation in distance education. *Online Journal of Distance Learning Administration, 12*(4), http://www.westga.edu/~distance/ojdla/winter124/reimers-hild124.html

Ritzhaupt, A.D., Dawson, K., & Cavanaugh, C. (2012). An investigation of factors influencing student use of technology in K-12 classrooms using path analysis. *Journal of Educational Computing Research, 46*(3). http://baywood.metapress.com/link.asp?id=972t6qv475615511

Sandholtz, J., Ringstaff, C., & Dwyer, D.C. (1997). *Teaching with Technology: Creating Student Centered Classrooms*. New York, NY: Teachers College Press, Columbia University. http://store.tcpress.com/0807735868.shtml

Seels, B., Campbell, S., & Talsma, V. (2003). Supporting excellence in technology through communities of learners. *Educational Technology Research and Development, 51*(1), 91-104. http://www.springerlink.com/content/v442443417q1q098/

Whetten, D.A., & Cameron, K.S. (1994). Organizational effectiveness: Old models and new constructs. In J. Greenberg (Ed.), *Organizational Behavior: The State of the Science*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Yee, K., & Hargis, J. (February 2012). When I should (Not) use technology. *Journal of the National University of Singapore Teaching Academy (JNUSTA), 1*(2), 65-69. http://www.nus.edu.sg/teachingacademy/jnusta/v2n1/v2n1p65_YeeKevin.pdf

Yukl, G. (2009). Leading organizational learning: Reflections on theory and research. *The Leadership Quarterly, 20*, 49–53.

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Student Perceptions of Classroom Engagement and Learning using iPads

Timothy T. Diemer[1], Eugenia Fernandez[2], and Jefferson W. Streepey[3]

Abstract**:** *Many colleges and universities have launched iPad initiatives in an effort to enhance student learning. Despite their rapid adoption, the extent to which iPads increase student engagement and learning is not well understood. This paper reports on a multidisciplinary assessment of student perceptions of engagement and learning using iPads. Student reactions following single and multiple classroom activities using iPads were measured via a survey asking them to rate their learning and engagement using a 5-point Likert scale. Responses to the questions were grouped into thematic categories of Perceived Learning and Perceived Engagement. Students who reported a high level of engagement while using iPads reported a high level of learning as well. No effects due to age, gender, or language were found. Students who characterized themselves as comfortable with modes of e-learning reported significantly greater levels of perception of learning and engagement. Those who reported being comfortable were more likely to use iPads for learning and professional development in the future. Furthermore, a number of students who initially described themselves as somewhat uncomfortable with e-learning technology also reported interest in continuing to use iPads.*

Keywords: iPads, e-learning technology, learning and engagement, student perceptions

I. Introduction.

Within two days after their initial launch in April 2010, iPads were sold out or scarce at Apple stores worldwide. Before 60 days had passed, Apple had sold 2 million iPads (Kane, 2010). The *Wall Street Journal* (Sherr, 2011) reported in mid August 2011 that Apple had sold 28.7 million iPads since the April 2010 launch. Since then several colleges and universities, including Stanford, Notre Dame, and Pepperdine universities, Oberlin and Reed colleges (Fischman & Keller, 2011; Rice, 2011; Wieder, 2011) have launched iPad initiatives in an effort to enhance student learning. Despite the rapid adoption of iPads for educational and professional purposes, the extent to which this technology enhances student engagement and learning in the classroom is not well understood. However, when other instructional technology has been thoughtfully deployed in the classroom, studies (Chen, Lambert, & Guidry, 2010; Nelson Laird & Kuh, 2005) have found positive correlations between the use of educational technology and student

[1] Organizational Leadership & Supervision, Indiana University Purdue University Indianapolis, 799 W. Michigan St., Indianapolis, IN, 46202, tdiemer@iupui.edu
[2] Computer & Information Technology, Indiana University Purdue University Indianapolis, 799 W. Michigan St., Indianapolis, IN, 46202, efernand@iupui.edu
[3] Kinesiology, Indiana University Purdue University Indianapolis, 901 W. New York St., Indianapolis, IN, 46202, jwstreep@iupui.edu

engagement, notably in the form of active and collaborative learning and student-faculty interaction.

Assessments of student perceptions of learning and engagement have traditionally been used for gauging the success of new instructional technology (Alavi, 1994). Such assessments are especially practical when the breadth of the impact of novel technology spans multiple disciplines and no single tool can be used to directly measure learning outcomes. While it is generally believed that students would prefer classroom sessions that utilize iPads (Wieder, 2011), no studies to date have explored factors that may contribute to student perceptions of learning or engagement.

The IUPUI Center for Teaching and Learning along with its University Information Technology Services convened a faculty learning community to explore the benefits and problems associated with the introduction of iPads into the classroom. This learning community, comprised of faculty from multiple disciplines, was given access to 40 iPads to deploy in their classrooms in single or multiple sessions over the length of a 16-week semester. We expected that iPad activities would promote *active and collaborative learning*, a defining component of student engagement (Kuh, 2005) associated with positive learning outcomes (Harper & Quaye, 2009; Kinzie, 2010; Prince; 2004).

II. Background.

Prince (2004) defined *active learning* as activities introduced into classrooms and *collaborative learning* as students working together on an assigned task. Pike, Kuh, and McCormick (2008) described "active and collaborative learning" as activity that requires students "to work with other students to solve problems and master difficult material" (p. 7). The iPad features numerous physical characteristics (such as a large screen, motion sensors, and portability) and an expansive selection of inexpensive software that instructors can use to accommodate active and collaborative learning in the classroom. For example, by using the iPad's motion sensors students can push, pull, and lift their iPads to gain a better understanding of the physics of movement; or by using collaborative software students can make concept maps that appear on multiple iPad screens so that each collaborator can contribute to the design of the map. The present study examines student response to the use of iPads as the catalyst for active and collaborative learning.

Prince (2004) summarized research on student engagement and described near consensus that student engagement is associated with positive learning outcomes. Prince further cited several meta-studies to show that collaborative-learning activities, compared to individual assignments, improved academic performance. Kinzie (2010) also explained that student engagement, as defined and measured by National Survey of Student Engagment, is associated with a wide array of desired outcomes. Kinzie further described the link between student engagement and academic success:

> A substantial body of research indicates that once students start college or university a key factor as to whether they will survive and thrive is the extent to which they take part in educationally purposeful activities…Quite simply, to ensure that all students graduate and make the most of their undergraduate education, universities must first ensure the learning environment provides rich and educationally meaningful opportunities and then focus squarely on increasing student engagement (p. 140).

Carini, Kuh, and Klein (2006) described general agreement that student engagement is associated with improved learning. Harper and Quaye (2009) suggested a connection between student engagement and academic success, explaining that students who are actively engaged in educationally purposeful activities inside and outside the classroom show higher retention rates and higher graduation rates. Aston (as cited in Axelson & Flick, 2011) further suggested a direct connection between the amount of engagement and the amount of learning. Kuh (2005) described the benefits of collaborative learning: "... when students collaborate with others in solving problems or mastering difficult material, they acquire valuable skills that prepare them to deal with the messy, unscripted problems that they will encounter daily during and after college" (p. 193).

The purpose of this study is to explore student experiences with iPads to determine their perceptions of learning and engagement and to describe factors that may shape student attitudes towards the use of iPad in the classroom. For this study, a multidisciplinary assessment of student perceptions was conducted following single and multiple activities using iPad. Specifically, the authors examined how factors, such as age, gender, ownership, and overall acceptance of instructional technology among others, impacted student perceptions of learning and their engagement in active and collaborative learning during iPad-centered activities.

III. Methodology.

A. Subjects.

IUPUI is an urban institution with an annual enrollment of approximately 30,000 undergraduate, graduate, and professional students seeking degrees from Indiana University and Purdue University programs. In total, 209 undergraduate students from several degree programs participated in the study by enrolling in a course for which iPads had been selected for deployment (see Table 1). Course selection was determined by the Center for Teaching and Learning and University Information Technology Services from proposals written by the course instructors detailing how iPads could help achieve course outcomes. All data collection and analysis procedures were performed in accordance with the university Institutional Review Board.

B. iPad Activities.

Prior to an iPad activity, class instructors requested specific apps to be installed on the iPads. These iPads were picked up by the instructor and brought to the classroom. At the beginning of each activity, each student was issued an iPad to use for the class period. If required, the students were given instruction for connecting the iPad to the Internet and setting up email. The class was then given an activity that was intended to promote engagement through active and collaborative learning. Activities included the use of collaborative concept mapping, brainstorming, graphing apps using the built-in accelerometer, ear training apps, and mobile access to library resources. Using the iPads, the students were free to move about the room and/or pass the iPads around to view each other's work. Following the activity, the students submitted their work to the instructor through email or a file-sharing application such as Dropbox. The iPads were then collected by the instructor and returned to the administrator who reset the iPads to remove all student work and login information and prepared the iPads for use in the next class. Over the

course of the semester, students used the iPads from 1- 7 times depending on the class in which they were enrolled (see Table 1).

C. Assessment.

At the end of the semester or, in the case of the Library class, at the end of a single session, the students were given a survey asking them to rate their perceptions of learning and engagement through ten questions using a 5-point Likert scale with possible responses ranging from *strongly agree* to *strongly disagree* (see Table 2).

Table 1. Courses & iPad activities used in the study.

Department	Course(s)	iPad Activities	Number of Activities Per Course
Tourism, Convention, and Event Management	Global Tourism Seminar; Mechanics of Meeting Planning	Evaluation of tourism applications; view virtual venue tours, select meeting sites, design meeting rooms, plan menus, and create staffing grids.	3
Organizational Leadership and Supervision	Leadership for a Global Workforce	Creating and accessing open source learning modules.	1
Music	Musicianship 2; Musicianship 4	Train musicians to measure intervals and hear the differences between two notes sounding together or in part.	3
Communication Studies	Introduction to Communication Theory	Demonstrate connections between communication theory and real-life scenarios with mapping applications; exploration of news apps and websites.	7
English	Communication Skills for International Teaching Assistants; English for Academic Purposes	Help international students improve English competency through active learning	2 and 4, respectively
Physical Education	Biomechanics	Measure human movement using the iPads' native accelerometers and video analysis apps.	7
Library	Computer Methods for Journalism	Improve academic honesty by teaching when and how to cite another's work.	1

In addition, all students were asked to answer questions about their age and gender as well as questions about their level of comfort with technology (*pre-comfort*), their future use of mobile devices (*post-use*), their attitude toward e-learning (*e-learning*), and their current ownership of mobile technology (*ownership*, see Table 3).

Table 2. Survey questions provided to the students.

Questions about Students' Perceptions of Learning
The iPad activity helped me apply course content to solve problems.
The iPad activity helped me learn the course content.
The iPad activity helped me connect ideas in new ways.
The iPad activity helped me participate in the course activity in ways that enhanced my learning.
The iPad activity helped me develop confidence in the subject area.
The iPad activity helped me develop skills that apply to my academic career and/or professional life.
Questions about Students' Perceptions of Engagement
The iPad activities motivated me to learn the course material more than class activities that did not use the iPad.
I participated more in class during the iPad activities than during activities that did not use the iPad.
My attention to the task(s) was greater using the iPad.
It was easier to work in a group using the iPad than in other group activities.

D. Analysis.

Survey responses were manually scored (strongly agree = 5, agree =4, neutral =3, disagree = 2, strongly disagree = 1) and entered into an Excel spreadsheet. Responses to the questions were then grouped into thematic categories of *perceived learning* and *perceived engagement* (see Table 2) and were averaged to create *perceived learning* and *perceived engagement* variables. Any case with a missing value for any question was not included in the average calculation. A Pearson correlation coefficient was then calculated for the relationship between participants' reported levels of engagement and reported levels of learning using iPads.

Two of the courses included in the study were for students for whom English is not a first language. For analysis purposes, we created two groups: one with responses from these two courses and another with all other courses. This was done to allow comparisons between exclusively non-native English speakers and primarily native English speakers. A 2 x 2 x 2 (Age x Gender x Language) between-subjects factorial ANOVA was used to compare *perceived learning* and *perceived engagement* among the three factors.

To test whether using iPads in the classroom affected students' likelihood of using iPads in the future for e-learning or professional development, a chi-square test of independence was conducted comparing *pre-comfort* to *post-use* likelihood. To meet the minimum expected cell count requirement, the pre-comfort 'Not at all comfortable' and 'Not very comfortable' responses were combined into 'Not Comfortable'. On the post-use variable, the responses for 'Not Likely', 'Somewhat Likely' and 'Unsure' were combined into 'Not or Low Likely'.

To test the relationship between students' e-learning preference and their perceived learning and perceived engagement, Spearman rank correlations were used. For this test, subjects with missing or "No preference" responses were dropped from the analysis, leaving only subjects whose preference for e-learning technology ranged from "little or no use" to "moderate amount" to "extensive use." A one-way ANOVA with Bonferoni post-hoc t-tests was used to examine whether those who had "no preference" for e-learning technology differed from the groups.

To test whether the frequency of iPad usage affected student reporting of learning and engagement, one-way ANOVAs were computed comparing perceived learning and perceived engagement to number of iPad activities used.

Table 3. Survey of student attitudes toward mobile technology and e-learning.

Question	Possible Response
Before using iPads in this class, what was your comfort level using handheld mobile computing devices? *(pre-comfort***)**	[ ] Not at all comfortable [ ] Not very comfortable [ ] Fairly comfortable [ ] Very comfortable
After using iPads in this class, how likely are you to use a handheld mobile computing device for e-learning or professional development? (*post-use***)**	[ ] Not likely [ ] Somewhat likely [ ] Unsure [ ] Likely [ ] Extremely likely
Considering face-to-face classes that use e-learning technology [such as handheld devices, online research guides, Oncourse, or other course management systems] in the classroom which of the following best fits your preference? (e-*learning***)**	[ ] Classes that make little or no use of e-learning technology. [ ] Classes that use a moderate amount of e-learning technology. [ ] Classes that make extensive use of e-learning technology. [ ] No preference.
Do you own a handheld mobile computing device that is capable of accessing the Internet (whether or not you use that capability)? Examples include iPhone, BlackBerry, other Internet-capable cell phone, iPod touch, PDA, iPad, Kindle, etc. (o*wnership***)**	[ ] No, and I don't plan to purchase one in the next 12 months. [ ] No, and I plan to purchase one in the next 12 months. [ ] Yes. [ ] Don't know

IV. Results.

Surveys were collected from 209 students in nine undergraduate courses. Table 4 shows the distribution by course. Of the 209 students, 91 were female (43.5%), 107 male (51.2%) with 11 (5.3%) declining to answer. The vast majority (82.8%) of the students were aged 19-28 with 26 (12.4%) aged 29-44 and 10 (4.8%) declining to answer. Most students (73.7%) owned a mobile device with Internet access; 9.6% planned to purchase one within 12 months; 9.1% did not own one and had no plans to purchase one; and 7.7% either did not know or did not answer.

Table 4. Number of students by course.

Course	Frequency	Percent
Intro to Communication Theory	36	17.2
English for Academic Purposes	55	26.3
Communication Skills for International Teaching Assistants	18	8.6
Biomechanics	32	15.3
Computer Methods of Journalism	23	11.0
Musicianship 2	9	4.3
Musicianship 4	11	5.3
Leadership for a Global Workforce	10	4.8
Global Tourism Seminar: Mechanics of Meeting Planning	15	7.2
Total	209	100.0

A large number of students (83.7%) reported high comfort levels with using handheld mobile computing devices prior to using iPads in the classroom. A large percentage (85.1%) of students also reported a preference for moderate or extensive use of e-learning technology in the classroom. Tables 5 and 6 provide further details.

