M-2009

DIGITAL FLUENCY OF STUDENTS AT A DISTANCE EDUCATION UNIVERSITY

Yolanda Gayol, Fielding Graduate University, USA

Co-author: Ouanessa Boubsil, University of Maryland University College, USA

Summary

In less than four decades, information and communication technology (ICT) has changed the way people work, communicate and learn. Digital competencies are now essential in the knowledge society and universities all over the world are adopting ICT standards to enhance these competencies regardless of the instructional modality used (online, blended or face-to-face). Digital fluency has become a strategic goal in education, since knowledge workers are required to intensively use information technology products and services. A vast amount of literature assessing instrumental ICT skills is available at all levels of education and training. However, reports exploring digital competencies related to academic tasks in graduate education are scarce, particularly those addressing ICT fluency beyond the notion of technical literacy.

This study reports the level of digital fluency found amongst faculty of a graduate distance education institution. The ability of faculty to access and communicate with students at a distance is explored. A customized survey evaluating the ICT skill levels associated with specific mentoring tasks was designed and applied to a random sample of faculty at three graduate colleges. The analysis of the institutional context provided a strong foundation for professional development and policy making in the three graduate colleges. A long-term faculty development training plan, enriching the digital competencies of faculty mentors, is feasible and realistic as a result of this evaluation.

Introduction

We are witnessing the transition from capitalism to digitalism, from human-only intelligence to machine-aid driven knowledge and from materiality to virtuality. In this period of deep socio-economic transformations, faculty continue to have a critical role in the way in which knowledge is perceived and used by new cohorts of learners. Among the essential competencies required to cope with the challenges faced by contemporary society, the ability to use information and communication technologies is the most important. In this research, we explore the digital fluency of faculty at Fielding Graduate University and provide recommendations for future steps in this topic

Describing the ability to operate computers, peripherials and the Internet has a polysemic nature. ICT literacy refers to basic skills needed to navigate efficiently in cyberspace and information literacy to the ability of finding and retrieving information in the infosphere. (Stern, 2006). Similarly, digital fluency alludes to a demonstrated competency for manipulating ICT artifacts for the purposes of input, process, retrieval and transformation of information. Digital fluency enables the mutation of information into knowledge and solutions for the human realm. In this research, we explore the digital fluency of faculty at Fielding Graduate University.

Faculty fluency on information and communication technologies (ICT) is essential for learning teaching, research, and the strive for social justice. Speed, ubiquity, networking and permanent presence augment the potential for learning in open global systems. Appropriate faculty fluency on ICTs revolutionizes the organization of education, since exposure to techno-rich environments changes the cognitive architecture of learners. The Pew Report (2009) characterizes the new generations of learner as digital natives. Digital natives are multi-taskers, holistic, problem solvers and permanently maintain a connection through social netowkrs. Digital fluency of faculty is important because society expects from them to provide students with the information technology scaffold for problem solving and working in a competitive global economy.

Digital fluency of faculty is relevant for social justice because the world is in great need to overcome the digital divide through competent educators acting as public intellectuals and scholar practitioners in a society in which access to opportunities, resources and networks increasingly depends on ICT connectivity. However, educators are often digital disconnects, that is, professionals who resist the inclusion of technology for learning and teaching (Schwieso, 1993; Parker, 1997; Caffarella, 1999; Trentin, 2006). This avoidance occurs regardless the modality adopted, whether it is face to face, dual, blended or full distance education. The research here presented reviews adoption and academic usage

Literature Review

On our study, faculty usage of information technology briefly addresses the epistemological assumptions used by researchers. Such views affect both, the research design and the outcomes. For instance, an instrumental approach to technology assumes that digital fluency could be achieved by teaching the commands of a particular application and this translates into automatic ICT adoption. Often the instrumental approach is tied to the 'blame' model which assumes that faculty attitudes prevent adoption (Jacobsen, 1988). We believe that neither blame approach nor the focus on hardware and software are adequate explanations to understand the complexity of faculty behavior or ICT learning gains. Instead, we consider that faculty usage of technology intersects with teleology and pedagogy. Faculty need to find significance in the effort of transitioning from conventional academic practices to technology mediated facilitation. The research presented below reviews adoption and academic usage

The Pennsylvania State University produces an annual report on the use of technology by faculty, students and staff. In the section for academics, the report provides data of 1000 faculty and 500 teaching assistants. From this academic universe, 270 faculty and 168 and teaching assistants responded the survey. The results show that 74% of them are Windows users, 24% Mac Users and 4% Linux users. Almost half (48%) of faculty respondents reported perceiving themselves as intermediate users and one third as advanced users. Only two applications are highly integrated to their practice: e-mail (92%) and Angel (89%), the Learning Management System (LMS). In the era of social networking, Web 2.0 applications received low marks amongst faculty: virtual worlds (6%), blogs(3%), wikis(3%),

Facebook/MySpace (2%) Text messages (2%). The highest ranked Web 2.0 application was conferred to YouTube, and only one third of faculty (29%) reported usage. Regarding the library at Penn State University, almost half of the faculty respondents reported that they visit the library web pages weekly (49%). (Sonak & Williams, 2008).

