TECHNOLOGY ADOPTION IN HIGHER EDUCATION: OVERCOMING ANXIETY THROUGH FACULTY BOOTCAMP

Terri Johnson, Mary Ann Wisniewski, Greg Kuhlemeyer, Gerald Isaacs, and Jamie Krzykowski
Carroll University

ABSTRACT

The reluctance to design and teach online courses in higher education is often attributed to technology anxiety in faculty. This article documents a faculty development model that has successfully helped faculty overcome this obstacle. "Bootcamps," faculty development programs held at Carroll University in Waukesha, WI, were specifically and intentionally designed to be consistent with the principles of andragogy and transfer of learning to assist faculty in technology adoption for teaching and learning in an online environment. The faculty development "Bootcamps" can be easily adapted for implementation at other higher education institutions.

KEYWORDS

technology anxiety; faculty learning; andragogy; pedagogy; learning theories

I. INTRODUCTION

Much has been written about faculty resistance to technology adoption in higher education [1, 2, 3, 4, 5, 6]. Some of the resistance stems from faculty concern about the resources to develop quality courses [7, 8]. Other barriers to technology adoption relate to lack of compensation for curriculum development as well as lack of recognition for embracing new technological pedagogies in tenure and promotion decisions [9, 10, 11, 12, 13]. Additional frustration comes from a lack of technology infrastructure, such as slow Internet connections, inadequate hardware and software, and low levels of technical expertise among instructors [14].

The most difficult barrier to overcome, however, may be technology anxiety which primarily arises from the design and teaching of online courses, but can be extended to include technology in general. Research has shown that technology anxiety may occur when faculty are asked to experiment with new technologies [2, 5, 15]. Faculty often lack self-confidence when it comes to using technologies [1, 16], and, thus, tend to avoid or resist it altogether. Moreover, research has found that age and experience are inversely related to technology anxiety [6, 17]. That is, older and more experienced instructors tend to have higher levels of technology anxiety.

Less clear is how these obstacles can be overcome. Although learning is an espoused value in higher education, *faculty* learning is often overlooked or disregarded. In a recent opinion piece in *Campus Technology*, Dr. Trent Batson challenged the accusations of "faculty resistance" or "lack of faculty buy-in" for low adoption of technology by suggesting that faculty fail to understand "why" they should incorporate technology into their classes; they are only told that they need to [18]. Weimer (2002) also suggests that the focus be on *faculty learning*, rather than on teaching. Taking a cue from both Batson and Weimer, higher education has a responsibility to explore how quality faculty development efforts might assist college/university professors in learning about both why and how to integrate technology into their teaching [19].

The purpose of this paper, then, is to offer one faculty development program at a small liberal arts

university that helped ease faculty into redesigning their course for online. We further suggest that faculty development programs should be designed around learning theory, particularly andragogy and the transfer of learning theory. When this occurs, we propose faculty will better comprehend the appropriateness and usefulness of instructional technology, and as a result, demonstrate less resistance to technology adoption in teaching.

II. LEARNING THEORIES AND FACULTY DEVELOPMENT PROGRAMS

Learning theories are the foundation for understanding how people learn. Popularized by Malcolm Knowles in the 20th century, andragogy focuses on the learning strategies of adults and suggests that their approach to learning is distinctly different than pedagogy, the principles of child learning [20]. While there are many critics of andragogy and its principles (and/or assumptions) [21, 22, 23], for the purposes here, the principles of adult learning articulated by Knowles are relevant for discussion. The four basic principles of andragogy are (as outlined by Kearsley 2011) [24]:

1) Adults need to be involved in the planning and evaluation of their instruction;
2) Experience (including mistakes) provides the basis for learning activities;
3) Adults are most interested in learning subjects that have immediate relevance to their job or personal life; and,
4) Adult learning is problem-centered rather than content-oriented.

Unfortunately, many university faculty development programs do not advocate the principles of andragogy, but rather focus on remedial workshops for newly hired educators or training sessions designed to "fix" what is deemed to be broken in teaching. When it comes to technology, most faculty development efforts demonstrate how to "use" a tool, or provide training on new software and applications (e.g., a course management system). Higher education institutions must begin to recognize the relationship between theory and practice in educating our educators and develop robust faculty development programs that endure over time.