Table 5. Student comfort levels with handheld devices.

Response	Frequency	Percent	Cumulative Percent
Very comfortable	103	49.3	49.3
Fairly comfortable	72	34.4	83.7
Not very comfortable	25	12.0	95.7
Not at all comfortable	5	2.4	98.1
Missing	4	1.9	100.0
Total	209	100.0	

Table 6. Student preferences for e-learning technology.

Response	Frequency	Percent	Cumulative Percent
Extensive use	63	30.1	30.1
Moderate amount	115	55.0	85.1
Little or no use	7	3.3	88.4
No preference	18	8.6	97.0
Missing	6	2.9	100.00
Total	209	100.0	

Students, on average, reported high levels of perceived learning and moderate levels of perceived engagement (see Table 7).

Table 7. Descriptive statistics for perceived learning and perceived engagement.

Variable	N	Min	Max	Mean	Std. Error	Std. Deviation
Perceived Learning	192	1.67	5.00	4.13	.049	.683
Perceived Engagement	206	1.00	5.00	3.65	.063	.904

A moderate positive correlation was found between reported levels of engagement and reported levels of learning using iPads ($r(192) = .684$, $p < .001$; Figure 2). Students who reported a high level of engagement while using iPads reported a high level of learning as well.

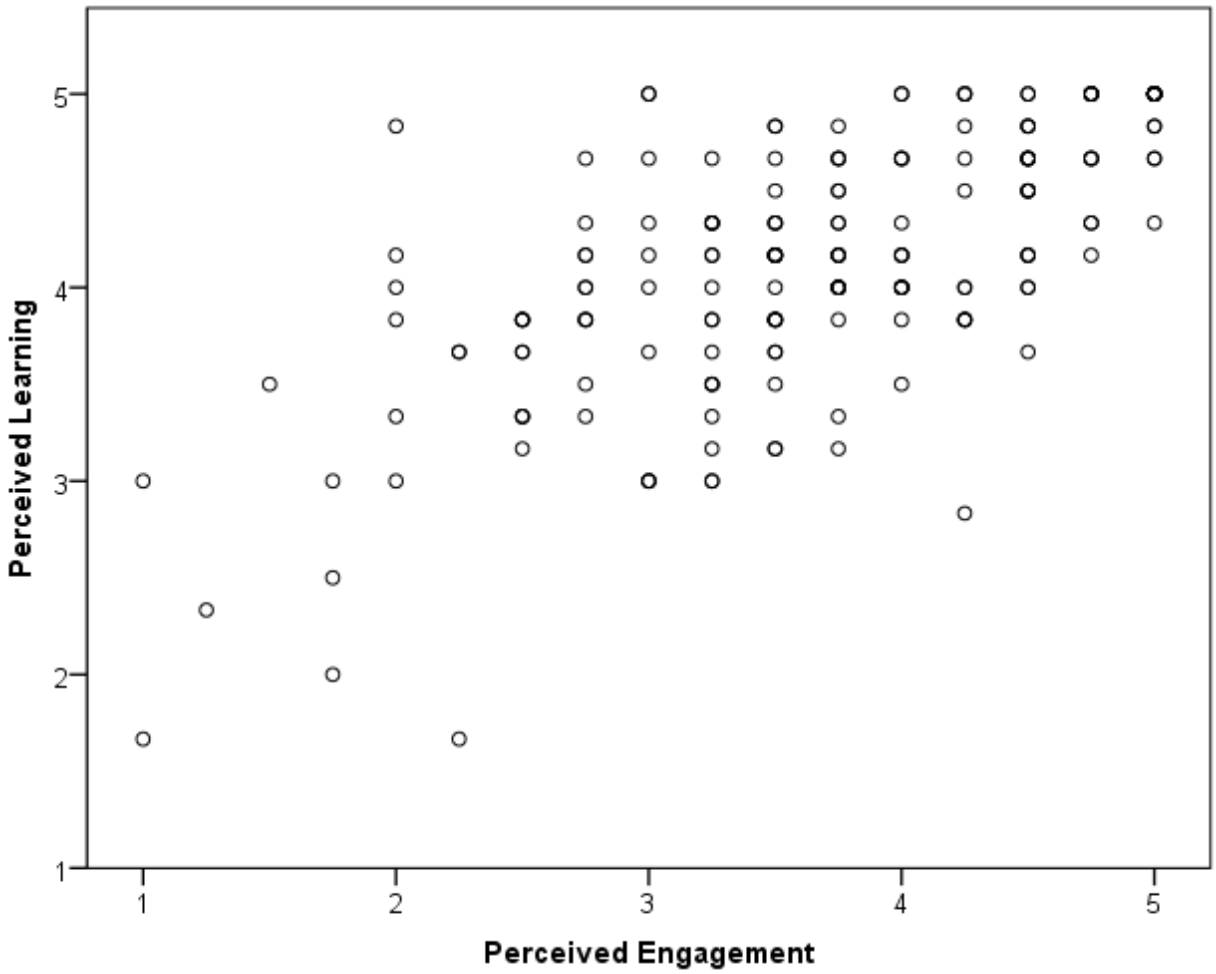

Figure 2. Relationship between perceived learning and perceived engagement.

A 2 (age range) x 2 (gender) x 2 (language) between-subjects factorial ANOVA was used to compare perceived learning and perceived engagement among the three factors. No main effects or interaction effects were significant ($p > .05$). None of age, gender, or use of English as a foreign language had a significant effect on self-reported learning or engagement.

A chi-square test of independence found that post-use likelihood was dependent on pre-comfort level ($\chi 2(4) = 12.50$, $p < .05$; Table 8). Note that approximately 2/3 of the students who

reported *Not Comfortable* before using iPads reported post-comfort levels of *Likely* and *Extremely Likely*.

Table 8. Cross tab of pre-comfort and post use levels.

	Post Use Level			
Pre-Comfort Level	Not or Low Likely	Likely	Extremely Likely	Total
Not comfortable	9	13	8	30
Fairly Comfortable	22	31	19	72
Very Comfortable	14	40	48	102
Total	45	84	75	204

Spearman rank correlations found a positive relationship between students' e-learning preference and their perceived learning ($\rho(170) = 0.30$, $p < 0.0001$) and perceived engagement ($\rho\ (180) = 0.32$, $p < 0.0001$). Students who preferred extensive use of e-learning technology also reported more perceived learning and engagement. For those students with no e-learning preference, significant main effects for e-learning on perceived learning ($F(3,182) = 6.87$, $p = 0.0002$) and perceived engagement ($F(3,195) = 6.21$, $p = 0.0005$) did not lead to discovery of significant differences between the "no preference" group and the groups who expressed the extent of their preference for e-learning.

One-way ANOVAs comparing perceived learning and perceived engagement to number of iPad activities found significance differences for perceived learning ($F(4,187) = 2.85$, $p < .05$). Tukey's HSD was used to determine the nature of the differences. Students who used iPads 7 times reported higher levels of learning ($m = 4.26$, $sd = .563$) than those who used iPads just once ($m = 3.86$, $sd = .776$).

V. Discussion.

As the Apple iPad becomes increasingly common on college campuses (Fischman & Keller, 2011; Rice, 2011; Wieder, 2011), exploration of its impact on instruction and learning is just being established. Writing about iPads for the *Chronicle of Higher Education*, Rice (2011) reported preliminary findings from several universities.

> The most noticeable difference was how students in the iPad classes moved around the classroom more and seemed to be more engaged in the material... iPads increase engagement and collaboration, acting as a facilitator for more easily sharing information. (para. 3-4).

Wieder (2011) pointed to early analyses showing that iPads promote active learning, collaboration, and student engagement. Wieder quoted a Pepperdine University administrator who reported that

> Students using iPads for group assignments in a math class were more in sync than were students in a section not using iPads. The iPad-equipped students worked at the same pace as one another and shared their screens to help one another solve tough problems. (p. A22).

The present study provides a measure of student perceptions of learning and engagement and describes factors that may affect those perceptions. The study involved iPad-centered

activities, conducted among multiple academic disciplines, during single or multiple classroom sessions, and a subsequent assessment of student perceptions of learning and engagement. Age, gender, and language did not affect students' perceptions of learning and their engagement in the form of active and collaborative learning. However, students who characterized themselves as comfortable with modes of e-learning reported significantly greater levels of perception of learning and engagement. Those who reported being comfortable with mobile technology prior to the iPad activities were also more likely to use iPads for learning and professional development in the future. Furthermore, a number of students who initially described themselves as somewhat uncomfortable with e-learning technology also reported interest in continuing to use iPad in coming semesters.

Parker, Bianchi, and Cheah (2008) explained that a link between use of instructional technology and increased student engagement is strongly supported in the literature. Noting a lack of evidence that the increased student engagement resulted in higher grades or higher exam scores, the authors reasoned that the clearest benefit of instructional technology may be its ability to promote collaboration. As noted earlier, Kuh (2005) is among those who asserted that collaborative learning helps students to develop valuable skills that have long-term benefit.

Mobile devices such as the iPad hold the potential to promote student engagement in the form of active and collaborative learning. Positive learning outcomes are likely to accompany use of iPads within university classrooms if the device effectively increases the level of student engagement. Though the classroom use of the iPad in the present study varied across disciplines and by instructor, students reported not only a perception of increased engagement (active and collaborative learning), but also a positive effect on their learning. However, evidence of increased learning through exams or course grades is beyond the scope of the present study.

Age, gender, and the use of English as a first language had little influence on students' perceptions of learning and engagement. This comes as no surprise. Research does not support a stereotype that older students are more resistant to instructional technology or that they are relatively novice in computer use compared to what Prensky (2001) called *digital natives*. Data from the Pew Internet Research Project (Jones & Fox, 2009) show no dramatic difference in Internet use between users in their 20s compared to older generations. Rizzuto and Mohammed (as cited in Githens, 2007) found that older employees in an industrial setting were in fact more willing to adapt to instructional technology for training programs than were younger employees.

Like age, gender also had no impact on perceived outcomes. Research in this area has primarily focused on studying gender in online courses with mixed results. Yukselturk and Bulut (2009) reported no gender difference in learning in an online computer programming course. On the other hand, in Chyung's (2007) study of graduate students in an instructional technology course, female students scored significantly higher on the final exam than did male students. In a study involving 12 online graduate education courses, Rovai and Baker (2005) found women reported learning more than their male peers. Parker, Bianchi, and Cheah (2008) showed that female students were more favorable toward instructional technology than were male students. Results were mixed in the one study we found that did look at mobile learning (Wang, Wu, & Wang, 2009). No gender difference was found for performance expectancy (finding mobile learning useful) but the effect of social influence on the intention to use mobile learning (*post-use*) was significant for men, but insignificant for women. Obviously, more work is needed in this area.

Research on resistance to e-learning provides some insight into how university students might receive the iPad as another component of e-learning technology (Annansingh & Bright,

2010; Thompson & Lynch, 2003). Students in the present study who were comfortable with e-learning and mobile technologies reported more learning and a greater likelihood to use iPads as instructional technology in the future. Research had shown that students who, in contrast, perceived themselves as inadequate or who reported low self-efficacy were generally reluctant to embrace technology in the classroom (Annansingh & Bright, 2010; Thompson & Lynch, 2003). The current study showed that it was possible, however, to overcome this resistance through repeated exposure to the iPad. Students in the present study reported higher levels of learning when given iPad activities multiple times over the semester. Tallent-Runnels et al. (2006) explained that a student's perception of self efficacy when faced with new instructional technology is a function of previous experience. The greater a student's experience with instructional technology, the more likely he or she is to accept new applications. Though the iPad is billed as an easy-to-use technology, students with poor attitude toward e-learning and instructional technology would likely benefit from multiple exposures to improve their self-efficacy and heighten their perceptions of learning and engagement.

The present study is an initial attempt to describe factors influencing the positive impact of iPad activities on perceptions of student learning and engagement. Though we believe that the iPad is generally effective in promoting active and collaborative learning, we did not assess the learning styles of our students prior to this analysis. In future studies, learning styles should be measured and the students should be asked directed questions about whether the iPad satisfied their ability to learn using different sensory modalities (visual, aural, kinesthetic). Furthermore, while measures of student perceptions are generally indicative of positive student success, we did not directly measure discipline-specific student learning. Future quantification of objective, discipline-specific student learning outcomes could further justify the use of the iPad in the classroom.

By design, the study was not narrowly focused on repetition of the same activity in multiple sections of the same academic course. Instead, the study focused widely among a range of academic disciplines, and each instructor used different iPad software. A controlled study with a single repeating iPad activity across several sections of the same course would provide a different perspective on the effect of iPad on engagement and learning.

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References

Alavi, M. (1994). Computer-mediated collaborative learning: An empirical evaluation. *MIS Quarterly*, *18*, 159-174.

Annansingh, F., & Bright, A. (2010). Exploring barriers to effective E-learning: Case study of DNPA. *Interactive Technology and Smart Education, 7*, 55-65. doi:10.1108/17415651011031653

Axelson, R.D., & Flick, A. (2011). Defining student engagement. *Change: The Magazine of Higher Learning*, *43*, 38-43.

Carini, R.M., Kuh, J.D., & Klein, S.P. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education, 47*(1), 1-32. doi:10.1007/s11162-005-8150-9

Chen, P.S.D., Lambert, A.D., & Guidry, K.R. (2010). Engaging online learners: The impact of Web-based technology on college student engagement. *Computers & Education, 54*(4), 1222-1232.

Chyung, S.Y. (2007). Age and gender differences in online behavior, self-efficacy and academic performance. *Quarterly Review of Distance Education, 8* (3), 213-222.

Fischman, J., & Keller, J. (2011). College tech goes mobile. *The Chronicle of Higher Education, 58*, 50.

Githens, R.P. (2007). Older adults and e-learning: Opportunities and barriers. *Quarterly Review of Distance Education, 8*(4), 329-338.

Harper, S. R., & Quaye, S. J. (2009*). Student Engagement in Higher Education: Theoretical Perspectives and Practical Approaches for Diverse Populations*. New York: Routledge.

Jones, S., & Fox, S. (2009). Generations online in 2009. *Pew Internet Research Project*. Retreived from http://www.pewinternet.org/Reports/ 2009/Generations-Online-in-2009.aspx

Kane, Y. (2010, June 1). Apple s iPad sales pass two-million mark. *Wall Street Journal - Eastern Edition*, p. B7.

Kinzie, J. (2010). Student engagement and learning: Experiences that matter. In *Taking Stock: Research on Teaching and Learning in Higher Education* (139-153). J. Christensen Hughes & J. Mighty (Eds.), Kingston, Canada: School of Policy Studies, Queens University at Kingston.

Kuh, G.K. (2005). *Student success in college: Creating conditions that matter.* San Francisco: Jossey-Bass.

Nelson Laird, T.F., & Kuh, G.D. (2005). Student experiences with information technology and their relationship to other aspects of student engagement. *Research in Higher Education, 46*(2), 211-233.

Parker, R.E., Bianchi, A., & Cheah, T. (2008). Perceptions of instructional technology: Factors of influence and anticipated consequences. *Educational Technology & Society*, *11*(2), 274-293.

Pike. G.R., Kuh, G.D., & McCormick, A.C. (2008, November). Learning community participation and educational outcomes: Direct, indirect, and contingent relationships. Paper presented at the annual meeting of the Association for the Study of Higher Education. Jacksonville, FL.

Prensky, M. (2001). Digital natives, digital immigrants. *Marcprensky.com*. Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education, 93*(3), 223-231.