While exploring the patterns of use of the courseware, Park, Lee and Cheong analyzed the factors influencing faculty the adoption and usage of a course management system (CMS). They support the research through the technology acceptance model (TAM) designed by Davis, (1986) in which a positive attitude is the main driver of intention of usage. They also adopted Rubin's (1986) interpretation approach in which motivation is the major driver of usage. The authors operationalized the notions—'intention of usage' and 'motivation' after having received the responses to a survey applied to 225 instructors using e-class, who had an average of 14 years of experience using computers in education. They found that motivation had an effect on all the dependent variables. Similarly, 'perceived ease of use' and 'perceived usefulness' had significant impact in the behavioral intention to keep using the CMS.

Method

IRB approval was obtained to apply a likert type survey with 109 questions. A pilot study was run amongst some faculty and senior managers. The reviewed survey was uploaded in Zoomerang. The Provost sent a broadcast e-mail inviting faculty of the School of Educational Leadership and Change, the School of Human and Organizational Development and the School of Psychology to participate in the survey. A laptop raffle was offered as an incentive for participation. Since we wanted to explore faculty tasks rather than general behavior we emphasized in the items the idea that all responses were tied to the academic work done at Fielding.

Data Analysis

Fifty three faculty completed the survey which represents 28% of the universe. This response rate indicates that we have a good validity ratio to make inferences about the target population. Demographic data show that almost two thirds of respondents were female (62%) and 38% were male. This corresponds to the overall demographic make up of faculty at Fielding Graduate University. One quarter of them are 45-54 years old, and 43% are 55-64 years old. Faculty members of the school of Psychology had the highest response rate (40%) which may cause some bias in the results. The other two schools (ELC and HOD) had equivalent response proportions (30%). The behavior of faculty of the three schools is consistent with prior survey applications.

Ninety two percent of respondents are associated with a doctoral degree program and 43% are full time faculty. One third of them joined Fielding three years ago and 13% between 1988 and 1992. These are the two highest proportions of involvement with the university.
Regarding access and connectivity we found that seventy four percent of faculty have the computers used to do the work for Fielding located in their homes. Only 19% use a computer situated in an office away from home to do the work for Fielding. Fifteen percent faculty purchased their computers three years ago; 16% two years ago and 15% a year ago or less. The rest of information is spread over the years, but clearly indicating that an important proportion of the target population is working with old systems (54%). Connection wise, ninety two percent of faculty use cable/DSL and 8% use wireless. More than three quarters of faculty are the sole users of their computers. Another 15% share their computers with one or two persons. Eighty five percent of them have a laptop available while traveling.

Concerning usage, we made an effort to collect hard data instead of vague assumptions often found in survey designs, such as never/very often (Wang, 2007). For that purpose, we

inquired about the number of days that faculty used Web 1.0 and Web 2.0 devices in the last 30 days. We found that 85% percent faculty reported using Word at least five days a week in the last 30 days and 70% use e-mail at least 5 days a week to do their academic work. Seventy three percent reported that they do not use the e-mail provided by Fielding.

Search engines are highly popular. Sixty nine percent of faculty used them at least five days a week during the last month, but only 17% took advantage of meta search engines on a daily basis. Twenty percent used multimedia at least five days a week in the last 30 days and only 7% used learning objects. WebAdvisor, the administrative tool to grade or review students' progress has a reported daily usage of 11%, while 30% of faculty report usage of at least 5 days a week in the last 30 days.

Library usage is reported as follows: Seven percent of faculty used either Fielding E-library or another E-library at least five days a week. On the opposite end, 13% did not use Fielding library or any other and 41% did not use a library in the last 30 days. Fifty four percent have a high or very high opinion of the library database, and 43% feel very comfortable while navigating library databases to find scholarly information. About one third of faculty feel very comfortable seeking reactions to their scholarly writing. In relation to expenses made while purchasing articles in the last 12 months, 48% faculty reported that they had not spent money buying journal articles over the Internet

One faculty member reported audiocast usage for academic purposes daily in the last 30 days and 60% reported no usage in the same period. Seventy seven percent expressed having not used podcasts in this time frame and only two survey participants acknowledged podcast usage on a daily basis, for academic purposes.

Faculty expressed high interest for increasing their ICT competencies. Respondents who chose the options high or very high for specific ICT categories are as follows: academic integrity (89%), intellectual property (83%), E-libraries (77%), fair use (70%), accessibility (68%), tools to analyze academic integrity (58%), databases (59%), qualitative data analysis tools (57%), sexual harassment (56%), open sources for bibliographic searches (53%),Webex (51%), videocast(51%), managing remote team work (49%), Endnote (49%), statistical packages (47%), surveys (47%), managing a learning community (46%), open sources for self-training (42%),audiocast (45%), spreadsheets (44%), alerts to track scholarly information (44%), Web site development (42%), concept mapping (39%), digital images (39%), automated assessment tools (36%), E-portfolios (38%), alerts to track specialized discussions (32%), accessibility friendly programs (36%), course management systems (29%), learning objects (26%), automated standardized tests (24%), text messaging (23%), blogs (22%), chat (20%), Webquests (17%), and learning about ICT legislation (16%).