A key element to a successful faculty development programs is the *transfer* of learning theory– learning that occurs in one context can be later transferred to another context. Transfer of learning integrates both prior learning and new learning [25]. "Low road" transfer develops from practiced situations that become automatic, while "high road" transfer learning involves high levels of cognitive effort and situations that are generally more complex and abstract [25, 26].

Transfer of learning theory is significant and indispensible for successful outcomes when designing faculty development programs as faculty are being invited, or in many cases, expected to transfer what they know about teaching to a new, technology-rich, collaborative learning environment [27, 28]. This may involve a paradigm shift from lecture-style teaching to active learning [19, 29, 30, 31]. When faculty understand the principles of andragogy and integrate these into their teaching, they can more easily transfer this knowledge to enhancing the learning environment with technology and be successful.

III. APPLICATION TO FACULTY DEVELOPMENT

Learning theories have significant implications for practice. Faculty development programs grounded in andragogy and transfer of learning theory can greatly enhance and strengthen an educator's teaching/learning repertoire. "Education can achieve abundant transfer *if it is designed to do so*" [26, authors' emphasis]. According to Perkins and Salomon (1992) there are several conditions of transfer: 1) thorough and diverse practice; 2) explicit abstraction; 3) active self-monitoring; 4) arousing mindfulness; and 5) using a metaphor or analogy [26]. Most relevant to this discussion are: thorough and diverse

practice and arousing mindfulness. When these conditions are combined with the principles of andragogy, a solid foundation of faculty development is attained.

Carroll University is a small liberal arts university located in Waukesha, WI, serving both undergraduate and graduate students, with approximately 112 full-time faculty. Administration recognized faculty's unwillingness to spend the time necessary to learn about online teaching and learning, including learning a new course management system adopted in 2009. Through the encouragement of the Provost, "Bootcamps" were specifically developed to assist faculty in technology adoption for teaching and learning in an online environment. The Provost has been an advocate for providing stipends to faculty for work done off-contract. While institutions vary in their beliefs about whether these kinds of faculty development efforts should be supported by additional pay, our institution believes it does help. Moreover, it sent a message to our faculty that the university was serious about helping faculty learn about technology. We feel Bootcamps have helped faculty overcome anxiety issues and get courses online. In additional to the $1,000 stipend, attendees enjoyed refreshments throughout the day. No other costs were associated with the Bootcamp.

The Bootcamps are three-day summer workshops in which faculty learn to redesign a current face-to-face course to an online course (either fully online or a blended format). Working in small groups of three or four, faculty members receive one-on-one instruction with an instructional technologist for their particular course and learning objectives, as well as learn from their peers who may be from very different disciplinary backgrounds. The Bootcamps were intentionally designed to be consistent with the principles of andragogy and transfer of learning, especially creating the conditions of thorough and diverse practice and arousing mindfulness. By the end of the Bootcamp, faculty members produce a substantively-ready online course to be launched the following academic year.

The three-day workshop is organized as follows:

Day 1 – Research on Online Learning (This was revised during the second summer to include additional articles pertaining to the history of instructional technology were required readings prior to Bootcamp. The application of this "learning" was then connected to the way faculty currently teach their courses, using the theories and principles current in the field. We did not test these differences but will do so in year 3.)

Faculty members participate in wide-ranging discussions of research on online learning and its application to each faculty member's course.

Day 2 – Introduction and Investigation of Online Tools

Faculty receive advanced training in the course management system and create of a personal "tool box" of online tools. The experiences incorporate a great deal of hands-on learning and practice, including, for example how to use a video camera, how to edit clips and upload them to YouTube, and how to embed the video into the course management system.

Day 3 – Putting it All Together

Faculty members revisit the student learning outcomes, content, and assessment for their particular course, determine how technology might enhance student learning, and design the content of their online course.

For the most part, Bootcamp adheres to Knowles principles of adult learning: 1) faculty are involved in planning how they want to redesign their course; 2) they learn through hands-on trial and error of using technology for various learning objectives; 3) faculty are very interested in learning how to create an online or hybrid course because the course will be designed and taught by them; and 4) the Bootcamp itself is a problem-based activity.