Rice, A. (2011, October 18). Colleges take varied approaches to iPad experiments, with mixed results. *The Chronicle of Higher Education*. Retrieved from http://chronicle.com/blogs/wiredcampus/colleges-take-varied-approaches-to-ipad-experiments-with-mixed-results/33749

Rovai, A.P., & Baker, J.D. (2005). Gender differences in online learning: Sense of community, perceived learning, and interpersonal interactions. *Quarterly Review of Distance Education*, *6*, 31-44.

Sherr, I. (2011, August 12). Tablet war is an Apple route. *Wall Street Journal - Eastern Edition*, p. B1-B2.

Tallent-Runnels, M.K., Thomas, J.A., Lan, W.Y., Cooper, S., Ahern, T.C., Shaw, S.M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76*, 93-135.

Thompson, L.F., & Lynch, B.J. (2003). Web-based instruction: Who is inclined to resist it and why? *Journal of Educational Computing Research, 29*(3), 375-385.

Wang, Y.S., Wu, M.C., & Wang, H.Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology, 4*(1), 92–118. doi:10.1111/j.1467-8535.2007.00809.x

Wieder, B. (2011). iPads could hinder teaching, professors say. *Chronicle of Higher Education, 57*(28), A22-A23. Retrieved from http://chronicle.com/article/ iPads-for-College-Classrooms-/126681/

Yukselturk, E., & Bulut, S. (2009). Gender differences in self-regulated online learning environment. *Educational Technology & Society, 12*(3), 12–22.

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Comparing students' evaluations and recall for Student Pecha Kucha and PowerPoint Presentations

Alisa Beyer[1], Catherine Gaze[2], & Julia Lazicki[1]

Abstract: Two experiments compared student reaction to and memory of peer presentations using either a fast-paced, images only format (Pecha Kucha) or a traditional PowerPoint presentation. In experiment 1, students saw a prerecorded 5-minute PowerPoint, 10-minute PowerPoint, or 5-minute Pecha Kucha presentation. Students rated the presentation and wrote down main points. One week later students completed an on-line survey. There were no recall differences, but a visual purpose rating was higher for Pecha Kucha. In experiment 2, students watched two presentations (10-minute PowerPoint and 5-minute Pecha Kucha) in a counterbalanced within-subjects design (same procedures used). Although students rated the Pecha Kucha presentation more positively, there were no recall differences. Results suggest Pecha Kucha is a useful student presentation style that maintains similar levels of retention.

I. Introduction.

Student presentations are incorporated into many psychology courses for a variety of reasons, which include increasing students' oral communication skills, actively engaging students in the material, and encouraging students to learn from one another. Students' competency in communication skills is a common goal for many universities and in line with goal seven of APA's guidelines for psychology majors (Halonen, Appleby, Brewer, Buskist, Gillem, Halpern et al., 2002). Student presentations enable students to learn from their peers and provide the opportunity for practice organizing material for public dissemination. Many students choose to use PowerPoint for their presentations, but then read straight from the slides or put too much information on each slide. The focus of the present study is to examine student interest and retention of presented material using Pecha Kucha (pronounced pa-chok-cha), a new presentation style designed to minimize some of the pitfalls of traditional PowerPoint presentations.

In a Pecha Kucha presentation, the user creates 20-second automated, pictorial slides within a program such as PowerPoint (or Prezi or SlideRocket). Developed in 2003, Pecha Kucha is a visual presentation style where each automated slide contains only pictures, photos, or graphics (i.e., pictorial, limited or no text; Glendall, 2007; http://www.pecha-kucha.org). The timing and style of Pecha Kucha may improve student presentations. The automatization and fast pace of the slides forces the presenter to be organized in order to capture each slide's message. The selection of imagery used can support key points (Eves & Davis, 2008) and the presenter's verbal message is not competing with slide text. Previous research has identified ineffective PowerPoint presentation issues, such as the presenter's message not mapping onto the slide text, the presenter reading from slide, or issues with font text size on the slides (Eves & Davis, 2008; Paradi, 2003). The Pecha Kucha presentation style is designed to minimize or eliminate many of these problems.

[1] Dominican University, 7900 W. Division St., River Forest, IL 60305, abeyer1231@gmail.com
[2] Elmhurst College, Elmhurst, IL

Few studies have examined Pecha Kucha as a PowerPoint presentation style. Beyer (2011) rated student class presentations that were either Pecha Kucha or traditional text-based PowerPoint (text and images on slides) and also had students rate their peers' presentations. The research was a series of studies including student choice and random assignment of presentation style, as well as using a between and within-subjects design. Beyer found that Pecha Kucha presentations had higher instructor ratings of eye contact, visuals, and overall presentation quality compared to student PowerPoint presentations. Although Beyer (2011) demonstrated that Pecha Kucha improves aspects of student presentation quality as compared to traditional PowerPoint, the study design had limited experimental control. For example, there was variability in the quality of the presentations given (students were only given general content and style restrictions). Additionally, the study did not include measures of retention of the material presented, so its effectiveness for student learning was not assessed. The current study design addresses these issues by using standardized presentations selected as good examples of each style and includes a measure of student retention of the material.

Pecha Kucha may also be superior to traditional PowerPoint presentations in terms of learning. One issue of multimedia learning is concern for cognitive load (Sweller, 1994). Depending on how the information is presented, processing capacity can be diminished. For example, Mayer, Moreno, Boire, and Vagge (1999) found that individuals who were presented large clips of alternating auditory and visual information performed worse than those who had concurrent clips or small alternating auditory and visual clips. Pecha Kucha may be a presentation that reduces cognitive load. There is no redundancy (or contradiction) of text on the slide with the auditory presentation. There is also an alignment of the chosen image and the message being presented with the timing of the images synchronized to the auditory message. Each of these differences ties into Mayer and Moreno's (2003) suggestions for reducing cognitive load in multimedia learning.

Previous research has examined the impact of PowerPoint presentations on student retention for lecture material. While findings have been mixed, in part due to methodological differences and limitations, two studies with stronger internal validity, have found evidence of better retention of lecture material presented with no slides or concise slides. Savoy, Proctor, and Salvendy (2009) compared students who attended PowerPoint lectures, traditional lectures, and/or those that did not go to class. Students attending the traditional lecture retained more of the auditory information compared to the PowerPoint lecture and those that did not attend class. For graphic material and material that was presented both orally and visually, those that attended either class did better than those that did not attend class. Interestingly, even though information was not better remembered with PowerPoint, the students preferred PowerPoint and felt like the PowerPoint presentation made the important material easier to identify. This suggests that student preference and perception of PowerPoint may not equate to better learning (Savoy et al., 2009). Wecker (2012) found similar findings using a between-subjects design with three conditions (no slides, 10 slides, or 4 slides) for a 30-minute presentation. The concise and no slides conditions had better retention of oral information compared to regular slides. Both studies suggest that traditional, text-based PowerPoint slides may not enhance learning, perhaps due to issues of cognitive load.

A recent meta-analysis of 57 studies examined student learning (recall, transfer, or response times) comparing spoken-only lectures and spoken-written lectures (Adesope & Nesbit, 2012). Studies included in the meta-analysis used random assignment or pretest/posttest data. Spoken-written lectures included those presentations where the written material was fully or

partially redundant with spoken material, and whether or not images or animation were included was noted. Although they did not focus on comparing auditory information to visual information, they found a small advantage of spoken-written lectures over the spoken only (particularly for those that were partially redundant; Adesope & Nesbit, 2012). Overall, their findings support verbal redundancy to be a positive factor in student learning (with the spoken message being in unison with the written one), but perhaps with the reduction of cognitive load (the less images/animations, the better material was retained).

There is limited research examining the use and learning impact of Pecha Kucha in the classroom. Klentzin, Paladino, Johnson, and Devine (2009) found that Pecha Kucha is as effective as traditional PowerPoint presentations for student retention of lecture information. Students listened to either a Pecha Kucha lecture (20 slides for 20 seconds each) or a traditional PowerPoint lecture (42 slides with no set timing) from a librarian instructor. Students then completed a 10-item true/false test on the material presented. There were no differences between the two groups' performance (both had averages of 91%). There were no student ratings of the presentation in the Klentzin et al study. Klentzin and colleagues' findings suggest that Pecha Kucha can more succinctly present information at the same quality level as a longer PowerPoint format with no immediate differences in student learning of the material. There has been little empirical work examining retention of peer presentations and no research comparing retention across different types of student presentations. We were specifically interested in comparing student interest and retention from peer PowerPoint and Pecha Kucha presentations. Pecha Kucha may be more appropriate for a student versus lecture presentation as the automated pace limits faculty-student interaction. As a student presentation style, it forces students to be more familiar with their material and reduces the mistakes often seen with traditional power-point slides. The pacing of Pecha Kucha allows student presentations to keep on time, and the pace of the slides may keep peers' attention while listening to numerous student presentations.

The goal of our study was to examine possible benefits of using Pecha Kucha for student presentations rather than traditional PowerPoint. How do students react to presentations that rely more on visual cues than text? How well do students retain information from a student presentation when presented in different formats? We were interested in examining possible differences of student ratings of student presentation quality and retention scores for the two presentation styles. The current study uses pre-recorded presentations from the same student presenter to minimize variability noted in previous research. Based on previous research, it is expected that students will have higher ratings of presentation quality for the Pecha Kucha, but there will be no differences in retention of the information presented despite a shorter presentation time.

We developed a set of studies to compare student presentation quality ratings and memory for recorded student presentations in one of three formats: a 5-minute or a 10-minute traditional PowerPoint, or a 5-minute Pecha Kucha. A 10-minute PowerPoint condition was added to determine whether there were differences in retention of the information when it was elaborated on verbally, without additional visuals. One undergraduate student research assistant was videotaped doing all of the presentations she had created to ensure uniformity across the study. A student researcher was chosen to present the information as the focus was on rating student presentations using a more controlled experimental design. The video focused on the slides and included the audio of her voice. The student was not shown on camera to minimize the impact of the presenter.

II. Experiment 1.

A. Method.

1. Design.

This was a between-subjects design, with presentation style as the independent variable. Three presentations on the same topic were created: a 5-minute Pecha Kucha, a 5-minute PowerPoint, and a 10-minute PowerPoint.

2. Participants.

Sixty-seven undergraduate students (51 women; 16 men) at two midwestern college campuses participated in the study. Fliers were posted in the psychology building for one of the campuses and announced in psychology classes on both campuses. Fifty- two percent responded they were between the ages of 18 to 20, and 38% responded they were between the ages of 21 to 23 years. Of the 67 participants, 57 participants fully completed the online rating and memory recall task (n = 65 partially completed online questionnaire). Students at one of the universities were offered payment for participating (n = 43), and the other university offered course extra credit for a psychology course (n = 24). The sample sizes by group, both initially and at follow-up, are displayed in Table 1.

3. Materials.

Presentations. The content of the presentations was adapted from a student presentation the student research assistant had created in an upper level Cognitive Development course. The topic for the presentations was related to cognitive development and had public interest (delaying kindergarten). The presentation focused on defining delayed entry, reasons why to delay entry, disadvantages for delayed entry, and suggestions for parents. The script was identical for the 5-minute presentations and elaborated on for the 10-minute PowerPoint presentation. Presentations were recorded and presented on a large projector screen for each session. There were 15 slides for the Pecha Kucha presentation and 7 slides for both of the PowerPoint presentations. Presentations were recorded and presented on a large projector screen in a classroom for each session. See Appendix for sample slides and spoken content.

Attention level Rating. Immediately following the presentation, students rated how attentive they were during the presentation on a 5- point Likert scale (1 = *highly distracted*; 2 = *distracted*; 3 = *slightly distracted*; 4 = *attentive*; 5 = *highly attentive*).

Immediate Presentation Quality Scale. Immediately following the presentation, students evaluated the presenter/presentation on organization, content coverage, voice quality, and visual aids purpose for the presentation using a 5-point Likert type scale (1 = *poor*; 2 = *below average*; 3 = *average*; 4 = *good*; 5 = *excellent*). Visual aids purpose was for the students to rate how effective they felt that the visuals were in supporting the presentation. Students were instructed to compare the presentation to student presentations they have seen in previous classes. The four item scale had high inter-item reliability, α=.77.

Immediate Recall. Immediately following the presentation, students wrote down points that were made during the presentation. Accurate responses were tallied. Thirty-eight (57%) of

the students wrote down 10 accurate points with the mean number of points made being approximately 8 (M = 8.62, SD = 1.91). All responses written down were accurate. Students wrote down between 4 and 10 responses.

Delayed Presentation Scale. Students were asked three questions about the presentation (clarity, visual aids purpose, and overall presentation) on a 5-point scale (1=*poor*; 2=*below average*; 3=*average*; 4=*good*; 5=*excellent*) using an on-line questionnaire. The three items were added together to create an overall mean for the follow-up presentation scale score (α = .83).

Delayed Recognition. Students were asked 10 multiple-choice questions about the content of the presentations in the on-line questionnaire.

B. Procedure.

Students watched a 10-minute PowerPoint presentation, 5-minute Pecha Kucha presentation, or 5-minute PowerPoint presentation depending on the session they signed up for. The groups ranged from 10 to 24 students. Students were told that they would be watching a student presentation, completing a questionnaire immediately afterwards about the student presentation, and then one week later filling out an on-line questionnaire. Students signed informed consent forms. After students watched the video, participants were given a questionnaire to rate the student presentation and provide information they learned from the presentation. The participants were given a website link to complete the second portion of the study one week later. They were also sent a reminder email the day the website link went active letting them know that they had four days to complete the study. The link was not activated until that day to ensure a one-week delay. The online questionnaire asked students to rate the presentation and answer multiple-choice questions about the presentation. Students in all three conditions completed the same follow-up questionnaire.

C. Results.

Descriptive statistics for the rating scales are shown in Table 1.

Attention level Rating

When asked to rate their attention level during the presentation, students reported a mean rating of 3.5 out of 5 indicating that they were slightly distracted to attentive. Fifty-two percent of the students responded they were either attentive or highly attentive. There were significant differences in the level of distraction between the three conditions, $F(2, 64) = 10.03$, $p < .001$, partial $\eta^2 = .24$. Students in the 5-minute PowerPoint condition self-reported they were less attentive than students in the 5-minute Pecha Kucha or the 10-minute PowerPoint.

Immediate and Delayed Presentation Quality Scales

There were no significant differences in immediate ratings of the presentation between the three conditions, $F(2, 64) = 0.66$, $p = .52$, partial $\eta^2 = .02$. However, for the delayed presentation scale, there were differences in ratings of the presentation quality between the three conditions, $F(2, 54) = 3.12$, $p = .05$, partial $\eta^2 = .10$. Post hoc analysis (Tukey HSD, p <. 05) indicated that the only significant difference was the 5-minute Pecha Kucha condition was rated as better than the 5-minute PowerPoint When specifically examining items within the presentation quality scales, the only significant differences was for the immediate and delayed visual aid purpose rating item, $F(2, 64) = 4.73$, $p = .01$, partial $\eta^2 = .13$; $F(2, 54) = 7.20$, $p < .005$,

partial $\eta^2 = .21$. For the immediate visual aid purpose rating, Pecha Kucha was rated higher than the 5-minute PowerPoint (Tukey HSD, $p < .01$). In the delayed visual aid purpose rating question, Pecha Kucha was rated higher than the other two conditions (Tukey HSD, $p \leq .006$).

Table 1. Exp 1 Means (SDs) for student ratings and responses at Immediate and Follow-up time points.

