Self-Directed Learning: College Students' Technology Preparedness Change in the Last 10 Years

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Abstract

This study compares a sample of approximately 44 first year college students in 2005 and 2015 on Long Island, New York, in their technology preparedness and self-directed instruction. The researchers used a survey instrument including demographic information focused upon students' preparation for classroom technology in high school and college. First, the study compared the extent to which students use self-directed instruction relative to proficiency in technology in 2005 and 2015. Second, the study examined the technology preparedness in high schools and colleges. Third, the study compared the difference in technology preparedness in high school and college between students in 2005 and 2015.

The 21st century high school and college student tends to favor a more independent, autonomous learning style that makes them more assertive information seekers and shapes how they approach learning in the classroom (Carlson, 2005). Over a decade since then-President of the Massachusetts Institute of Technology (MIT), Charles Vest, first made all courses available for free use online, the educational world has changed drastically. (Sheu, Lee, Bonk & Kou, 2013). Currently, students are increasingly utilizing online environments for their learning needs as they not only seek professional growth and development, but also to pursue their learning interests (Bonk, Miyoung, Kou, Xu & Sheu, 2014). Open educational resources, (OER), open courseware (OCW), massive open online courses (MOOCs), hybrid (or blended courses), and flipped (or inverted) classrooms offer self-directed learners the technologies to be able to acquire a skill or study an endless array of topics. Other educators, however, feel that by incorporating greater autonomy in learning, the higher education system will suffer and that although students may be digital natives, they do not necessarily understand how their use of technology affects their literacy or habits of learning (Barnes, Marateo & Ferris, 2007; Oblinger & Oblinger, 2005). Therefore, as society seems to be shifting towards a more free and open educational platform, advances in self-directed learning technology are disruptive forces to the traditional higher education environment, forcing learning institutions to embrace these trends for their future success.

Purpose of the Study

The purpose of this study is to compare the extent to which first-year college students in 2005 and 2015 use self-directed instruction relative to proficiency in technology on Long Island, New York. Data for this study was drawn from the initial study of Perceptions of Recent High School Graduates on Educational Technology Preparedness for College (Brachio, 2005). In this study, Brachio defined educational technology competency through the following concepts: Spreadsheet, General Computer Use, Advanced Word Processing, Share Information, Power Point Presentations, Basic Word Processing, and Ethical Use of Computers. The 2015 study adds the additional concept of Social Media, and examines the difference in which high schools and colleges prepare first-year college students for proficiency in technology. Lastly, the study compares the difference in technology preparedness in high school and college between students in 2005 and 2015.

Theoretical Framework

In today's fast-paced world, students can access information anywhere and anytime thanks to mobile devices such as smartphones and tablet computers. The attitudes and perceptions of digital learners towards the use of computer technology is essential to better understanding the relationship between technology preparedness and self-directed learning.

First, it is necessary to define what self-directed learning entails. Knowles (1989) defined self-directed learning as a "process in which individuals take the initiative, with or without the help from others, in diagnosing their learning needs, formulating goals, identifying human and material resources, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (pg. 18).

According to standards developed by the International Society for Technology in Education (ISTE), students should be able to demonstrate personal responsibility for lifelong learning by demonstrating a sound understanding of technology concepts, systems, and operations. This included a student-centered learning model as an essential condition for planning, teaching, and assessment based on the needs and abilities of students (www.iste.org).

In 2000, Ben-Jacob, Levin, and Ben-Jacob believed that the student of the new millennium would be more academically independent, self-motivated, and better able than their educational predecessors. The authors also opined that the typical student would be technologically astute and prepared to tap into the vast potential for technologically assisted learning. Now in 2015, with the evolution of OER, OCW, and MOOCs, today's student must effectively manage the endless array of learning resources available; often with little or no guidance (Sheu et al., 2013).