Over the summers of 2010 and 2011, 25 faculty members participated in Bootcamp. Faculty came from all disciplines from business, exercise science, nursing and computer science to art, music, and religious studies. Redesigned courses were mostly aimed at undergraduates (all levels) and a few for graduate students. Anecdotally, faculty stated that they learned a lot and it is apparent that many of them brought

new life and energy to their courses. Many had "ah ha!" moments. Comments gathered from an anonymous post-Bootcamp survey (N=24) indicated that faculty liked the small group discussions, learned quite a bit from their peers, and appreciated the individual attention from the instructional technologist on "their" course. All participants said they would recommend Bootcamp to their colleagues. Survey responses suggested attendees felt the Bootcamp was effective or very effective in helping them become familiar with the scholarship in online teaching and learning (N=21 or 88.5%), learn about tools that help engage students (N=22 or 91.7%), increase confidence levels for teaching online (N=23 or 95.8%), and feel comfortable working in our course management system (N=21 or 87.5%). Perhaps most telling of the success of the Bootcamp was the unanimous agreement that the Bootcamp made faculty *feel comfortable* with creating online course content (N=24 or 100%). See Appendix A for survey results.

The 2010 Bootcamp faculty presented their experiences at presentations to their colleagues and at a state-wide conference (WAICU – Wisconsin Association of Independent Colleges & Universities). After the second wave of Bootcampers in 2011, the campus had nearly 25% of the full-time faculty able to participate in pilots of new software, beta testing of upgrades, and assist others with questions about technology or the learning management system. Moreover, *Outside The Box* was born to highlight how instructional tools were being used in the classroom. These informal Bootcamper-led demonstrations and discussions over a soup and salad lunch is a highly successful way to keep the conversation going, to drive interest, to engage faculty.

In sum, the essential component in developing faculty training programs that lead to substantive change in teaching and learning is to not solely focus on the "how" to use technology but the "why." While we did not directly test assumptions of transfer of learning, we believe we have developed a high road training program that gives faculty the conditions to transfer learning that will be more enduring and long-lasting than trying to keep up with technologies that are emerging on a daily basis. A purposeful effort to help faculty reflect on learning theories and teaching principles goes a long way to enabling them to redesign their own courses as necessary to meet the learning needs and demands of our students.

IV. BOOTCAMP 3.0

Looking forward, one additional technique will be included in the 2012 Bootcamp. Each participant is to articulate a personal philosophy of teaching and learning that includes the identification of personal values and beliefs in the following categories: the nature of the learners, the purposes/learning outcomes of their courses, the content, the teaching/learning processes, and the role of the educator (32). A philosophy that demonstrates consistency among all of these categories will help faculty identify their teaching/learning paradigms and how their fundamental beliefs influence their teaching practice. Development of a personal philosophy of teaching/learning helps to ensure that faculty are reflecting on their educational paradigms, and as a result, this reflection might provide the "thorough and diverse practice" and "arousing mindfulness" conditions needed to promote transfer of learning. Transfer of learning will hopefully be evident in the faculty member's continued adoption of technology in future course development.

Future Bootcamps will include similar post-Bootcamp surveys. However, there seems to be value in a pre-Bootcamp survey. For example, we might better assess current levels of anxiety and look for effect post-Bootcamp. In addition, we have the foundation for a longitudinal study and efforts to prepare for that are underway.

V. SUMMARY

"The most significant influence on the evolution of virtual learning will not be the technical development of more powerful devices, but the professional development of wise designers, educators and learners" [33]. This paper outlined one faculty development model that incorporates teaching/learning theories as a foundation for online course development. Education has changed dramatically with the Internet and mobile technologies, and educators who continue a strategy of a "sage on the stage" instead of a "guide on the side" are not going to fully engage today's students. The transfer of learning theory says that

learning in one context can be transferred to another. But if faculty haven't learned about learning theories and principles that apply to teaching, how can they "transfer" that learning to redesigning their courses to incorporate new technologies that might improve learning of their students?

Knowles' principles of adult education were applied to one such faculty training program at Carroll University – Bootcamp. And from this perspective the Bootcamp seems to fit the mold. The Bootcamps involve faculty in planning and evaluating, provide hands-on experiences, are of interest to the faculty, and the learning is problem-based [34, 35, 36]. However, when we look at the transfer of learning theory – arguably what education is all about – we know many faculty come to training sessions with limited knowledge of learning theories or teaching principles which could result in their inability to "high-road" transfer their learning to other teaching situations. Given the appropriate conditions –such as thorough and diverse practice and arousing mindfulness – faculty might indeed engage in high-transfer learning. In a fast-evolving, ever-emerging technology environment, it is untenable for higher education to continue training instructors on how to "use" technology. Faculty need to learn "why" technology can aid teaching and learning based on theory and practice. This might be best approached by ensuring conditions for high-road transfer exists in our faculty development programs.