	Experiment 1			
	Pecha Kucha	5min PPT	10min PPT	Sig diff?
Immediate	(*n*=20)	(*n*=24)	(*n*=23)	
Presentation Quality	15.05 (3.42)	14.17 (3.09)	15.04 (2.51)	ns
Organization	3.95 (.95)	4.08 (.83)	4.35 (.65)	ns
Visual purpose	3.90 (1.12)	2.92 (1.10)	3.22 (1.00)	PK > 5 and 10min PPT **
Voice	3.70 (1.03)	3.79 (1.02)	3.96 (.82)	ns
Content	3.50 (1.00)	3.38 (.92)	3.52 (.99)	ns
Attention level	3.95 (.89)	2.94 (.73)	3.70 (.76)	5min PPT < PK and 10min PPT ***
Recall[a]	8.45 (2.01)	9.17 (1.74)	8.04 (2.46)	ns
1-week Delay	(*n*=18)	(*n*=18)	(*n*=21)	
Presentation Quality[b]	10.83 (3.00)	8.67 (2.54)	9.57 (2.31)	PK > 5min PPT *
Visual purpose	3.61 (1.15)	2.39 (1.24)	2.38 (1.02)	PK > 5 and 10min PPT **
Clarity	3.78 (1.11)	3.33 (.84)	3.86 (.96)	ns
Overall	3.44 (.92)	2.94 (.73)	3.33 (.91)	ns
Recognition	5.11 (1.75)	5.79 (1.38)	5.61 (1.85)	ns

Note. Items were on a 1-5 scale. Scale maximum of 20 unless otherwise noted
[a] 10 points possible. [b] Scale maximum of 15.
* = p <.05, **= p <.01, ***= p < .001

Immediate Recall and Delayed Recognition

There was no significant difference in immediate recall for listing of accurate points remembered, $F(2, 64) = 1.74$, $p = .18$, partial $\eta^2 = .05$. Additionally, for the delayed multiple choice questions, there were no significant differences between the three conditions, $F(2, 62) = 0.89$, $p = .41$, partial $\eta^2 = .03$.

D. Discussion.

The study suggest that Pecha Kucha, with its shorter and pictorially based format, leads to similar retention of the material to the longer traditional format and results in higher ratings for some opinion scales. There were higher ratings for visual purpose of the Pecha Kucha versus a traditional PowerPoint presentation. This may be attributed to students enjoying not having to read any text on the slide. Interestingly, the difference in presentation style and opinion rating does not lead to better retention of the material. One may expect that a longer presentation results in students remembering more information, but this was not the case either. There were no differences in retention. Scores were low overall considering students only answered approximately half of the questions correctly following a one-week delay. This may be due to the fact that the questions were too specific and/or may reflect a lack of investment on the students' part, since the presentation was not related to a course grade.

A surprising finding was that students in the 5-minute PowerPoint presentation rated themselves as significantly less attentive than students in either of the other conditions. It is possible that their difference in attention level was due to the timing of the experiment rather than the type of presentation they watched. Students in the 5-minute PowerPoint section participated immediately after a class meeting, while students participating in the other two groups had a choice of times available.

Although students were assigned to conditions, a potential weakness of the study was the use of a between subjects design. Students did not view all presentation types to examine individual preference. Experiment 2 was designed to account for individual differences and explored differences between a 10-minute PowerPoint and a 5-minute Pecha Kucha. Given that there were no retention or quality rating differences for the 5-minute PowerPoint, we wanted to examine for preferences using the more standard versions of the presentations (e.g., it is not typical for a Pecha Kucha presentation to last for 10 minutes and a 5-minute Power Point would be considered a brief student presentation and not convey as much information as a 5-minute Pecha Kucha). Are there individual differences in retention for 10-minute PowerPoint versus the 5-minute Pecha Kucha presentation? Would students prefer one presentation style/length over the other? Additionally, we included more rating scales to specifically compare the slides in addition to the quality of the general presentation.

III. Experiment 2.

A. Method.

For experiment 2, a within-subjects design was used. The 5-minute Pecha Kucha and 10-minute PowerPoint presentations from experiment 1 were used. Additionally, a 5-minute Pecha Kucha and 10-minute PowerPoint were recorded by the same student research assistant on a different topic (young children watching television). The presentations on this topic focused on educational programming, differences between educational and entertainment television, specific programming that promotes development, and suggestions/reported guidelines for parents. The two Pecha Kucha presentations were designed to be similar in word count and number of sentences, and the two PowerPoint scripts were designed to be similar in word count and number of sentences. The scripts for Pecha Kucha and PowerPoint presentations were based on the same

outline but included some elaboration of the material for the 10-minute PowerPoint presentations.

B. Participants.

Seventy-four undergraduate students (60 women; 14 men) enrolled in four undergraduate developmental psychology courses at two college campuses gave permission to participate in the study. Fifty-seven students participated in both class sessions (n = 56 fully completed), and of those students, 38 participated in both of the follow-up online measures (n = 33 fully completed). For demographics, 47% of the 74 students responded they were between the ages of 18 to 20, whereas 45% responded they were between the ages of 21 to 23 years (8% did not respond to question).

C. Materials.

Presentations. Students saw two of the four presentations, one on each topic. There were four total conditions. Half of the students watched a 5-minute Pecha Kucha on one topic and then a 10-minute PowerPoint on the other topic while the other half of the students watched a 10-minute PowerPoint presentation first and a 5-minute Pecha Kucha second.

For both presentation topics, there were seven slides for the PowerPoint and 15 slides for the Pecha Kucha. The Pecha Kucha slides were 20 seconds in length and only had images to convey the speaker's message. The PowerPoint presentation added elaboration of the material and had text with no images on the slides.

Attention level Rating. Students completed the same question about their attention level as described in Experiment 1.

Immediate Presentation Scale Ratings and Recall. Students completed the same 4-item presentation quality scale (α = .76) and open-ended recall question as described in Experiment 1. A new scale (slide quality) was developed for students to evaluate specific aspects of the slides (message, effectiveness, interest, appeal) using a 5-point Likert scale (1=*definitely*; 2=*adequately*; 3=*neutral*; 4=*inadequate*; 5=*definitely not*). The 4-item scale had high inter-item reliability, α=.76. Like experiment 1, students wrote down up to ten points they remembered from the presentation for each condition. Across all participants, all but two statements written down were coded as accurate (i.e., 98% of all statements were accurate).

Delayed Presentation Scale Ratings and Recognition. The same 3-item delayed presentation scale was used as Experiment 1, α = .75. The online recognition questions from Experiment 1 were used for the kindergarten entry presentations. New memory questions were developed for the television topic. Students with the same topic received the same online questions regardless of presentation style. There were ten multiple-choice questions for each topic.

D. Procedure.

Prior to starting Experiment 2, four psychology students rated the slides and scripts from the four presentations for consistency in topic interest. For each item, ratings were based on a 5-point Likert scale (1 = *definitely interesting*; 2 = *adequately*; 3 = *undecided*; 4 = *inadequately*; 5 =

definitely not). All raters rated the slides as either 1 or 2 for each of the statements, *M*s = 1-1.75, *SD*s = 0-.58. Seventy-five percent of the raters preferred the television topic.

The procedure used in the current experiment was similar to the procedure used in Experiment 1, adapted for a within-subjects design such that each student completed two study sessions and two online questionnaires. In this experiment, the second presentation occurred seven weeks after the first session. The session conditions were randomized by the experimenters to ensure that each student watched two different topics and two different presentation styles in the study sessions. A total of 43 students across two classes saw the PowerPoint first, and 31 students across two classes saw the Pecha Kucha first.

E. Results.

Because of varying degrees of study completion, analyses were performed in two ways. Once as repeated measures analyses, for students who completed the entire study and then as between subjects analyses examining those students who completed any session. There were no contradictory findings between these two types of analyses and so only the repeated measures analyses are reported. Descriptive statistics are presented in Table 2.

Attention level Rating

There were no significant differences in the self-reported level of distraction between the Pecha Kucha and PowerPoint conditions, $t(48) = 1.05$, $p = .30$, $d = .14$.

Immediate and Delayed Presentation Quality Scales.

Descriptive statistics for the presentation ratings scales are shown in Table 2. When asked to rate the overall presentation immediately following each presentation, there were no differences in the student ratings, $t(56) = 1.69$, $p = .10$, $d = .28$. When examining individual items within the scale, the visual aid purpose rating item was higher for Pecha Kucha than the 10-minute PowerPoint, $t(58) = 3.96$, , $p < .001$, $d = .52$.

Immediately following the presentations, students were also asked to rate message, effectiveness, interest, and appeal (slide quality scale). For this scale, students rated the PowerPoint slides significantly higher, $t(55) = 3.71$, $p < .001$, $d = .62$. For this scale, a higher score indicates a lower slide quality.

There were significant differences for the delayed presentation scale, $t(29) = 2.23$, $p = .03$, $d = .60$, such that Pecha Kucha was rated higher than the PowerPoint (see Table 2). When specifically examining items within the presentation scales, the delayed visual purpose item was rated significantly higher for the Pecha Kucha condition than the PowerPoint condition, $t(31) = 3.57$, $p = .001$, $d = 1.89$. There were no significant differences when examining the immediate presentation scales by topic (kindergarten [$M = 14.49$, $SD = 2.53$] and television [$M = 15.11$, $SD = 2.46$]), $t(56) = -1.45$, $p = .15$, $d = .21$. Additionally, there were no significant differences when examining the delayed presentations scale by topic (kindergarten [$M = 9.48$, $SD = 1.88$] and television [$M = 9.90$, $SD = 1.90$]), $t(30) = .90$, $p = .38$, $d = .22$.

A subset of students ($n = 40$) responded to questions that explicitly asked about preference for topic and preference for style. Fifty-five percent of the students reported that they preferred the educational TV topic, 30% preferred the delaying kindergarten topic and 15% had no preference. For style, 37.5% preferred the traditional PowerPoint, 35% preferred the Pecha Kucha and 27.5% had no preference.

Table 2. Exp 2 Means (SDs) for student ratings and responses at Immediate and Follow-up time points.

	Pecha Kucha	10min PPT	Sig diff?
Immediate			
Presentation Quality	15.18 (2.73)	14.47 (2.24)	ns
Organization	4.03 (.79)	4.07 (.64)	ns
Visual purpose	3.78 (1.00)	3.05 (.99)	PK>PPT***
Voice	3.75 (.92)	3.85 (.87)	ns
Content	3.58 (.79)	3.39 (.79)	ns
Slide Scale [a]	10.21 (3.52)	12.12 (2.66)	PK more positive than PPT ***
Message	2.14 (1.06)	2.43 (.91)	ns
Interest	2.69 (1.02)	3.20 (.87)	PK more positive than PPT **
Effectiveness	2.31 (.92)	3.10 (.87)	PK more positive than PPT ***
Appeal	2.66 (1.09)	3.38 (.95)	PK more positive than PPT ***
Attention level	3.38 (.93)	3.22 (.80)	ns
Recall[c]	8.12 (2.23)	6.53 (3.00)	PK > PPT ***
1-week Delay			
Presentation Quality[d]	10.13(1.48)	9.17 (1.74)	PK > PPT *
Visual purpose	3.34 (.79)	2.65 (.79)	PK > PPT ***
Clarity	3.52 (.78)	3.49 (.72)	ns
Overall	3.22 (.76)	3.02 (.81)	ns
Recognition	5.45 (1.82)	5.79 (.99)	ns

Notes. Items were on a 1-5 scale. Unless otherwise noted scale maximum of 20.
[a.] Higher score reflect less favorable ratings. [b.] 10 points possible. [c.] Scale maximum of 15.
* = p <.05, **= p <.01, ***= p < .001

Immediate Recall

Significant differences in immediate recall were found based on topic and presentation style. There were differences in immediate recall between the two presentation styles, $t(48) = 3.98$, $p < .001$, $d = .60$. More specifically, students recalled more information in the Pecha Kucha condition than in the PowerPoint condition. Additionally, there was a significant difference in immediate recall by topic for listing of points remembered, $t(48) = 2.23$, $p = .03$, $d = .36$, where students remembered more Kindergarten points ($M = 7.82$, $SD = 2.46$) than TV topic points ($M = 6.84$, S$D = 2.96$).

Delayed Recognition

Students remembered similar amounts of information a week after the presentation regardless of presentation style, $t(32) = .92$, $p = .37$, $d = .23$. This suggests that amount of time spent discussing the material and the additional detail included in a 10-minute presentation were not beneficial for students' retention of the material. Performance on the delayed recognition task was found to differ by topic. Unlike the initial immediate recall listing, students answered more

questions correctly for the Television topic (M = 6.18, SD = 1.21) than the Kindergarten topic (M = 5.00, SD = 1.54), $t(32)$ = -3.68, p = .001, d = .85.

F. Discussion.

Pecha Kucha was rated higher than the PowerPoint for the immediate and follow-up ratings. There also was an order effect of ratings such that those who saw a Pecha Kucha following the PowerPoint presentation rated the Pecha Kucha more favorably, suggesting a comparison effect. Although students initially remembered more information for the Pecha Kucha presentations, there were no differences in recognition for the follow-up questions. Interestingly, students initially wrote down more information about the Kindergarten topic, but then remembered more for the Television topic.

IV. General Discussion.

The purpose of the experiments was to determine if there were differences in student presentation quality ratings, recall, and recognition when using an image-only, fast paced, timed presentation style (Pecha Kucha) compared to the traditional PowerPoint presentation style. The overall findings suggest some preference for Pecha Kucha versus a traditional PowerPoint peer presentation, without differences in retention of the material.

For the PowerPoint presentation, although the information was reinforced with text on the slides, students did not show improved retention of the information. In fact, in Experiment 2 students recalled more information from the Pecha Kucha presentation than the PowerPoint, immediately following the session. Although the information was reinforced with text in the PowerPoint, students may have been distracted from the verbal presentation by the text. There were no differences in the delayed recognition for either experiment.

The similarity of retention across the presentation types supports the utility of Pecha Kucha for student presentations. From an instructor's perspective, Pecha Kucha offers a shorter time frame for student presentations and perhaps has advantages to the presentations being more practiced and engaging for the audience (Beyer, 2011). With automated slides, student Pecha Kucha presentations are always completed in the set time limit.

Students rated the Pecha Kucha presentation more favorably on the slide presentation scale compared to the PowerPoint. This is interesting because the slides in the Pecha Kucha have little meaning outside of the presentation. The audience does not have text on the Pecha Kucha slide to reinforce the point made by the presenter. Perhaps having limited text is more appealing to an audience as previous research has found that students can be distracted from what the speaker is saying (Savoy et al., 2012). Additionally, students using Pecha Kucha may also have an advantage of a generation effect versus reading from a slide that has been shown to improve recognition (e.g., Slamacka & Graf, 1978).

In Experiment 2, the Pecha Kucha presentation received a high overall presentation rating than the traditional PowerPoint presentation. Although the overall presentation scale ratings were not higher for Experiment 1, students rated the visual purpose item in that scale for Pecha Kucha higher than PowerPoint. It may have been simple for students to see the connection of the image to the message.

These experiments are not without limitations. The sample sizes were small with participants coming from two liberal arts colleges in the Midwest, and the majority of the

participants were female which reflects the colleges' populations. Although efforts were made to randomize presentation styles, there were group differences for a topic effect in Experiment 2. Both topics selected for Experiment 2 were based on cognitive development topics, but perhaps the Television topic was more relatable or inherently interesting. Surprisingly, students wrote down more correct items learned for the Kindergarten topic immediately after the presentation than for the Television topic. However, students answered more Television topic multiple-choice questions correctly than Kindergarten questions on the online recognition task. Perhaps the Television questions were easier than the Kindergarten, even though efforts were made to create similar questions across topics. Overall, retention scores were low for both experiments. This could be due to the difficulty of the questions, or students' investment in learning the material as it was outside of a class and their performance on the questions had no connection to their grades. Additionally, the questions for both topics were factual and specific to the presentation. These questions may have been challenging for students, as they were not explicitly told that they would be tested on the material. The dropout rate for the second study was substantial as only 50% of students completed all parts of the study. Students had the convenience of on-line follow-up questionnaires, incentives for completing all phases, and email reminders; all which were not sufficient to motivate all students to complete the study.