High School Level Perspectives

Kahveci (2010) investigated high school students' motivation to use technology for learning comparing varying personal characteristics such as gender, grade level, content area of interest, and previous experience in using technology for learning. The study suggested that students in grades 9-12 had a positive attitude towards the use of technology for their learning and recommended that educators should integrate technological components to foster student learning and motivation to learn. In a similar study conducted in 2014 by Demir, Yasar, Sert and Yurdugul, the researchers examined Turkish students' self-directed learning attitudes towards computers in either a public middle or secondary school. They found that as students adopted computers more, they used them more often for self-directed learning. This learning typically occurred outside of schools and was related to computer self-efficacy through e-learning environments.

In a 2009 teacher survey of technology conducted by the National Center for Education Statistics, 78 percent of high school teachers reported using independent learning as the most effective means for preparing them for educational technology in the classroom. The following year, in a Speak Up 2010 survey of K-12 students, parents, and educators regarding the role of technology for learning, while 74 percent of high school teachers, 72 percent of high school principals, and 62 percent of parents of high school aged children said that they felt their school was "doing a good job using technology to enhance learning and/or student achievement," only 47 percent of high school students agreed (www.tomorrow.org/speakup, pg. 15).

College Level Perspectives

In a 2014 MIT study by Bonk et al., the researchers surveyed the learning preferences, motivations, achievements, obstacles, and possibilities for life change of self-directed online learners. The results of their survey revealed that nearly 85 percent of students used self-directed online learning to learn a new skill or competency whereas 70 percent used self-directed online learning for self-improvement or curiosity. The most common reason for such self-directed learning included intrinsic motivation with lack of time being the most significant obstacle for using the resource.

Identifying second year college students' attitudes and self-efficacy towards m-learning (mobile and smartphones, tablets), Yang (2012) identified that the students' computer self-efficacy and attitudes were core factors which affected the success of m-learning in the classroom.

The Educator's Perspective

Although most educators would generally agree that 21st century competencies demand fundamental changes in how student learning will occur, there seems to be a divide in teacher preparedness as well as perceptions of how classrooms should change in order to better prepare young people to be educated for careers that do not yet exist.

Newby, Stepich, Lehman and Russell (2000) stated that due to learner-centered instruction allowing students to engage with various sources of potential information to gain insights into a problem, the teacher's role would "shift to one of guide and facilitator who assists learners in achieving their learning goals" (pg. 7). Christensen, Horn and Johnson (2008) believed that by acting as learning coaches and tutors, teachers would spend more of their time assisting students individually, helping students find the learning approach that makes the most sense for them. This decentralized view of teaching learning was not to be viewed as an abandonment of instructional responsibility, but rather as an embracing of the core skills and capacities that students needed to be successful (Zmuda, 2009).

Li (2007) reported limited participation from students when schools made technology initiatives. Instead, his findings reported that many teachers did not share the same beliefs about technology due to a fear of being replaced by computers. Some teachers had even described reluctance to structure technology-enhanced learning projects with students whom they felt were more technologically savvy than they were since they did not grow up with using the Internet as much as today's learners (Greenhow, Walker & Kim, 2009). However, in order to take advantage of a technology-supported learning environment, good teaching and learning required an awareness of students' level of understanding, dynamic adjustment of delivery and content, and the active engagement of students in their learning (Lv, 2014). Mehaffy (2012) recommended hybrid courses (blending a traditional course with face-to-face and online instruction) and flipped classrooms (content is delivered as homework with class time reserved for collaboration, discussion, and addressing misperceptions) as an entry point for teachers to see the power of an Internet portion of a course, making them more open to including online portions in their courses for the future.

Johnson (2006) encouraged a faculty-led movement to embrace technology through the use of professional development taught internally by faculty members,

computer information system faculty, or by acknowledged experts or "technology gurus" within the school. Similarly, Eickelmann (2011) believed that strong leadership, schoolwide adoption of computer technology, a focus on the implementation process, collaboration with external partners and with other schools as essential for promoting sustainable implementation of 21st century skills in the classroom.

