

Does Age And Gender *Really* Play A Role In Faculty's Use Of Instructional And Assessment Technologies?

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Abstract: This paper examines the use of technology by faculty at the higher education level. The data used was from a case study of a liberal arts college in the Northeastern United States. It examines whether there is a difference in use of technology for assessment purposes and instructional purposes based on age or gender. This study found there is no significant difference between genders regarding their use technology for assessment or instructional purposes, nor was there a difference between age groups and their use of technology for assessment purposes. The data did reveal interesting indications that suggested the possibility of age influencing the degree to which technology is used for instructional purposes. Namely, educators above the age of 55 used technology more often than educators between the ages of 40 and 55.

Introduction

The relative affordability of today's technology offers education professionals a wider range of options in the way they present material to their students, and how they may assess the progress of their students. This paper examines the use of technology by faculty at the higher education level, which may lead to further insight as to what degree education professionals are seeking these capabilities. The use of technology by faculty in colleges and universities have been studied widely, including present and future uses, testing age, gender, length of teaching careers, and other factors. Kelly (2005) published a case study of a liberal arts college in the Northeast United States. A closer look at the items in his survey resulted in an indication of an area to be further investigated, namely, was there a difference in use based on the use of technology related to instruction versus use of technology for assessment/administration of a class, across age and gender.

The relationships of age, gender, years of teaching, et al. to uses of technology are masked by grouping the uses as one construct. The use of technology was related to total length of time teaching and length of time teaching at present school. New teachers that used technology less than others may be attributed to the time required for them to acclimate into the culture of the school. Educational setting, teaching style, level of teacher/student interaction, type of technology, student learning style, and complexity of technology may all play a role in the degree of technology use within instructional practices. Additionally, the gender and age of educators may play a role in technology use.

This research will answer: 1. is there a difference between faculty gender and use of assessment technology and instructional technology? And, 2, is there a difference between faculty age and use of assessment technology and instructional technology?

Literature Review

Technology has been used in educational settings in various forms over the years. Schmidt (1996) described the Middle Tennessee State University Instructional Technology Support Center but the focus was on hardware and software use in classrooms, not analyzing and creating better approaches to learning. Albright (1996) proposed a clear difference between informational technology and instructional technology, citing the Association for Educational Communications and Technology's 1977 definition: '[instructional technology] is a complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems involved in all aspects of human learning' (p. 2). He proposed a shift from "teacher-centered instructional paradigm to a learner-centered paradigm... and a significant transformation from the ways we've traditionally approached college teaching" (p.4). Educators that have a clear understanding of how technology works, what categories technology can be broken into, and how it can be applied to educational settings, may result in a more effective method of proper applications within that setting.

The degree to which educators apply technology within their instructional practices have been suggested to be influenced by various factors. Bahr, Shaha, Farnsworth, Lewis and Benson (2004) proposed providing teacher candidates with courses addressing technology in instruction. Yang and Lu (2001) reported that faculty of MBA programs at schools of business tended to use technology less due to the interactive style and collaborative nature of class sessions. Peluchette and Rust (2005) found that use of technology was a function of the time required to learn how to use the technology for instruction, and how cumbersome was the technology for the teacher and for the students. They also found that female teachers had a tendency to use technology less than male teachers for instruction due to consideration of different learning styles of students. Russell, O'Dwyer, Bebell and Tao (2007) declared the importance of performing analyses on the individual items of technology rather than grouping them together.

The clarity educators have in methods that technology can be used to facilitate instruction and learning may be a factor determining the level in which they adopt it within their practices. Baia (2009) "examined the importance of faculty's commitment to pedagogical quality (CPQ) in predicting instructional technology adoption" (p. 1). Her study analyzed the relationship of title, years teaching in higher education and tenure status. She cites a 2006 study by Mishra and Koehler who developed a model where technology, content and pedagogy intersected, and she stated: "Faculty are primarily hired because they are subject matter experts in their field, but do not necessarily have pedagogical knowledge. When considering the adoption of instructional technology, both content and pedagogy should be considered as a unit" (p. 4). If educators are given the chance to learn how to apply the use of instructional technology to the context of the content within their curriculum, the level of their commitment and effectiveness in using such technology may increase.