It is important to note several characteristics of the presentations used in this study before generalizing the findings to student presentations. First, while the presenter was a student, the quality of the presentation was high. The presentation was carefully scripted, visuals were critically examined, and she avoided the pitfalls of many PowerPoint presentations. Individual differences in student presentation quality would be expected for class presentations. Second, the presentation was videotaped for consistency across study sessions and the student presenter was not pictured in the video. Presenter eye contact and body movement were not included in the presentation, which may have impacted the study results.

While we have discussed the potential advantages of Pecha Kucha as a presentation style, this presentation style may be more appropriate for a student presentation rather than a lecture. The fast, automated pace is not optimal for an active learning situation allowing students to ask questions and engage in the lecture as the automated pace limits faculty-student interaction. Moreover, faculty could not pause to assess student comprehension and elaborate on points as needed. Furthermore, some material for lecture may not lend itself well to Pecha Kucha. If faculty are to use Pecha Kucha, it may be more appropriate for review material rather than new material because of the limited interaction and fast pace of the slides. The fast pace may tax processing capacity for the student as new, challenging material is being presented.

Pecha Kucha presentations would be appropriate for student presentation of review topics, general topic overviews, and material that ties into the course but is not a specific empirical study. Pecha Kucha may not lend itself well to specific empirical work due to the pace of the slides. Pecha Kucha would be appropriate in nearly any course depending on the topics being presented. Pecha Kucha has been used for student introductions in a first-year seminar in addition to art student presentations of their senior capstone project.

As a student presentation style, it forces students to be more familiar with their material and reduces the mistakes often seen with traditional power-point slides. For example, student presenters would also have better eye contact and avoid reading from the slides. With its set time, it would keep presentations running on time, and the faster pace may also be more appealing and interesting for students listening to numerous student presentations. Pecha Kucha would help student presenters avoid having conflicting audio and visual messages that would

reduce the audience's cognitive load. A faster paced presentation may also be more appealing and interesting for students listening to numerous student presentations.

Pecha Kucha may also be a valuable tool for student presenters' understanding and retention of the content they present. Although no differences were seen for immediate recall or recognition for the students listening to the presentations, there likely could be an effect of stronger retention of the material for the student presenters themselves. The student presenter is forced to become more familiar with the content of the presentation because they do not have text on the slide to read from. Indeed, Beyer and Earle (2009) found that when students presented a class concept using Pecha Kucha during an exam review activity, they answered the exam question correctly (both multiple choice or short answer questions). Although it was not the focus of the current study, future research should evaluate the impact of the Pecha Kucha on students' retention of material from their own presentation.

The current study builds upon previous work on improving student presentation skills. Examining student presentations skills is an important component of general education. Many colleges and universities, as well as associations such as APA, have included oral communication proficiency as a student outcome. In addition to improving student speaking skills, teaching students about Pecha Kucha fits well with APA's learning goal seven, students' ability to communicate effectively in a variety of formats (Halonen et al., 2002; also see Dunn, McCarthy, Baker, Halonen, & Hill, 2007).

Learning to do Pecha Kucha may also give students better visual design literacy. After all, Pecha Kucha was developed by architects Mark Dytham and Astrid Klein as a creative presentation style (Klein Dytham architecture, 2008). After preparing a Pecha Kucha presentation, students may have better visual design skills as a result of preparing each image to map their intended message with virtually no text on the slides. This skill could carryover to traditional PowerPoint presentations used in other settings, encouraging students to reduce their use of text on slides and increase use of visual images. Students watching these presentations may also be more conscientious in their own use of text and images when creating a traditional PowerPoint presentation. Thus, Pecha Kucha may be another useful skill for students entering the workforce.

In sum, Pecha Kucha is a worthwhile type of student presentation to consider using in courses. First, in the interest of managing class time, student presentations will always end on time using the paced timing. Students retained as much information from Pecha Kucha as traditional PowerPoint, with a slight advantage for Pecha Kucha in immediate recall. Additionally, students seem to like the new presentation style. The new style may also promote visual design literacy while building oral communication skills.

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References

Adesope, O.O., & Nesbit, J.C. (2012). Verbal redundancy in multimedia learning environments: A meta-analysis. *Journal of Educational Psychology, 104*(1), 250-263. Doi:10.1037/a—26147.

Beyer, A.M., & Earle, M. (2009). Pecha Kucha presentations as an exam review activity. Poster presented at International Society for Scholarship of Teaching and Learning meeting, Bloomington, IN (October, 2009).

Beyer, A.M. (2011). Improving student presentations: Pecha Kucha and just plain PowerPoint. *Teaching of Psychology, 38* (2), 122-126. doi: 10.1177/0098628311401588

Dunn, D., McCarthy, M., Baker, S., Halonen, J., & Hill, G.W. (2007). Quality benchmarks of an undergraduate psychology program. *American Psychologist, 62*(7), 650-670. doi: 10.1037/0003-066X.62.7.650

Eves, R.L., & Davis, L.E. (2008). Death by PowerPoint? *Journal of College Science Teaching, 37*(5), 8-9. Retrieve from: http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=32085818&loginpage=Login.asp&site=ehost-live&scope=site

Falchikov, N., & Goldfinch, J. (2000). Student peer assessment in higher education: A meta-analysis comparing peer and teacher marks. *Review of Educational Research, 70*(3), 287.

Glendall, J. (2007, December). 20 presentations. 20 slides. 20 seconds. *Architecture*, 66-69. Retrieved from http:www.architechturemagzine.com

Halonen, J.S., Appleby, D.C., Brewer, C.L., Buskist, W., Gillem, A.R., Halpern, D.F., et al. (APA Task Force on Undergraduate Major Competencies). (2002). *Undergraduate psychology major learning goals and outcomes: A report.* Washington, DC: American Psychological Association.

Klein Dytham architecture. (n.d.). Pecha Kucha night. Retrieved August 4, 2011from http://www.pecha-kucha.org/

Klentzin, J.C., Paladino, E.B., Johnson, B., & Devine, C. (2009). Pecha Kucha: Using "lightning talk" in university instruction. *Computers & Education, 35*(3), 175-187. DOI: 10.1016/S0360-1315(00)00030-0.

Mayer, R.E. & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. Educational Psychologist, 38, 43-52. DOI : 10.1207/S15326985EP3801_6

Mayer, R. E., Moreno, R., Boire M., & Vagge S. (1999). Maximizing constructivist learning from multimedia communications by minimizing cognitive load. *Journal of Educational Psychology , 91*, 638-643. DOI: 10.1037/0022-0663.91.4.638

Paradi, D. (2003, September). Communicating Using Technology. Retrieved from http://www.communicateusingtechnology.com/pptresults.htm

Patri, M. (2002). The influence of peer feedback on self and peer-assessment of oral skills. *Language Testing, 19*(2), 109-131. DOI:10.1191/0265532202lt224oa

Pink, D. (2007, August 21). Pecha Kucha: Get to the PowerPoint in 20 slides and then sit the hell down. *Wired Magazine, 15*(9). Retrieved August 4, 201 from http://www.wired.com/techbiz/media/magazine/15-09/st_pechakucha

Savoy, A., Proctor, R.W., & Salvendy, G. (2009). Information retention from PowerPoint and traditional lectures. *Computers & Education, 52*, 858-867. doi: 10.1016/j.compedu.2008.12.005

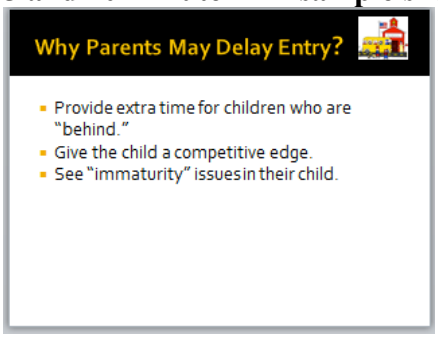
Slamecka, N.J., & Graf, P. (1978). The generation effect: Delineation of a phenomenon. . *Journal of Experimental Psychology: Human Learning and Memory, 4*(6), 592-604. doi: 10.1037/0278-7393.4.6.592

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction, 4*, 295-312.

Wecker, C. (2012). Slide presentations as speech suppressors: When and why learners miss oral information. *Computers & Education, 59,* 260-273. doi: 10.1016/j.compedu.2012.01.013

Appendix

5 and 10 minute PPT sample slide



5 minute PPT spoken content (10 minute added information in italics)

There are several reasons why parents may choose to delay their child's kindergarten entry. The most common reason is because parents believe that it will provide extra time for their child to catch up if they are believe to be behind. Children entering kindergarten are expected to know a list of various items, such as the alphabet, how to write their name, and a majority of the numbers, and when a child does not know these things, a parent may delay their entry so they can learn them. *Some researchers suggest that schools expect children to be ready when they come to school rather than acquiring readiness in kindergarten. Therefore, parents use that extra year to ensure that their child is in fact ready for school rather than the child making adjustments while in kindergarten. Escalated curriculum also makes parents and teachers fearful that young 5-year-olds will fail.*

Some parents believe that by delaying a child's kindergarten entry, it will give them a competitive edge over his or her peers. This competitive edge parents believe they are giving their child can be an academic advantage, social advantage, or later on in schooling, a sports advantage.
If parents see an immaturity issue in their child, they may choose to delay entry as well. This, however, may not be the best option for the child because it could stem from underlying issues, *which will be discussed later*.

Two sample Pecha Kucha slides for corresponding PPT slides above

Pecha Kucha spoken content

Slide 1: There are several reasons why parents may choose to delay their child's kindergarten entry. The most common reason parents delay their child's kindergarten entry is to provide extra time for their child to catch up if they are believed to be behind. Children entering kindergarten are expected to know a list of various items and when a child does not know them, a parent may delay entry so they can learn them.
Slide 2: Some parents believe that by delaying a child's kindergarten entry, it will give them a competitive edge over his or her peers. This competitive edge parents believe they are giving their child can be an academic advantage, social advantage, or later on in schooling, a sports advantage.

Sample multiple-choice question

Why do parents delay Kindergarten entry?

a. Competitive edge
b. Costs involved
c. Given the child more time before schooling starts
d. A and C

Immediate questionnaire

Please provide us 4-digits (birth month and birthdate) and the last letter of your first name

_____

On a scale of 1 (poor) to five (excellent), please compare this presentation to student presentations you have seen in classes: (circle 1 per item)

1 *poor* *2 below average* 3 *average* 4 *above average* 5 *Excellent*

Poor		**Avg**		**Excellent**	
1	2	3	4	5	Introduced motivation and interest in topic/problem

1 2 3 4 5 Coherent pattern of organization

1 2 3 4 5 Voice quality

1 2 3 4 5 Visuals suited purpose

Use the following 5-point scale for the next 4 questions, rate the presentation. (circle 1 per item)
1 *definitely* 2 *adequately* 3 *neutral* 4 *inadequate* 5 *definitely not*

1 2 3 4 5 The slides captured the message being conveyed.

1 2 3 4 5 The slides appearance was effective.

1 2 3 4 5 The slides were interesting.

1 2 3 4 5 The appearances of the slides were appealing.

What were ten concepts or pieces of information that you learned from the presentation?

On a scale of 1 to 5, how would you describe your attentiveness during the presentation?
1 (very distracted) 2 (distracted) 3 (slightly distracted) 4 (attentive) 5 (highly attentive)

Online follow-up questionnaire
What was the month and day you were born (put as 4-digits)?

What is the last letter of your first name?

What were 3 recommendations made during the presentation?

On a scale of 1 (poor) to five (excellent), please compare this presentation to student presentations you have seen in classes: (circle 1 per item)
1 *poor* *2 below average* 3 *average* 4 *above average* 5 *great*
Overall presentation
Visuals suited purpose
Clarity of materials presented
[10 multiple choice questions based on topic condition]
Please indicate your gender.
Please indicate your age range.

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A Case for the use of Pedagogical Agents in Online Learning Environments

Noah L Schroeder & Olusola O. Adesope

Keywords: Pedagogical Agent, Cost-effectiveness, Multimedia, Learning

Framework

Progressive multimedia learning tools have been extensively researched over the past twenty years. Two of these tools include intelligent tutoring systems (Graesser et al., 2004; Ma, Adesope, & Nesbit, 2011; VanLehn, 2011) and pedagogical agents (Mayer & DaPra, 2012; Moreno, Mayer, Spires, & Lester, 2001). In this paper we discuss pedagogical agents, which are visible characters in multimedia learning environments designed to facilitate learning (Moreno, 2005; Schroeder, Adesope, & Barouch Gilbert, 2012). Some researchers have expressed reservations that pedagogical agents may not be cost-effective (Choi & Clark, 2006; Clark & Choi, 2005; 2007). However, while it previously may have taken a considerable amount of time and resources to design and implement a pedagogical agent within a learning environment, recent advances in technology make pedagogical agent-based systems more accessible and affordable to educators.

Pedagogical agent research is typically grounded in social agency theory. Social agency theory is based on previous research which indicates that people treat computers as fellow humans (Reeves & Nass, 1996), and posits that "social cues in a multimedia message can prime the social conversation schema in learners" (Mayer, Sabko, & Mautone, 2003, p. 419). Thus, Mayer et al. (2003) suggest that learners may perceive computer interaction as a social exchange of information. In sum, it is hypothesized that if the learner perceives the computer interaction as social communication, it may cause increased performance on transfer tests due to the student engaging in the "sense-making process" (Mayer et al., 2003, p. 420). This process describes active learning, which is delineated into three stages: selecting information, organizing it, and integrating it with prior knowledge (Mayer et al., 2003; Mayer, 2005). Alternatively, Mayer et al. (2003) posit that a lack of social cues in a multimedia message will not cause a social response in the learner, and thus foster rote learning, or memorization. As such, it is the process of deeper understanding (Atkinson, Mayer, & Merrill, 2005) that pedagogical agent researchers hope to foster to promote meaningful learning (Mayer et al., 2003) in pedagogical agent-based learning environments.

Are pedagogical agents useful in multimedia environments?

Research suggests that pedagogical agents have the ability to play many roles in the multimedia learning environment, such as demonstrating, scaffolding, coaching, modeling and testing (Clarebout, Elen, Johnson, & Shaw, 2002). However, throughout research, pedagogical agents often take the role of an instructor or a coach (Clarebout et al., 2002). Recent research has started to investigate the use of peer-agents (e.g., Holmes, 2007), however this area is under-represented compared to studies which utilized the agent as an instructor.

Pedagogical agents are not necessarily artificially intelligent, although in the past researchers have paired them with intelligent tutoring systems (e.g., Moreno, Mayer, Spires, &

Lester, 2001). To some this may seem a major limitation. However, an alternative viewpoint suggests that constructing artificially intelligent agents generally requires computing and programming knowledge that many educators may lack. Thus, the ability to incorporate a non-intelligent agent into a multimedia learning environment with relative ease may increase the effectiveness of the environment for minimal cost. Cost-effectiveness should be an important consideration for educational researchers, as it is well known that budget cuts continue to affect many higher education programs (Potter, 2003).