In 2015, Lai studied the influence of teacher behaviors on undergraduate foreign language students regarding learners' self-directed use of technology outside the classroom. Using three conceptual models of teacher support including affection, capacity, and behavior, the researcher noted the importance of raising teachers' awareness of the different roles they played in enhancing the abilities to perform a combination of roles to promote student self-directed use of technological resources for learning outside the classroom. Thus, it was important for professional development programs to stress teachers' responsibilities for, as well as the various ways they could influence students' self-directed technology use outside the classroom.

In contrast, some research has found that although students recognized the potential and significant role of technology in teaching and learning, the recognition was limited to the use of technology as an instructional medium, but not a key determinant of learning. Instead, the student-teacher relationship was the primary factor for engaging students in a way that helped them find education satisfying. Students were not as concerned with technology specifically, but rather the autonomy, relevance, and connectedness that it often provided (Ali and Elfessi, 2004; Lemley, Schumacher and Vesey, 2014).

Overall, the research indicates a need for educators in the 21st century to recognize the more self-directed learning style of today's students while creating improved professional development opportunities in technology for teachers in order to maximize the potential of emerging technologies in the classroom, designing a 21st century learning experience to better prepare students for the future (Ben-Jacob et al., 2000; Bonk et al., 2014; Christensen et al., 2008; Demir et al., 2014; Eickelmann, 2011; Johnson, 2006, Newby et al., 2000).

Sample and Instrument

The sample includes 44 first-year college students from the years 2005 (n=29) and 2015 (n=15) on Long Island, New York from two colleges. Brian Brachio's 2005 study had a sample of 134 college students responding. Twenty-nine first-year college students were selected to be contrasted with the students from a similar setting in 2015. In 2015, the researchers surveyed 18 students as a convenient sample, looking to match demographics of the 29 first-year college students in the Brachio 2005 study. Fifteen were first-year college students. A 74-item survey instrument was applied including demographic information focused upon students' preparation of classroom technology, measured on a five-point Likert Scale (Strongly Disagree -1, Disagree -2, Neutral - 3, Agree - 4, and Strongly Agree -5). Survey participants selected applicable technology items on the survey based on the categories: high school preparation, college usage, and whether or not each skill was acquired through self-taught learning. Sixty-five items on the survey were designed by Brian Brachio (2005, p. 143) and was constructed using survey questions from Sormunen, Ray and Harris (2005); Ali and Elfessi (2005); Gupta and Houtz (2000); and Long (2003) with an additional nine social media items designed for this study by Caravello, Jiménez and Kahl in 2015. In the Brachio study, Cronbach's alphas were .89 for spreadsheet, .89 for general computer use, .84 for advanced Word processing, .85 for share information, .82 for Power Point presentations, .73 for basic Word processing, and .67 for ethical use of computers. Cronbach's alphas for the additional nine social media items for high school were .96 and .95 for college.

Data Sources

Data from 2005 was taken from a larger study conducted by Brian Brachio (2005) entitled, "Perceptions of Recent High School Graduates on Educational Technology Preparedness for College" at Dowling College in Oakdale, New York. Additional data was collected in 2015 at Dowling College in Oakdale, New York and Stony Brook University in Stony Brook, New York. All participants were anonymous. The data analysis included eight factors, including the seven concepts from the 2005 study (**Tables 1 - 1.7**) with the addition of Social Media for the 2015 study (see **Table 1.8**).

Research Questions and Method

This study asks the following research question: To what extent do first-year college students use self-directed instruction relative to proficiency in technology in 2005 and 2015? The researchers used frequency analysis.

Results

Results of the study indicate a significant amount of students utilize self-directed instruction to obtain proficiency in the use of technology.