VI. ABOUT THE AUTHORS

Terri Johnson has a Ph.D. in political science from University of Wisconsin–Milwaukee and has published her research on town governments in peer-reviewed journals such as Public Administration Review and State & Local Government Review. Dr. Johnson studied as a Teaching Scholar while employed at the University of Wisconsin–Green Bay, and has been recognized for her outstanding teaching. Currently she serves as Director for the Center for Educational Technology & Innovation (CETI) at Carroll University. Her current research interests focus on student learning and engagement with technology.

Mary Ann Wisniewski, Ph.D. is a professor of Business, Accounting and Economics and the director of Organizational Leadership at Carroll University in Waukesha, WI. Her research interests are in the areas of leadership, adult education, and technology in teaching and learning.

Dr. **Greg Kuhlmeyer** is Associate Professor of Business at Carroll University.

Dr. **Gerald Isaacs** has been involved in technology since the 60s; first in industry and then for Carroll University as Director of Computing and Chair of the Computer Science Department. As a Computer Science Faculty, he began teaching on line courses shortly after the WWW came into existence. He has taught and developed both Hybrid and an fully online courses for both majors and non-majors alike. Dr. **Jamie Krzykowski**, Ph.D., ATC, LAT is a Clinical Assistant Professor of Exercise Science and Athletic Training primarily teaching courses related to sports nutrition, motor development and learning across the lifespan as well as exercise in health and disease. She also instructs practicum and capstone students in areas related to cardiac rehabilitation, specialty care populations and clinical research. Dr. Krzykowski also works closely with the Director of the Center for Educational Technology & Innovation, promoting and educating colleagues on the practical application of technology in the classroom.

VII. REFERENCES

1. **Brinkerhoff, J.** Effects of a Long-Duration, Professional Development Academy on Technology Skills, Computer Self-Efficacy, and Technology Integration and Beliefs. *Journal of Research on Technology in Education (JRTE)* 39(1): 22-43 (Fall 2006).
2. **Budin, H.** The Computer Enters the Classroom. *Teachers College Record (TCR)* 100(3): 656-669 (Spring 1999).
3. **Mumtaz, S.** Factors Affecting Teachers' Use of Information and Communications Technology: A Review of the Literature. *Journal of Information Technology for Teacher Education (JITTE)* 9(3): 319-342 (2000).