Empirical Results

Clarebout et al.'s (2002) seminal review concluded that "pedagogical agents do have possibilities for supporting learners when working with complex tasks…The potential of these pedagogical agents offer opportunities that should be grasped" (p. 281). These claims were reiterated by Kim and Ryu's (2003) meta-analysis, which indicated that pedagogical agents presence in multimedia learning environments increased both learners' retention (d=.30, p<.05) and transfer (d=.64, p<.05) scores.

Mayer's (2005b) review revealed a median effect size of d=.22 for studies in which an agent was present. Similarly, Moreno's review (2005) investigated pedagogical agent research in relation to Mayer's (2005) cognitive theory of multimedia learning. Moreno found support for the redundancy principle, in that learners were able to learn more when the learning material did not provide redundant text and narration. Additionally, Moreno found support for the modality principle, in that learners were able to perform better on post-tests if the pedagogical agent provided narration as the modality of communication rather than text. Moreover, Moreno's review did not find support for the deleterious effects of the split-attention principle (Ayers & Sweller, 2005). In other words, while learner's split their attention between the agent and the learning material, it did not produce negative learning effects. Finally, and perhaps most importantly, Moreno found that pedagogical agents can foster the active learning process.

Recently, Heidig and Clarebout (2011) reviewed pedagogical agent research; however their results were not promising. They summarize that "the majority of studies (9 out of 15) yielded no difference on learning" (Heidig & Clarebout, 2011, p. 51). However, Schroeder, Adesope, and Barouch Gilbert's (2012) recent meta-analysis indicates that pedagogical agents produce a small, positive effect on learning.

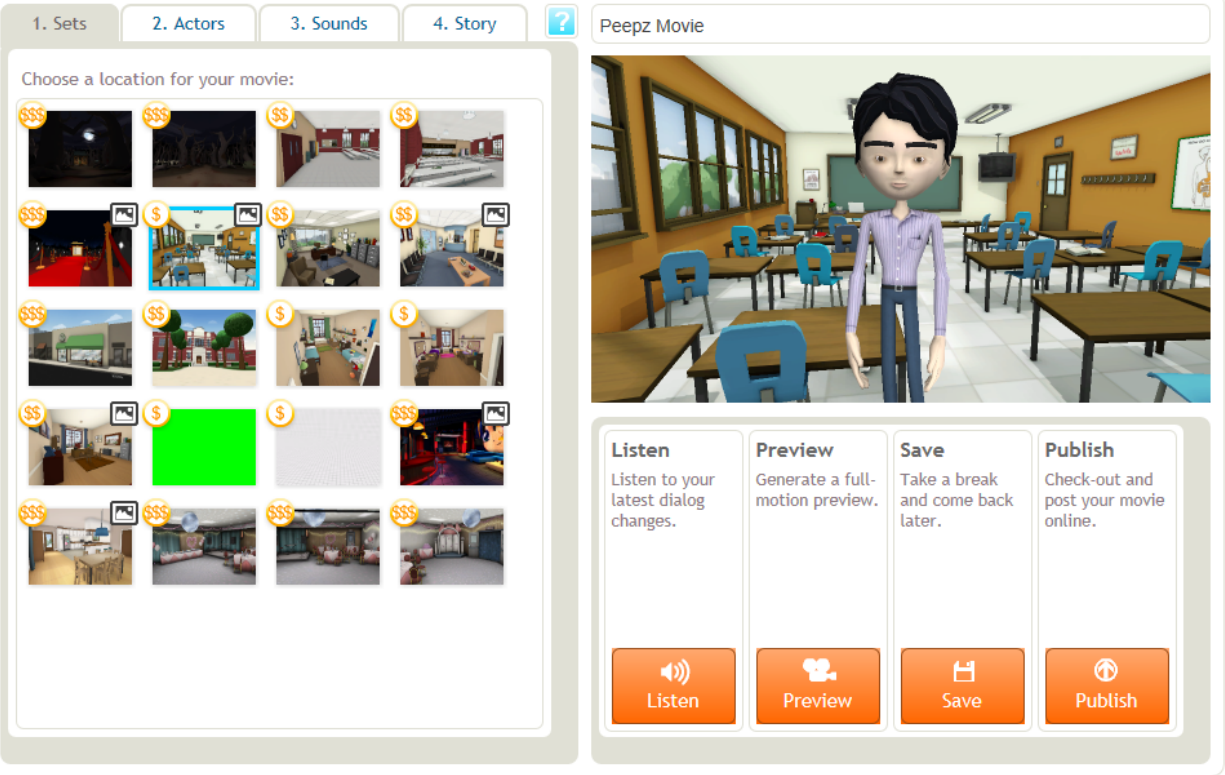
Making it Work

As mentioned, researchers have suggested that pedagogical agents may not be cost-effective (Choi & Clark, 2006; Clark & Choi, 2005; 2007). In the past, pedagogical agent learning environments needed to either be created from scratch, or through the use of complex computer programs. Recently, inexpensive and easy to operate software options are becoming available to educators who want to include an agent in their instruction. For example, Xtranormal (2012) can be used to create presentations which include pedagogical agents (see Figure 1).

Xtranormal (2012) allows the user to create videos using animated characters in virtual environments. The characters range from cartoons characters and stick figures to fully anthropomorphized humanoids dressed in business attire. The program is very simple to operate: you choose whether you want one or two agents, select the setting in which they will appear, select which the characters you will like to use, choose background sounds and type in the text which the text-to-speech engine will generate as narration. Alternatively, one could record

human voices and upload the recording to provide the narration. The program also allows the user to customize the agents' gestures and movements to make them more realistic.

Figure 1. A screenshot which shows the user-interface of Xtranormal. From Xtranormal (2012).



Future Implications

It is plausible that creating a short presentation in Xtranormal (2012) may take slightly longer than a comparable slideshow or other multimedia presentation. However, the novelty of the presentation may facilitate student learning and motivation. While pedagogical agents are not the panacea of multimedia learning, in certain situations where something different is needed to grasp students attention, the use of pedagogical agents may be beneficial.

References

Atkinson, R.K., Mayer, R.E., & Merrill, M.M. (2005). Fostering social agency in multimedia learning: Examining the impact of an animated agent's voice. *Contemporary Educational Psychology, 30,* 117-139.

Ayers, P., & Sweller, J. (2005). The split-attention principle in multimedia learning. In R. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp.19-30). New York, NY: Cambridge University Press.

Choi, S., & Clark, R.E. (2006). Cognitive and affective benefits of an animated pedagogical

agent for learning English as a second language. *Journal of Educational Computing Research, 34*(4), 441-466.

Clarebout, G., Elen, J., Johnson, W.L., & Shaw, E. (2002). Animated pedagogical agents: An opportunity to be grasped? *Journal of Educational Multimedia and Hypermedia*, *11*(3), 267-286.

Clark, R.E., & Choi, S. (2005). Five design principles for experiments on the effects of animated pedagogical agents. *Journal of Educational Computing Research, 32*(3), 209-225.

Clark, R.E., & Choi, S. (2007). The questionable benefits of pedagogical agents: Response to Veletsianos. *Journal of Educational Computing Research, 36*(4), 379-381.

Graesser, A.C., Lu, S., Jackson, G.T., Mitchell, H.H., Ventura, M., Olney, A., & Louwerse, M.M. (2004). AutoTutor: A tutor with dialogue in natural language. *Behavioral Research Methods, Instruments and Computers, 36,* 180-193.

Heidig, S., & Clarebout, G. (2011). Do pedagogical agents make a difference to student motivation and learning? Educational Research Review, 6, 27-54.

Holmes, J. (2007). Designing agents to support learning by explaining. *Computer & Education*, *48*, 523–547.

Kim, M,. & Ryu, J. (2003). Meta-analysis of the effectiveness of pedagogical agent. In D. Lassner & C. McNaught (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003* (pp. 479-486). Chesapeake, VA: AACE.

Ma, W., Adesope, O.O., & Nesbit, J.C. (2011). *Intelligent tutoring systems: A meta-analysis.* American Educational Research Association Meeting, New Orleans, LA.

Mayer, R.E., (2005). Cognitive theory of multimedia learning. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp.19-30). New York, NY: Cambridge University Press.

Mayer, R.E., (2005b). Principles of multimedia learning based on social cues: Personalization, voice, and image principles. In R. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp.201-212). New York, NY: Cambridge University Press.

Mayer, R.E., & DaPra, S.C. (2012). An embodiment effect in computer-based learning with animated pedagogical agents. *Journal of Experimental Psychology: Applied, 3,* 239-252.

Mayer, R.E., Sabko, K., & Mautone, P. (2003). Social cues in multimedia learning: Role of speaker's voice. *Journal of Educational Psychology, 95*(2), 419-425.

Moreno, R. (2005). Multimedia learning with animated pedagogical agents. In R. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp. 507-523). New York, NY: Cambridge University Press.

Moreno, R., Mayer, R.E., Spires, H.A., & Lester, J.C. (2001) The case for social agency in computer-based teaching: Do students learn more deeply when they interact with animated pedagogical agents? *Cognition & Instruction, 19*(2), 177-213.

Potter, W. (2003, August 8). State lawmakers again cut higher-education spending. *The Chronicle of Higher Education*, p. A22.

Reeves, B., & Nass, C. (1996). *The Media Equation: How People Treat Computers, Television, and New Media like Real People and Places.* Stanford, CA: CSLI Publications.

Schroeder, N. L., Adesope, O. O., & Barouch Gilbert, R. (2012). *A meta-analysis of the effects of pedagogical agents on learning*. Paper presented at the American Educational Research Association Annual Meeting. Vancouver, British Columbia.

VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist, 46(4),* 197-221.

Xtranormal. (2012). *Xtranormal* [computer software]. http://www.xtranormal.com

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Using Quality Matters™ (QM) to Improve All Courses

Diane L. Finley[1]

Framework

Quality Matters is a program of quality assurance for online and hybrid education. The program has received national recognition for its process which includes peer review, faculty-centeredness and a focus on continuous improvement in online teaching and learning. Quality Matters is a subscription program whose current subscribers include community and technical colleges and universities in the United States, other countries, K-12, and other academic institutions. It is a systematic process for ensuring quality in the design of online and blended/hybrid courses and its rubric standards align with accreditation standards. Using Quality Matters also has implications for improving student outcomes and retention. I became involved with QM at its inception in 2003 since I worked at one of the original institutions involved with its development under a Fund for the Improvement of Post-Secondary Education (FIPSE) grant. I eventually became a certified Peer Reviewer, a certified Master Reviewer and now I help to train Master Reviewers. While not entirely sold on the process at first, I witnessed the improvements in my online courses once I applied the rubric to my courses. Students had fewer procedural questions, navigation was smoother, and I was able to focus more on interacting with the students. I became a believer in the rubric and the process.

Making It Work

Before discussing how I specifically use QM in my courses, let me give a bit of background on QM and some specifics about the process. QM was a collaboration of 14 community colleges, 5 four year institutions in Maryland, and nine external partners. The goal of the FIPSE project was to develop criteria (in a rubric) for quality assurance of online learning and to create training for online faculty. The rubric focused on course design, not delivery, and was not intended to resolve all quality issues in online classes. After the grant expired, QM became an independent subscriber-based organization under MarylandOnline. Subscribers include educational institutions of all levels as well as publishers of online courses. QM also offers online training for instructors and has to date, trained over 16,000 faculty and instructional design staff. The QM process which is researched-based involves a faculty-centered, peer-review process of online and hybrid (blended) courses. The rubric, now in its third iteration (since becoming a non-profit organization), focuses on course design and is a diagnostic instrument which faculty can use for continuous improvement of their courses. The expectation is that all courses can eventually meet QM expectations. Meeting QM expectations involves meeting the 21 essential standards l and receiving at least 85% of the possible points from the rubric. If a course does not initially meet expectation, the faculty member is encouraged to use the feedback from the review to improve the course which is then re-reviewed. The rubric focuses on eight areas: overview, objectives, assessment, materials, learner interaction, technology, learner support, and accessibility. Why worry about course design? Why use Quality Matters? Since the Department of Education changed the rules for federal financial aid in 2005 with the Higher Education

[1] Professor, Department of Psychology, Prince George's Community College, finleydl@pgcc.edu

Reconciliation Act of 2005 (HERA), the number of institutions offering online courses has increased dramatically. The Sloan Consortium reported a 10% growth in distance learning enrollments in 2011. The Instructional Technology Council which examined elearning at community colleges reported an 8.2% increase in online enrollments from Fall 2010 to Fall 2011. I now use the QM rubric in all my course designs, even for courses that have not been officially reviewed. As our institution has increased emphasis on assessment, I find using the rubric forces me to see how my course and chapter objectives align with my assessments and activities. Everything in the course has a purpose and that purpose is made clear and transparent to students. Students who read all of the objectives and explanations understand why they are doing particular activities or taking certain quizzes. Applying the rubric has made me really examine my choice of activities and assessments. They are much more purposeful now. Even weekly discussion boards link to specific objectives. I give students a course map that clearly shows this linkage. The research shows that better student outcomes result when a course design relates to the course objectives (Swan, Matthews, Bogle, Boles, & Day, 2011). It was a "duh!" moment when I looked at these rubric standards and the research. Students are also more satisfied when all the course components are clearly integrated (Ke & Xie, 2009).

The rubric has also helped me to make my courses more accessible to all students. I used to use all sorts of font style and colors, not realizing how difficult those can be for some students. Now my courses are more simple in design but they are easier to read. I recently had a visually impaired student who was able to use a screen reader in the course with no problems. The third area in which I have found the rubric most helpful is the Course Overview and Introduction (QM Standard 1). To meet the specific review standards in this area, I created “Start Here” areas for students with detailed directions on how to get started. I include information on my expectations and institutional policies relevant to online learners. I also include links to institutional tutorials on using our LMS. No longer do I assume students can just find these items. I have streamlined my navigation so there are fewer buttons. Students have to click fewer times to find course components. It does take a good deal of time before the course begins to create the designs that meet QM expectations. However, I found that once I completed one course and it met expectations, other courses took less time. There were many items that could be reused with slight edits such as the Start Here sections. I also found that by using the rubric for the design, I was better able to focus on content. Some faculty raise concerns about QM creating packaged courses with no room for individual teaching styles. I have reviewed over 90 courses from all types of institutions. I have not found anything that would resemble a "packaged" course. There are many design elements that can meet QM expectations. It does not tell any instructor how to teach a class. I have reviewed multiple classes on the same topic and have yet to find two that are just alike, even at the same institution. As mentioned above, by using the QM rubric to guide course design, the faculty member is free to focus on content and devising creative ways of presenting that content to students.

Future Implications

As the body of research literature on online courses continues to grow, the QM rubric will continue to be revised, to take into account new developments and new information on student success. Future iterations of the rubric will enable me to keep my courses up-to-date with the literature on student success. My institution requires that all online courses meet QM expectations. By using the rubric, the Department is better able to ensure that courses with

multiple sections are comparable. Not every instructor uses exactly the same activities but each instructor has to show how those activities align with our common course objectives. Students are learning the same things; they are just learning them in different ways. Using the rubric, especially the standards related to alignment of objectives and assessments/activities, has made it easier to extract data for our Department review and course assessment process. We are able to demonstrate precisely how each objective is being achieved. I think the next big use for the rubric is to assess face-to-face classes. The rubric's focus on accessibility, alignment and transparency to students is relevant to synchronous, in-person classes as well. The rubric really is a guide for good teaching. In my Department, we have already taken some standards and asked all faculty to use them in their syllabi and teaching. How can you use QM in your own course? Many institutions and state consortiums belong to QM. If they subscribe, you have access to the full rubric and can request a course review from the Institutional Representative at your school. If your institution does not subscribe, you can ask the eLearning or Distance Learning office to become a part of Quality Matters. If that is not an option, you can still look at the rubric at http://www.qmprogram.org/rubric and use it to help improve your own course. You can incorporate many of QM's principles even without an official review. You can also take QM courses at non-subscriber prices and learn to improve your course by applying some of the rubric to its design. In closing, I would recommend Quality Matters as a way to improve online (and hybrid as well as face-to-face) classes by focusing on design issues, thereby freeing the instructor to focus on content and on interaction with students. Ultimately increased student success and satisfaction can result.