Russell et al. (2007) stated that relationships of age, gender, years of teaching, et al., to uses of technology, are masked by grouping the uses as one construct. They also found that use of technology was related to total length of time teaching and length of time teaching at present school. Less use by new teachers was attributed to time required to fit into the culture of the school. Previous studies appear to suggest that educational setting, teaching style, level of teacher/student interaction, type of technology, student learning style, and complexity of technology may all play a role in the likelihood of technology use within instructional practices. Additionally, the gender and age of educators may play a role in technology use, but further exploration within previously investigated constructs may be necessary to determine this.

Methodology

Kelly (2005) did a case study of a liberal arts college in the Northeast United States, exploring the use of technology by faculty, for instruction, operational support given by the college, and development of faculty in the use of technology.

To address the research questions, an examination of items on the Kelly instrument researched and analyzed the items and selected some of them to represent instructional technology and assessment technology. then, by factor analyzing them were able to select the best fit into two new variables, instructional technology and assessment technology. Items affecting the reliability were eliminated. Assessment technology was defined by original questions

from the Kelly instrument, 4, 5, 22, 23, 24, 25, 26i. Instructional technology was defined by questions from the Kelly instrument, 1, 2, 3, 6, 7, 10, 12.

Items were renumbered for clarity purposes. Items used for the Assessment Technology variable (reliability = 78.7%):

1. Web Portal/Intranet.
2. Web Portal to view class rosters.
3. Web Portal to access student records.
4. Web Portal to submit grades.
5. Blackboard course management software use – online gradebook.

Items used for the Instructional Technology variable (reliability = 70.5%):

1. Presentation software such as Powerpoint to deliver instructional materials.
2. Word processing software to create instructional materials i.e., lecture notes, assessments.
3. Smart Room technology to enhance instruction.
4. Simulation / Modeling software for instruction.
5. Graphic Software such as Photoshop to display images.
6. Search Engines such as Google to locate online sources.
7. Digital camera for acquiring images to use in lectures and presentations.

To answer the first research question, is there a difference between faculty gender and use of assessment technology and instructional technology, a *t*-test for gender was conducted for assessment technology and instructional technology.

To answer the second research question, is there a difference between faculty age and use of assessment technology and instructional technology, a one-way analysis of variance was conducted including a Post Hoc DunettT3 to compare the 3 age groups to one another for assessment technology and instructional technology.

Results

Is there a difference between faculty gender and use of assessment technology and instructional technology?

An independent-samples *t* test was conducted to evaluate the hypothesis that the degree of technology used for assessment differs between women (22) and men (36). The test was not significant, $t(54) = -1.06$, $p = .29$. Women's use of technology was not significantly different ($M = 9.31$, $SD = 4.65$) compared to men's use of technology ($M = 10.70$, $SD = 4.80$).

An independent-samples *t* test was conducted to evaluate the hypothesis that the degree of technology used for instruction differs between women (22) and men (36). The test was not significant, $t(53) = 0.44$, $p = .67$. Women's use of technology was not significantly different ($M = 20.09$, $SD = 5.09$) compared to men's use of technology ($M = 19.50$, $SD = 4.11$).

Is there a difference between faculty age and use of assessment technology and instructional technology?

A one-way analysis of variance was conducted to evaluate the relationship between age of educators and the degree that they use technology for assessment. The independent variable, age, included 3 levels of age groups: 11 participants were in group 1 (age 25-40), 22 participants were in group 2 (age 41-55), and 25 participants were in group 3 (age 56+). The dependent variable was the degree of use of assessment technology. The ANOVA was not significant, $F(2, 53) = 1.32$, $p = .28$.

A one-way analysis of variance was conducted to evaluate the relationship between age of educators and the degree that they use technology for instruction. The independent variable, age, included 3 levels of age groups: group 1 (age 25-40), group 2 (age 41-55), and group 3 (age 56+). The dependent variable was the degree of use of instructional technology. The ANOVA was not significant, $F(2, 54) = 2.28$, $p = .11$.

Post Hoc follow-ups show that differences were more likely to occur between group 1 and group 2 ($p = 0.081$) group 1 was higher than group 2. However, we found no differences between group 1 and group 3. The following figure shows an interesting pattern between ages. Faculty (25-40) and older faculty (56+) seemed more interested in the use of technology for instruction.