We run bivariate correlations and found that gender and age had a significant effect on usage of a number of Technologies. There was a negative correlation between age and usage of Fielding's e-library as shown in table 1 below.

Table 1 Correlation between Age and E-library usage

		Question 3: Age	Question 25: Fielding E-Library
Question 3: Age	Pearson Correlation	1	-.308[*]
	Sig. (2-tailed)		.029
	N	52	50

Question 25: Fielding E-Library	Pearson Correlation	-.308[*]	1
	Sig. (2-tailed)	.029	
	N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

Similarly, we found negative correlations between age and the use of Webex (-.333[*]) as well as between age and the use of podcasts (-.380[**]). We also found that gender had a significant effect on the use of multimedia (.401[**]), WebCast (.328[*]) and Wikis (.460[**]). Interestingly, no correlation was found between years of teaching in distributed environments and technology usage.

Conclusions

Access to computers and connectivity are not problems faced by Fielding faculty, but the age of the computer used may be addressed as an institutional issue. It was found ICT training readines. Faculty intention to become more fluent in digital technologies could be useful in the design of a faculty development program. Age and gender are important while designing programs aiming to increase the use of technology for academic purposes.

Some matters of concern are: a) while literature in distance education emphasizes the importance of social networking and personal learning environments (PLEs), faculty at Fielding manifest low interest in some Web 1.0 and Web 2.0 applications (Learning objects, Webquests, concept maps, blogs, wikis, chats and text messages).; b) the low interest expressed in learning on accessibility issues; c) the age of the computers. Harware older than two years is often behind. Interestingly the frequent use of e-mails and and the low use of social software mirrors the behaviors found in the report of The Pennsylvania State University (Sonak & Williams, 2008).

This first set of data is a step towards development of a non-instrumental vision regarding the academic use of ICT at Fielding Graduate University.

References

Arms, W. Y. & Larsen, R. L. (2007). The future of scholarly communication. Building the infrastructure for cyberscholarship. Workshop sponsored by the National Science Foundation and the Joint Information Systems Committee. Phoenix, Arizona: April 17-19.

Caffarella, R. S., & Zinn, L.R. (1999). Professional development for faculty: A conceptual framework of barriers and supports - A conceptual framework for examining factors that support or impede our continuing professional development as faculty in higher education. *Innovative Higher Education,* 23(4), 241.

Davis, C. (1986). A technology acceptance model for empirically testing new end-user information systems. Theory and results. Unpublished doctoral dissertation. Massachusetts Institute of Technology.

Jacobsen, M. (1998). *Adoption patterns of faculty who integrate computer technology for teaching and learning in higher education*., Ontario, Canada: Social Sciences and Humanities Research Council of Canada.

MacKenzie, N. & Stanley, A**.** (2001). Online professional development for academic staff: putting the curriculum first. *Innovations in Education and Teaching International (38)*1, 42-53.

Palloff, R. M. & Pratt, K. (2002). Beyond the looking glass: what faculty and students need to be successful online. In K. Rudestam & J. Schoenholtz-Read (Eds.), Handbook of *online learning: Innovations in higher education and corporate training.* Thousand Oaks: Sage

Pew report (2009). Technology user types. The Pew Internet Report & American Life project. Retrieved on March 30, 2009 from http://www.pewinternet.org/Press-Releases/2009/The-Mobile-Difference.aspx

Park, N., Min Lee, K., Cheong, P. H. (2008). University instructor's acceptance of Electronic courseware: An application of the technology acceptance model. *Journal of Computer-Mediated Education, 13,* 163-186.

Rubin, A. M. (1986). Uses, gratifications, and media effects research. In J. Bryant & D. Zilman (Eds.), *Perspectives On Media Effects.* Hillsdale, NJ: Laurence Erlbaum Associates.

Sonak, B. & Williams, V.S. (2008). Survey of Technology Use at Penn State By Faculty, Staff, and Students Faculty Advisory Committee on Academic Computing

Stern, C. (2002) Information literacy unplugged: teaching information literacy without technology. White paper prepared for UNESCO, the US NCLIS and National Forum for Information Literacy. Retrieved

Survey Research Center of the Social Science Research Institute and Information Technology Services. State College, PA: The Pennsylvania State University.

on January 10, 2009 from http://www.nclis.gov/libinter/

Trentin, G. (2006). The Xanadu project: training faculty in the use of information and communication technology in university teaching. *Journal of Computer Assisted Learning 22*(3), 182-196.

Wang, Y.M. (2007). Internet uses in university courses. *International Journal on E-learning 6*(2), 279-292.

Weaver, R. (1948). Ideas have consequences. Chicago, IL: University of Chicago Press.