References

Allen, I.E., & Seaman, J. (November 2011). Going the distance: Online education in the United States, 2011. Retrieved September 28, 2012 from http://www.onlinelearningsurvey.com/reports/goingthedistance.pdf

Instructional Technology Council. (March, 2012). 2011 Distance education survey results: Trends in eLearning: Tracking The impact of eLearning at community colleges. Retrieved September 29, 2012 from http://www.itcnetwork.org/attachments/article/87/ITCAnnualSurveyMarch2012.pdf

Ke, F., & Xie, K. (2009). Toward deep learning in adult-oriented online courses: The impact of course design strategies. *The Internet and Higher Education*, *12*(3-4), 136-145. http://dx.doi.org/10.1016/j.iheduc.2009.08.001

Quality Matters. (2012) Underlying Principles of Quality Matters. Retrieved from http://www.qmprogram.org September 27, 2012.

Swan, K., Matthews, D., Bogle, L., Boles, E., & Day, S. (2011). Linking online course design and implementation to learning outcomes: A design experiment. *The Internet and Higher Education*. doi:10.1016/j.iheduc.2011.07.002

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Learning Lens: Using Photovoice as a health disparities teaching tool

Michelle L. Bragg[1]

Keywords: Photovoice, health disparities, student engagement

Framework

This newly-developed graduate health disparities course is taught in a university located in an area where, according to 2009 data from the Philadelphia Department of Public Health, significant health problems exist including high rates of low-weight births, infant mortality, cancer, obesity, diabetes and childhood asthma. The course focuses on social determinants of health, defined by the World Health Organization (WHO) as "the conditions in which people are born, grow, live, work and age that can contribute to or detract from the health of individuals and communities." According to Thomas LaViest, author of the course text, *Minority Health*, health disparities can be understood as "differences in the incidence, prevalence, mortality and burden of disease and other adverse health conditions that exist among specific population groups." This applied assignment grew out of the desire to integrate activities that engaged students with "real world" information.

Making It Work

Images teach and raise consciousness. They are present and multivoiced. Thus, to help students contextualize factors affecting health in the community, photovoice (voicing our individual and collective experience) was selected as a means of developing a more refined understanding of the community in which the university is situated.

Photovoice is a camera-based, qualitative method that elevates picture taking by using images for substantive purposes such as social action. According to Wang and Burris (1997), photovoice has three main goals:

- To enable people to record and reflect their community's strengths and concerns;
- To promote critical dialogue and knowledge about personal and community issues through large and small group discussions of photographs; and
- To reach policy makers.

Photovoice can be used in isolation or integrated among approaches in community-based participatory research (CBPR). Essentially, CBPR involves participation, cooperation and mutual respect among researchers and community members. A core component of CBPR is engagement with the community for the co-creation of knowledge, understanding and information (Minkler & Wallerstein, 2003). With respect to photovoice, images help achieve the aforementioned. Three steps are essential: selecting images that reflect community assets/needs, contextualizing the meanings of images and codifying themes (Wang& Burris, 1997). This process gives photovoice potency.

[1] University of the Sciences, m.bragg@usciences.edu

Photovoice can be inexpensive as only the use of common cameras (i.e. cell phone, disposable) is required. However, it is important to have a means to develop film or upload images onto a computer. Photovoice can be a means to engage various populations (i.e. middle-school children, adults) irrespective of socioeconomic status. Additionally, an array of topics can be examined using it. For example, Wang and Burris (1997) used photovoice to examine the concerns of rural women in China. Whitney (2006) highlighted the educational concerns of high school students with disabilities. The Kaiser Permanente Community Health Initiative implemented photovoice in support of nutritional improvements, physical activity and reductions in obesity (Kramer et al., 2010). Get Healthy Philly employed photovoice to examine tobacco issues (http://www.smokefreephilly.org/photovoices) and Witness to Hunger (http://www.witnessestohunger.org) uses it to raise awareness about childhood hunger and related issues. Supplemental resources needed to fully implement photovoice are contingent upon the topic. Students in my course had access to various maps, vital statistics, local health survey data, property data and the like.

Process

Students were instructed to keep the community perspective at the forefront. That is, they were to function as if the community in which the university is embedded was *their* community. They examined health-based data about the community (i.e. rates of obesity, amount of daily exercise). From there, they identified a health disparity of interest for the assignment. In addition to brainstorming, examining additional information (i.e. journal articles, environmental factors) and working as a team to develop an oral presentation, students also captured "data" (images) with cameras to inform the assignment. Using the SHOWeD technique (Wang, 1999), students discussed photos of the local community—the built environment, food stores, recreational areas, available services/organizations—in order to develop a collective understanding of what each image represented. The technique outlines the following questions: What do you ***S****ee* here? What is really ***H****appening* here? How does this relate to ***O****ur* lives? ***W****hy* does this situation, concern or strength ***e****xist*? What can we ***D****o* about it? Once this process was completed, students were able to connect the significance of the images to the health disparity.

Results

Students synthesized information—essentially using collectively selected photographs as data points—and crafted language for a resolution to potentially inform policy change. They developed and made an oral presentation, which articulated their narrative about the health disparity, community assets, next steps and recommendations. As an added perspective, they also engaged with a community representative during the presentation. Finally, the students submitted an abstract for a professional conference. The abstract was accepted and two students recently gave a presentation about the assignment at a national health conference.

In practice, evaluation is contingent upon course aims and the structure of the photovoice assignments. However, assessing written reflections about experiences with the SHOWeD technique, for example, is a possible evaluation tool. In sum, engaging photovoice as an active lens through which to learn about health disparities affords students:

- Opportunities to understand health disparities in a local context by creating, examining and using "real world" data;

- The chance to bring their own expressiveness to bear;
- The occasion, as emerging health professionals, to develop recommendations that address the identified disparity with practical solutions; and
- The chance to gain familiarity with a tool they can use in the future to engage with community members as well as to help give voice to community concerns.

Future Implications

Going forward, engaging additional community members is a primary goal. Broadening the use of photovoice into a complete research project would enhance learning and more directly benefit the community. Also, including a community representative as an "advisor" to the team (or teams) of students as they complete the project would afford the opportunity to work with and learn from the community. Finally, with the proliferation of iPads, it is possible to integrate video technology as a supplement to still images and an enhancement to the narrative about community concerns.

References

Kramer, L., Schwartz, P., Cheadle, A., Borton, E.J., Wright, M., Chase, C. & Lindley, C. (2010). Promoting policy and environmental change using Photovoice in the Kaiser Permanente Community Health Initiative. *Health Promotion and Practice*, *11*, 332-339.

Minkler, M., & Wallerstein, N. (2003). *Community Based Participatory Research for Health*. San Francisco: Jossey-Bass.

Wang, C. (1999). Photovoice: A participatory action research strategy applied to women's health. *Journal of Women's Health*, *8*, 185-192.

Wang, C., & Burris, M.A. (1997). Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment. *Health Education & Behavior*, *24*, 369-387.

Whitney, J.C. (2006). My Education: Students with Disabilities Describe High School in Pictures and Words. *Teaching Exceptional Children Plus*, *3*, 2 Article 1. Retrieved [September 20, 2012] from http://escholarship.bc.edu/education/tecplus/vol3/iss2/art1.

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Using Short Video Tutorials

Scott Jones[1]

Keywords: tutorials, video

Framework

Teachers have argued for the use of the Web 2.0 tool screencast software, such as Techsmith's Jing, to provide feedback on student course assignments (Lee, 2012). A screencast is a digital recording of computer screen output, also known as a video screen capture, often containing audio narration (Davis, 2012). A teacher might review a student's assignment on a computer and use screencast software to record video of the teacher's evaluation of the student's assignment, along with the teacher's comments. However, screencast software has other uses within a course, including video tutorials. Silva (2012) notes that few studies of the use of screen video capture software to create tutorials have been conducted, and of those the overall student impressions of such tutorials have been favorable.

The goal of this paper is to describe how teachers can use Web 2.0 screencast software to provide students with short video tutorials. As Urtel and Fernandez (2012) note, audio podcasts work best when short, and it is likely true of video tutorials as well. Although numerous screencast software applications exist, the focus of this paper will be on Jing (http://www.techsmith.com/jing.html), as at the time of this writing, it is free and relatively simple to use. Jing is available for Windows and Macintosh operating systems. The discussion of this application should be construed as one example of many, rather than as a specific product endorsement.

The Jing application captures the actions on a screen and stores them as a video file. Additionally, if the reviewer's computer is equipped with a microphone, audio may also be captured. Jing is limited to video captures of up to five minutes, which can be converted to the Flash format for viewing on Windows and Macintosh systems. Application upgrades from the free service allow longer videos and varied formats, including MPEG-4 for viewing on Apple mobile devices or uploading to a video-sharing website, such as YouTube. Captured videos can be shared: via a course management system, such as Blackboard or Oncourse; by converting the video to a format compatible with a video-sharing service such as YouTube, then uploading the video and sharing a link; or by uploading video to a website affiliated with Jing (www.screencast.com) that provides limited, free access for uploading and sharing videos.

Instructors can use video tutorials in several ways. They can be used to create quick lectures or demonstrations for a class as part of a planned lesson, which can be used to supplement instruction in a traditional classroom; or they can provide the student with a tutor-type of resource by allowing students to replay material. Further, the video tutorials would be useful as online content for hybrid (blended traditional face-to-face and online courses) or even fully-online courses.

The software would also provide an excellent tool for specifically answering student questions electronically, in an easy to understand or explain manner. When a student emails an instructor with a question, the instructor can generate a brief video explanation/response tailored

[1] scotjones@iuk.edu

to the student's concern. While a valuable tool for many courses, the strength of this tool would be best recognized in the hybrid and fully-online courses where visual content might be more beneficial for responding to student questions.

Making It Work

As an instructor, this author uses the screencast software in web design courses. Regardless of whether the courses are taught in a traditional or hybrid format, these courses require demonstrations on how to perform various actions with software or with code, and the screencast software easily captures such video and audio of the demonstrations and makes it available for replay. Should tutorials require more than the five minute limit imposed by the free version of the software, they can simply be broken down into a series of shorter segments. After examining other similar products, it is the opinion of this author that the screencast software is also superior for creating high quality, precise, static captures of parts of a screen. This feature is valuable for creating print documentation to supplement recorded videos.

As an instructor, this author also uses the screencast software to generate impromptu videos in response to student requests. If a student needed specific guidance on how to use Adobe Photoshop to slice an image into a webpage, this author would create a brief video demonstrating how to perform the activity. Similarly, if a student emails a question concerning issues with software, or with problems with HTML or CSS, a brief video response tailored to the solution would be generated and sent to the student. The use of the screencast software allows the instructor a similar degree of flexibility as if she were present in the classroom with the student. The benefit for the student is the receipt of tailored information she can review and replay until she gains the necessary degree of understanding, without requiring the student to necessarily be in the classroom.

Lastly, since many of the general student questions are repetitious in nature, the use of the screencast software allows the instructor to develop a Frequently Asked Questions (FAQ) resource of videos which students can examine for solutions to FAQs.

Future Implications

As digital media becomes easier to use, instructors across the spectrum of education will continue to find new ways to integrate it into teaching. Networked communication tools will become further integrated into our students' lives as bandwidth, processing power, and mobility improve, allowing Web 2.0 tools such as screencasts to become increasingly important means for interacting with students. Lastly, as institutions migrate to different platforms and formats for courses, tools such as screencast software can provide students with more of a sense of the presence of the instructor.

This topic was based primarily on pre-existing sources of information and could be enhanced by future researchers who might conduct larger scale studies of instructors and students.

References

Lee, K. (2012). Technology-mediated feedback. In Robin K. Morgan & Kimberly T. Olivares (Eds.), *Quick Hits for Teaching with Technology* (pp. 80-81). Bloomington, Indiana: Indiana University Press.

"Screencast." Ziff Davis. PC Magazine: Encyclopedia. (http://www.pcmag.com/encyclopedia_term/0,2542,t=screencast&i=60127,00.asp) Retrieved 31 July 2012

Silva, M.L. (2012). Camtasia in the classroom: Student attitudes and preferences for video commentary or Microsoft Word comments during the revision process. *Computers and Composition, 29*(1), 1-22

Urtel, M., & Fernandez, E. (2012). To podcast or not to podcast. In Robin K. Morgan & Kimberly T. Olivares (Eds.), *Quick Hits for Teaching with Technology* (pp. 37-38). Bloomington, Indiana: Indiana University Press.

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Book Review

How to Design and Teach a Hybrid Course: Achieving Student-Centered Learning through Blended Classroom, Online and Experiential Activities

Gordon Hensley[1]

Citation: Caulfield, J. (2011). *How to Design and Teach a Hybrid Course: Achieving Student-Centered Learning through Blended Classroom, Online and Experiential Activities*. Sterling, VA: Stylus Publishing. ISBN: 9781579224226

Publisher Description: This practical handbook for designing and teaching hybrid or blended courses focuses on outcomes-based practice. It reflects the author's experience of having taught over 70 hybrid courses, and having worked for three years in the Learning Technology Center at the University of Wisconsin-Milwaukee, a center that is recognized as a leader in the field of hybrid course design.

Jay Caulfield defines hybrid courses as ones where not only is face time replaced to varying degrees by online learning, but also by experiential learning that takes place in the community or within an organization with or without the presence of a teacher; and as a pedagogy that places the primary responsibility of learning on the learner, with the teacher's primary role being to create opportunities and environments that foster independent and collaborative student learning.

Starting with a brief review of the relevant theory – such as andragogy, inquiry-based learning, experiential learning and theories that specifically relate to distance education – she addresses the practicalities of planning a hybrid course, taking into account class characteristics such as size, demographics, subject matter, learning outcomes, and time available. She offers criteria for determining the appropriate mix of face-to-face, online, and experiential components for a course, and guidance on creating social presence online.

The section on designing and teaching in the hybrid environment covers such key elements as promoting and managing discussion, using small groups, creating opportunities for student feedback, and ensuring that students' learning expectations are met.

A concluding section of interviews with students and teachers offers a rich vein of tips and ideas.

How to Design and Teach a Hybrid Course: Achieving Student-Centered Learning through Blended Classroom, Online and Experiential Activities by Jay Caulfield offers a summary of effective pedagogy one can apply to any classroom, and proposes practical design tips for teachers of hybrid courses.

[1] Associate Professor and Theatre Education Coordinator, Department of Theatre and Dance, Appalachian State University, gordonhensley@att.net

Effective teachers often find themselves redesigning curriculum, researching new pedagogical approaches, and seeking refreshing changes to their courses. This helpful text provides an introduction to the hybrid model, teaching pedagogy, and designing a hybrid course. The book also highlights interview data about hybrid learning, teaching, and best practices. Caulfield concludes with actual interview data from hybrid course students and teachers, which is a clever way to investigate both sides of the hybrid experience.