Tables 1.1 - 1.8 display forty questions from the survey that resulted in changes between 2005 and 2015 in self-directed learning items along with nine questions regarding self-directed learning in regard to social media. The three items with the greatest differences between 2005 and 2015 were creating a bookmark (51 percent), opening and navigating between one or more browsers at a time (62 percent), and accessing email (52 percent). The dimensions of the greatest differences between 2005 and 2015 were Spreadsheet (up 32 percent), Advanced Word Processing (up 46 percent), Power Point Presentations (up 25 percent), and Ethical Use of Computers (up 25 percent). Also important is that Dowling College, which was the sole institution in the 2005 study, was one of the two institutions surveyed in 2015.

Table 1
Averages between 2005 and 2015 first-year College students for self-directed learning

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
Spreadsheet	47.00%	**78.80%**
General Computer Use	59.18%	**63.63%**
Advanced Word Processing	44.02%	**89.98%**
Share Information	54.43%	**74.43%**
PowerPoint Presentations	54%	**79.48%**
Ethical Use of Computers	56%	**81.20%**
Social Media		**97.77%**

Table 1.1
Differences between 2005 and 2015 first-year College students for self-directed learning in Spreadsheet

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I do not try to bypass content filtering systems	55.20%	69.20%
I can demonstrate general computer use skills in the classroom or in the computer lab	56.70%	93.30%
I know the difference between "save" and "save as"	50%	85.70%
I can demonstrate presentation skills in the classroom or in the computer lab.	43.30%	56.70%
I can use a URL to locate a specific Web site address	41.40%	66.70%
I can make a bookmark	35.70%	86.70%
I can create folders for my mail	46.70%	93.30%
2005 versus 2015 Averages	47.00%	**78.80%**

Table 1.2
Differences between 2005 and 2015 first-year College students for self-directed learning in General Computer Use

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I copy and paste internet pages into my documents	46.70%	53.30%
I do not use the school system to access material that is profane or obscene	46.70%	53.80%
I report irresponsible access so that inappropriate sites may be blocked	56.70%	61.50%
I use appropriate language	76.70%	76.90%
I can have more than one program open at a time and move between them	70%	53.80%
I am familiar with basic computer components (monitor, floppy drive, and CD Rom)	63.30%	61.50%
Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can save my document on a disk or other storage devices	60%	61.50%
I can use the find function to find a specific file	53.30%	86.70%
2005 versus 2015 Averages	59.18%	**63.63%**

Table 1.3
Differences between 2005 and 2015 first-year College students for self-directed learning in Advanced Word Processing

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can format a document using page numbers	33.30%	80%
I can copy a picture form the Internet and paste it into a document	44.80%	80%
I can demonstrate internet skills in the classroom or in the computer lab	60%	93.30%
I can access my e-mail account	41.40%	93.30%
I can send an e-mail	46.70%	93.30%
2005 versus 2015 Averages	44.02%	**89.98%**

Table 1.4
Differences between 2005 and 2015 first-year College students for self-directed learning in Share Information

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can format a page using tabs and margins	43.30%	73.30%
I can format a page using bullets and numbering	56.70%	73.30%
I can change the row height and column width	63.30%	80%
I can set the desired print range	63.30%	60%
I can add background color or change the color scheme of my presentation	53.30%	73.30%
I can print handout copies of my presentation	46.70%	86.70%
2005 versus 2015 Averages	54.43%	**74.43%**

Table 1.5
Differences between 2005 and 2015 first-year College students for self-directed learning in Power Point Presentations (Ppt)

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I respect the rights of copyright owners	63.30%	76.90%
I can use the insert command and place graphics into a document	33.30%	73.30%
I can use different text styles (bold, italic, etc)	66.70%	80%
I can demonstrate how to use digital camera and scanner in the classroom or in the lab	58.60%	66.70%
I can copy information from one e-mail, paste it into a new message, and send it	51.70%	93.30%
I can group images	50%	86.70%
2005 versus 2015 Averages	54%	**79.48%**