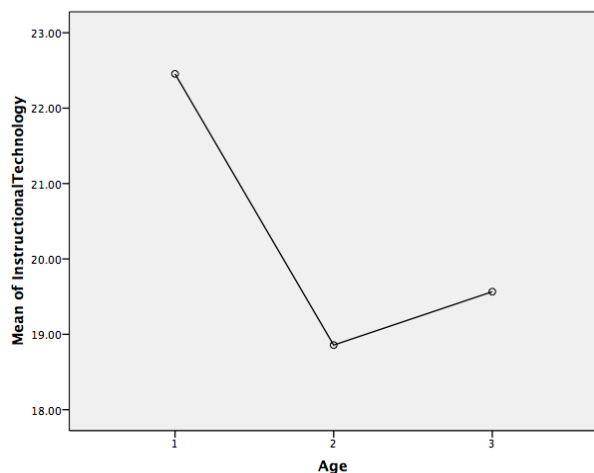


Figure 1. Age and Technology Use for Instruction

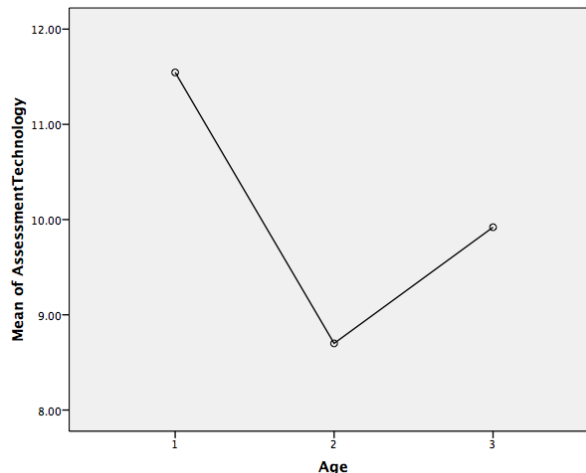


Figure 2. Age and Technology Use for Assessment

Figure 1 shows the groups numbered by age, and their interest in use of technology for instructional purposes.

Figure 2 shows the groups numbered by age, and their interest in use of technology for assessment purposes.

Conclusion and Discussion

The results of the tests conducted found no significant difference between gender or age and the use of assessment technology. In addition, there was no significant difference between gender and use of instructional technology. However, the results did show a suggested difference between age and the use of instructional technology. Data indicated the first group tends to use instructional technology more than the second group. We also found it interesting that the third group used instructional technology more than the second group.

Although this study did not find any evidence that an educators gender was a factor in determining whether or not they are likely to use technology for instruction or assessment, we did find that there may be a relationship between an educators age and whether or not they use technology for instructional and assessment purposes.

To the contrary of Russel (2007), our expectations were that younger teachers would use technology the most, followed by a decline in usage with an increase in an educator's age. The data in this study suggested that educators from 25 to 40 tend to use more technology than educators 41 to 55. Surprisingly, however, the percentage of educators above 56 years of age that used technology was higher compared to educators aged 41 to 55.

Based on previous research, we found suggested several possible factors that may influence how likely a teacher may use technology. One possibility may be related to an educators teaching style, and the level of interaction between the teacher and student. A teacher may not initially use technology during a class discussion. However, we have found the use of recording salient points by typing them into a computer and projecting them onto a screen allows students to see the development and progression of a free flowing discussion. While this can be achieved on a chalkboard as well, chalk notes require students to take notes. Electronic recordings allow teachers to distribute the information via email and like mediums.

The time required to learn the technology available may play a factor as well. The more difficult the technology is, the less likely it may be used. Careful selection of technology that is less cumbersome should be

considered. Specialized training should be tailored to the subject matter being taught, as well as to the teachers existing abilities. In higher education, professors are often hired because they are subject matter experts in their field. This however, does not mean they are well versed in delivering instruction, or using technology to help in doing so. Having a staff that can assess these factors and train new teachers may result in maximizing instructional effectiveness.

We also found reported instances where a teacher's use of technology was based on how long they were in a particular setting. This could be initially seen on the surface as a relationship with educators age, since many "new" teachers in a setting are new because they recently completed their training. However, many "experienced" educators scored low on the amount of technology use. The common factor between these younger teachers and experienced teachers was how long they were in their educational setting. The longer they were in their setting, the more likely they were to use technology. We felt this may be due to the distractions of a new educator simply struggling with acclimating to their new setting. As a result, employment of technology may be "put on the backburner" instead of taken advantage of. Again, we feel that an existing staff's awareness of these issues could allow for the inclusion of technology in the initial orientation training of new teachers.

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