The language of this book is directly aimed at teachers. Jay Caulfield succinctly explains hybrid learning and teaching, compares pedagogy styles and learning theories with a focus on experiential learning, and she compares traditional teaching to hybrid teaching. The book includes useful charts and samples of key components for visual learners. Caulfield dedicates two entire chapters to hybrid course learning strategies: discussion, and small group. In each chapter, Caulfield clearly previews information to be covered, gives information, provides examples, and ends by summarizes the information. The text is broken up into small, easily digestible, one-to-two paragraph sections. The book is absolutely accessible and not written solely for the tech savvy expert as one might expect. This text is applicable to all teachers.

From this book, teachers can expect to learn:

- The concept of hybrid learning and teaching;
- Skills and ideas for effectively creating hybrid learning experiences; and
- Data-driven justification for hybrid teaching and learning.

This text would be most useful as a resource to consider when preparing or redesigning a course, whether it be online, hybrid, or face-to-face. Teacher training programs could also recommend this book to their students because of the survey of pedagogical styles. Reading this book with time to reflect on each chapter is thought provoking as there are opportunities for practical application throughout. Caulfield seems to genuinely want to share her depth of knowledge and experience. The final reflection reveals her intentions with this book: "what I've written is, in essence, a reflection and culmination of my life experiences as a learner and a teacher." Her years of teaching and curriculum design experience are humbly reflected in this practical text.

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Book Review

Blended Learning: Across the Disciplines, Across the Academy

Norman Vaughan[1]

Citation: Francine S. Glazer, Editor. (2012). *Blended Learning: Across the Disciplines, Across the Academy.* Sterling, Virginia: Stylus. 138 pages. ISBN: 978-1-57922-324-3 (pbk)

Publisher Description: This is a practical introduction to blended learning, presenting examples of implementation across a broad spectrum of disciplines. For faculty unfamiliar with this mode of teaching, it illustrates how to address the core challenge of blended learning—to link the activities in each medium so that they reinforce each other to create a single, unified, course—and offers models they can adapt.

Francine Glazer and the contributors to this book describe how they integrate a wide range of pedagogical approaches in their blended courses, use groups to build learning communities, and make the online environment attractive to students. They illustrate under what circumstances particular tasks and activities work best online or face-to-face, and when to incorporate synchronous and asynchronous interactions. They introduce the concept of layering the content of courses to appropriately sequence material for beginning and experienced learners, and to ensure that students see both the online and the face-to-face components as being equal in value and devote equal effort to both modalities. The underlying theme of this book is encouraging students to develop the skills to continue learning throughout their lives.

By allowing students to take more time and reflect on the course content, blended learning can promote more student engagement and, consequently, deeper learning. It appeals to today's digital natives who are accustomed to using technology to find and share information, communicate, and collaborate, and also enables non-traditional students to juggle their commitments more efficiently and successfully.

Blended Learning: Across the Disciplines, Across the Academy is an edited book by Francine Glazer. The book describes five blended learning case studies. The case studies are from a variety of disciplines and institutions in American higher education. The authors of each case study have taken a self-study approach to explore their blended learning courses (Bullough & Pinnegar, 2001).

The introductory chapter of this book does an excellent job of setting the stage for the five case studies by clearly defining blended learning as "courses [that] employ active learning strategies through the use of a variety of pedagogical approaches (p.3) . . . When done well, blended learning combines the best attributes of face-to-face and online courses" (p.7). Glazer also indicates that "one size does not fit all" when it comes to course redesign and that the

[1] Professor in the Department of Education and Schooling, Faculty of Teaching and Learning, Mount Royal University, Calgary, Alberta, Canada.

"challenge of blended learning is to link, or blend, what happens in each medium so that face-to-face and online activities reinforce each other to create a single, unified course" (p.1). Avoiding what Twigg (2003) refers to as the course and a half syndrome.

Each case study describes the author's personal course redesign journey for blended learning. These chapters include rich personal narratives, course descriptions, lessons learned, and a description of the educational framework that was used to guide the course redesign process. Barkley (2006) stresses the importance of communicating these conceptual frameworks to our students so that they can become the "architects of their own learning" (p.1).

Two of the authors have used the revised version of Bloom's taxonomy of educational objectives (Krathwohl, 2002) to determine how to sequence the online and face-to-face learning tasks. For example, Carl Behnke in his Culinary Arts course indicates that "most of the online resources are geared toward basic remember and understanding dimensions, reserving the lecture for higher-order tasks of analyzing and evaluating" (p.17). This is similar to the approach that Tracey Gau uses in her World Literature course, "Lower-level objectives can be addressed and achieved online so that valuable class time is not spent merely summarizing" (p.91). Both authors emphasize "effective integration and leveraging the best of both techniques" (p.17). This approach to course redesign has been referred to as the 'flipped approach' where students complete individual web-based learning activities, outside of class time, and then work on collaborative problem solving activities, in-class (Baker, 2000).

Francine Glazer has combined a team-based learning and case-study approach to begin the implementation of a blended design for her Principles of Genetics course. Team-based learning is a highly structured form of cooperative learning where students are grouped into permanent teams for the semester and work on sophisticated problems and applications (Michaelson, Knight, & Fink, 2004). Whereas, the case-study approach helps students deal with abstract material by providing a story line to make the material more accessible (Styer, 2009).

A rapid formative assessment approach based on the Angelo and Cross' (1993) classroom assessment techniques (CATs) framework has been used by Alan Aycock to guide the blended learning redesign of his Survey of World Cultures (SWC) course. Aycock describes CATs as "very short – typically one-page – assignments in which students respond to a question that reveals the extent of their learning or the tenor of their response to a particular module or course content . . . they are always *formative* or *progressive assessments* that occur during the learning process and therefore evoke a quality of immediacy that promotes rapid feedback (the hallmark of blended learning) and multiple voices in the classroom" (p.72).

Finally, Robert Hartwell and Elizabeth Barkley have used the concept of differentiation as the framework to anchor the blended redesign of their Music of Multicultural America (MMA) course. This is a "systematic approach to planning curriculum and instruction" (Tomlinson & Strickland, 2005, p. 6) where "teachers individualize course elements such as content (the stuff we teach), process (the ways learners make meaning of content), and product (how learners demonstrate what they have come to know, understand, or do)" (p.115). For the MMA course, students choose from a menu of online and face-to-face activities that best meets their personal, scheduling, and learning needs. Some students do the entire course online or face-to-face, whereas about 60% combine both delivery methods.

Overall, I thoroughly enjoyed reading the book *Blended Learning: Across the Disciplines, Across the Academy* as I discovered that each chapter had a 'key take away' or 'lesson learned' that I could directly apply to my own blended learning courses. This book also

provides some very valuable advice about how to manage the workload of a blended course and how to sustain the blend through the use of a community approach.

Personally, I found there were several limitations to this book. First, all of the blended learning cases were written from the perspective of the teacher. With the exception of the Hartwell and Barkley case, the voice of the students was noticeably absent. For me this is somewhat problematic as the goal of blended approach to learning is to promote student engagement and success. Second, how do we know if any of these course redesigns made a difference for the students? Gau describes the evaluation approach that she used for her World Literature course (e.g., pre and post course surveys, increase in course success rates - percentage of students receiving an A, B or C in the course) but again, I found this lacking in the other cases.

Despite these shortcomings, I would recommend *Blended Learning: Across the Disciplines, Across the Academy* to faculty members in higher education who are contemplating redesigning their courses for blended learning. The insights and lessons learned from each of the cases are very useful and can immediately be put into practice.

References

Angelo, T., & Cross, P. (1993). *Classroom Assessment Techniques* (2nd ed.). San Francisco: Jossey-Bass.

Barkley, E. (2006). Honoring student voices, offering students choices: Empowering students as architects of their own learning. *National Teaching and Learning Forum*, *153*(3), 1-6.

Baker, W.J. (2000). The 'classroom flip': Using web course management tools to become the guide by the side. Selected Papers from the *11th International Conference on College Teaching and Learning* (11th, Jacksonville, Florida, April 12-15, 2000).

Bullough, R.V., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study research. *Educational Researcher*, *30*(3), 13-21.

Krathwohl, D.R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice*, *41*(4), 212-218.

Michaelson, L.K., Knight, A., & Fink, D. (Eds.). (2004). *Team-Based Learning: A Transformative Use of Small Groups in College Teaching*. Sterling, VA: Stylus.

Tomlinson, C., & Strickland, C. (2005). *Differentiation in Practice: A Resource Book for Differentiating Curriculum, Grades 9-12.* Alexandria, VA: Association for Supervision and Curriculum Development.

Twigg, C. (2003). Improving learning and reducing costs: New models for online learning. *Educause Review*, *38*(5), 28-38.

Styer, S.C. (2009). Constructing and using case studies in genetics to engage students in active learning. *American Biology Teacher*, *71*(3), 142-143.

JoTLT
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The Journal of Teaching and Learning with Technology (JoTLT) is an international journal dedicated to exploring efforts to enhance student learning in higher education through the use of technology. The goal of this journal is to provide a platform for academicians all over the world to promote, share, and discuss what does and does not work when using technology in postsecondary instruction. Over the last few decades, faculty have progressively added more and more sophisticated technology into their courses. Today, the variety of technology and the creative ways in which technology is being used is simply astonishing, whether in-class, online, or in a blended format. In the final analysis, however, it isn't whether our students - or faculty members - like the technology that matters but whether the addition of these technological tools results in or expands access to quality student learning. JoTLT will play a prominent role in helping higher education professionals better understand and answer these questions.

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Submissions

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- Empirical Manuscript: Manuscripts in this category should provide qualitative or quantitative evidence demonstrating the effectiveness of the technology in increasing student learning. Each manuscript should include sufficient detail to allow another educator to use the technology in his or her own course.

- Book Reviews: Book Reviews can be submitted for recently published works related to teaching and learning with technology. These manuscripts are typically less than 1500 words in addition to the complete citation of the book and the publisher's description of the book.

- Case Studies: These studies illustrate the use of technology in regards to teaching and learning of higher education students, usually generalizable to a wide and multidisciplinary audience.

All submissions for JoTLT should be submitted using the online submission process.

Please follow this link to get more detailed information on the submission process for the Journal of Teaching and Learning with Technology: http://jotlt.indiana.edu/about/submissions#onlineSubmissions

If you have additional questions or run into problems please contact the journal at jotlt@iu.edu

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Style Sheet for the *Journal of Teaching and Learning with Technology*

John Dewey[1] **and Marie Curie**[2]

Abstract: This paper provides the style sheet for the Journal of Teaching and Learning with Technology. Manuscripts submitted for publication should adhere to these guidelines.

Keywords: clickers, iPad, tablet, retention, engagement.

I. General Guidelines for the Manuscript.

The final manuscript should be prepared in 12-point, Times New Roman, and single-spaced. Submissions being reviewed should be double-spaced. All margins should be 1 inch. The text should be fully left- and right-justified. The title (in 16 point bold) and author's name (in 12 pt. bold) should be at the top of the first page. The author's name should be followed by a footnote reference that provides the author's institutional affiliation and address. The abstract should be indented 0.5" left and right from the margins, and should be in italics.

Except the first paragraph in a section subsequent paragraphs should have a 0.5" first line indent. Use only one space after the period of a sentence (word processors automatically adjust for the additional character spacing between sentences). The keywords should be formatted identically to the abstract with one line space between the abstract and the keywords. Authors should use keywords that are helpful in the description of their articles. Common words found in the journal name or their title article are not helpful.

Pages should be unnumbered since they will be entered by the Journal editorial staff. We will also insert a header on the first page of the article, as above.

References should be incorporated in the text as authors name and date of publication (Coffin, 1993), with a reference section at the end of the manuscript (see below for the desired format for the references). Titles of articles should be included in the references in sentence case. Unless instructed otherwise in this Style Sheet, please use APA style formatting. Footnotes should incorporate material that is relevant, but not in the main text.

A. Plagiarism.

It is essential that authors refrain from plagiarism. Plagiarism is a violation of ethics and, in serious cases, will lead to a manuscript being rejected by this journal. No future manuscripts will be accepted from authors who have submitted a plagiarized manuscript.

[1]Department of Educational Philosophy, Indiana University Northwest, 3400 Broadway, Gary, IN 46408, jdewey@iun.edu.
[2]Institut Pasteur, University of Paris, 75015 Paris, France.

B. Unique work.

This journal does not accept previously published work. We also do not accept work that is being considered for publication by another journal. If your manuscript is accepted, you will be required to sign a form stating that your manuscript has not been previously published.

II. Section and Sub-Section Headings.

A. Major Sections.

Major section headings should be flush-left, bold-faced, and Roman numeral numbered. Major section headings should have one-line space before and after. The first paragraph(s) of the article do not require a major heading.

B. Sub-Sections.

Sub-section headings should also be flush-left, in italics, and alphabetically numbered. Sub-section headings should have a one-line space before and after. Sub-sub-sections should appear at the beginning of a paragraph (i.e., with an 0.5" indent, followed immediately by the text of the sub-sub-section), with the heading also in italics.

III. Tables and Figures.

Tables and figures should be inserted in the text where the author believes they best fit. They may be moved around a little to better correspond to the space requirements of the Journal. If necessary, tables and figures may occupy an entire page to ensure readability and may be in either portrait or landscape orientation. Insofar as possible, tables should fit onto a single page. All tables and figures should be germane to the paper. Tables should be labeled as follows with the title at the beginning (in bold), with data entries single-spaced, and numbered. Column labels should be half-line spacing above data.

Table 1. The title of the table.

Unit	Length, inches
Point	1/12
Pica	1/6

Figures should have their captions follow the image. Captions should be single-spaced, with title in bold. Additional text should not be in bold. The Editorial staff may adjust layout to allow optimal use of space.

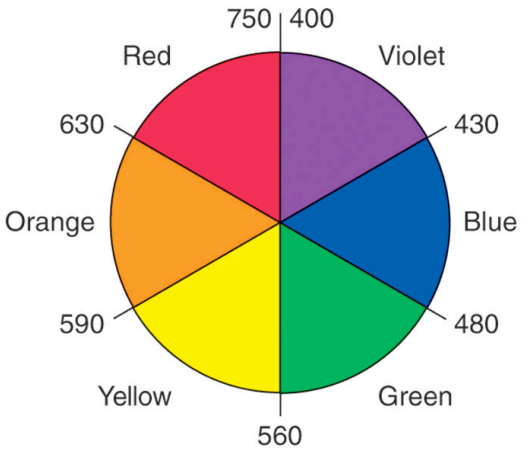

Figure 1. Color wheel with wavelengths indicated in millimicrons. Opposite colors are complementary.

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Acknowledgements should identify grants or other financial support for this research by agency (source) and number (if appropriate). You may also acknowledge colleagues that have played a significant role in this research.

Appendix

Please insert any appendices after the acknowledgments. They should be labeled as follows:

Appendix 1. The Title of the Appendix.

References

Coffin, D.A. (1993). Using the competitive edge. *Journal of Economic Education*, *24* (1), 62-69.

Garcia, J. and Rodriguez, P. (2002). The determinants of football match attendance revisited: Empirical evidence from the Spanish football league. *Journal of Sports Economics*, *3* (1), 18-38.

Hamilton, S. J. (1995). My name's not Susie: A life transformed by literacy. Portsmouth, NH: Boynton/Cook Publishers.

Pappas, D. (2004). Fixing the fan cost index: A more realistic view. Retrieved April 21, 2004, from http://www.baseballprospectus.com/article.php?articleid=2790.

Contact Info for the Journal

JoTLT Editorial Office

Indiana University Purdue University Indianapolis
755 W. Michigan St, UL 1180D
Indianapolis, IN 46202

jotlt@iu.edu

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