Table 1.6
Differences between 2005 and 2015 first-year College students for self-directed learning in Basic Word Processing

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can use a spreadsheet to make a chart	53.30%	73.30%
I can sort a row of cells	56.70%	73.30%
I can add visual effect to the slides sin my presentation	60%	60%
I can create folders for my mail	46.70%	93.30%
2005 versus 2015 Averages	54.18%	**74.98%**

Table 1.7
Differences between 2005 and 2015 first-year College students for self-directed learning in Ethical Use of Computers

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can open a computer program	70%	76.90%
I can create a basic slide presentation with text and graphics	55.60%	86.70%
I can rearrange the slides in my presentation	41.40%	80%
2005 versus 2015 Averages	56%	**81.20%**

Table 1.8
2015 first-year College students for self-directed learning in Social Media (2005 survey did not include these items)

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
I can view a video on YouTube		100%
I can set up a social media account		100%
I can store photos on social media		93.3%
I can follow someone on Twitter		100%
I use social media for networking		100%
I can use social media for academic purposes		100%
I can communicate with my teachers through social media		93.3%
I am familiar with how to start a group page on Facebook		100%
I am aware of how to adjust my privacy settings on social media		93.3%
2015 Average		**97.77%**

Table 1.9
2005 versus 2015 Averages on combined dimensions (see tables 1.1-1.7) between 2005 and 2015 first-year College students for self-directed learning

Self-Directed Learning Questions	2005 Self-Directed Learning (N=29)	2015 Self-Directed Learning (N=15)
2005 versus 2015 Averages Combined (All Dimensions)	52.69%	**76.99%**

In the 2015 survey, 97.77 percent of students reported having used self-directed learning for social media. The notable increases can be attributed to current students learning technology at an earlier age with more at-home technological devices coupled with more elementary and secondary schools increasing technology instruction.

In summary, the results of the study indicate a significant amount of students utilize self-directed instruction to obtain proficiency in the use of technology.

Conclusion

Today's college students are comfortable satisfying their immense curiosity in a self-directed manner. Even when educators are not involved, students are naturally creating personalized learning spaces where they choose their own trusted information sources; develop their use of networking, communication, and creativity tools; and manage their time and self-image (Zmuda, 2009). This capacity for independent learning is essential to their future well-being, since they are likely to have multiple careers and will need to continually learn new skills they were not taught in college (Brown, 2006).

This study compared the extent to which first-year college students in 2005 and 2015 used self-directed instruction relative to proficiency in technology. Comparing the difference on technology preparedness in high school and college between students in 2005 and 2015, the results indicated that in 2005, 53 percent of students utilized self-directed instruction to obtain proficiency in the use of technology versus 77 percent in 2015. Similar to results collected by Kahveci (2010), suggesting that students in grades 9-12 had a positive attitude towards the use of technology for their learning; Demir et al. (2014) finding that as students adopted computers more, they used them more often for self-directed learning; and Bonk et al. (2014), revealing that nearly 85 percent of students used self-directed online learning to learn a new skill or competency, the current study found a notable difference in how students perceive their use of technology in the classroom.

This study was limited to two four-year colleges on Long Island, New York with only a small sample participating in the 2015 study. If this study were to be replicated, the researchers would recommend surveying a larger sample, either comparing colleges from different geographic locations or across multiple institutions.

With educational institutions shifting towards more open resources such as OER, OCW, and MOOCs as well as hybrid and flipped courses, there is a pressing need for secondary schools and higher education to better understand how to foster students' innate ability towards self-directed learning and find ways to reinforce learning outside of the classroom. If educators do not embrace social media technology in their teaching, this will lead to a considerable disconnect between educators and students. To secure their relevance in the future, educators will also be faced with the unique challenge to guide students in their self-directed learning pursuits. By helping students to evaluate the viability of an endless array of resources available to them, educators can assist students to become more responsible, critical information seekers.

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