4. **Vannatta, R.A., & Fordham, N.** Teacher Dispositions as Predictors of Classroom Technology Use. *Journal of Research on Technology in Education (JRTE)* 36(3): 253-271 (Spring 2004).
5. **Redmann, D.H., & Kotrlik, J.W.** Analysis of Technology Integration in the Teaching-Learning Process in Selected Careers and Technical Education Programs. *Journal of Vocational Education Research (JVER)* 29(1): 3-25 (2004).
6. **Waugh, W.L.** Using Personal Attributes to Predict Technology Adoption: A Study of College Faculty. *National Association for Business Teacher Education Review (NABTE)* (31): 58-63 (2004).
7. **Allen, I. E., & Seaman, J.** Staying the Course: Online Education in the United States. *Needham, MA: Sloan Center for Online Education*, (2008).
8. **Keengwe, J., Kidd, T. T., & Kyei-Blankson, L.** Faculty and Technology: Implications for Faculty Training and Technology Leadership. *Journal of Science Education and Technology (JSET)* 18(1): 23-28 (February 2009).
9. **Brogden, L. M., & Couros, A.** Contemplating the Virtual Campus: Pedagogical and Administrative Considerations. *The Delta Kappa Gamma Bulletin (DKG) 68* (3): 22-30 (2002).
10. **Grosse, C. U.** How Distance Learning Changes Faculty. *International Journal of Instructional Technology and Distance Learning (ITDL)* 1(6) (June 2004).
11. **Lorenzetti, J. P.** Changing Faculty Perception of Online Workload. *Distance Education Report (DER) 8* (20): 1-6 (2004).
12. **Franklin, T., & Blankson, J.** Together and Alone: The Instructional, Technical, and Psychological Outcomes of Faculty Building Online Courses. In C. Crawford (Ed.), *Proceedings of Society for Information Technology and Teacher Education International Conference*, Chesapeake, VA: Association for the Advancement of Computing in Education (AACE), 659-664, 2001.
13. **Nelson, S. J., & Thompson, G. W.** Barriers Perceived by Administrators and Faculty Regarding the Use of Distance Education Technologies in Pre-Service Programs for Secondary Agricultural Education Teachers. *Journal of Agricultural Education (JAE) 46*(4): 36-48, (2005).
14. **Nkonge, B., & Geuldenzolph, L.** Best Practices in Online Education: Implications for Policy and Practice. *Business Education Digest* 14: 42-53 (May 2006).
15. **Kotrlik, J. W., & Redmann, D. H.** Technology Adoption for Use in Instruction by Secondary Technology Education Teachers. *Journal of Technology Education (JTE)* 21(1): 44-59 (Fall 2009).
16. **Park, S. H., & Ertmer, P. A.** Impact of Problem-Based Learning (PBL) on Teachers' Beliefs Regarding Technology Use. *Journal of Research on Technology in Education (JRTE)* 40(2): 247-267 (Winter 2007).
17. **Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N., & Angeles, J.** Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology (Report No. NCES 2000-102). Washington D.C.: U.S. Department of Education, National Center for Education Statistics, 102-110, 2000. http://nces.ed.gov/pubs2000/2000102.pdf.
18. **Batson,T.** "Faculty 'buy-in'—to what?"*Campus Technology in Technology* (2011). http://campustechnology.com/articles/2011/04/06/faculty-buy-in-to-what.aspx
19. **Weimer, M.** Learner-Centered Teaching: Five Key Changes to Practice, San Francisco: Jossey-Bass, 2002.
20. **Jarvis, P.** The Sociology of Adult and Continuing Education, Beckenham: Croom Helm, 1985.
21. **Davenport.** 'Is There Any Way Out of the Andragogy Mess?' in M. Thorpe, R. Edwards and A. Hanson (eds.) *Culture and Processes of Adult Learning*, London: Routledge, 1987.
22. **Jarvis, P.** 'Malcolm Knowles' in P. Jarvis (ed.) *Twentieth Century Thinkers in Adult Education*, London: Croom Helm, 1987.
23. **Tennant, M.** Psychology and Adult Learning, London: Routledge, 1988, 1996.
24. **Kearsley, G.** Andragogy (M. Knowles). *The Theory Into Practice Database*. (2011). http://tip.psychology.org/knowles.html
25. **Ruth,** T. Teaching For Transfer of Learning. *National Center of Research in Vocational Education*, Berkeley, CA. Office of Vocational and Adult Education, Washington,D.C., (1992). http://eric.ed.gov/PDFS/ED352469.pdf.

26. **Perkins, D N., & Salomon, G.** Transfer of Learning. Contribution to the *International Encyclopedia of Education 2*nd ed., Oxford, England: Pergamon Press, 1992.
27. **Barr, R. B., and Tagg, J.** From Teaching to Learning – A New Paradigm for Undergraduate Education. *Change Magazine*, *27*(6): 12-25, 1995.
28. **McQuiggan, C. A.** The Role of Faculty Development in Online Teaching's Potential to Question Teaching Beliefs and Assumptions. *Online Journal of Distance Learning Administration*, *10*(3) (Fall 2007). http://www.westga.edu/~distance/ojdla/fall103/mcquiggan103.htm
29. **Fink, L.D.** Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses. San Francisco, CA: Jossey-Bass, 17-25, 2003.
30. **Mandernach, B.J.** The Role of Instructor Interactivity in Promoting Critical Thinking in Online and Face-to-Face Classrooms. *MERLOT Journal of Online Learning and Teaching* 5(1): 49-62, 2009.
31. **Vrasidas, C., & Glass, G.V. (Eds.).** Online Professional Development for Teachers. Greenwich, CT: Information Age Publishing, 2004.
32. **Apps, J.W.** Toward a Working Philosophy of Adult Education, Syracuse, NY: ERIC Clearinghouse on Adult Education, 1973.
33. **Dede, C., Brown-L'Bahy, T., Ketelhut, D. and Whitehouse, P.** Distance Learning (Virtual Learning). *The Internet Encyclopedia*, Hoboken, New Jersey: John Wiley & Sons, Inc., 558, 2004.
34. **Knowles, M.** Self-Directed Learning. Chicago: Follet, 1975.
35. **Knowles, M.** The Adult Learner: A Neglected Species (3rd Ed.), Houston, TX: Gulf Publishing, 1984.
36. **Knowles, M.** Andragogy in Action, San Francisco: Jossey-Bass, 1984.

VIII. APPENDIX A: SURVEY QUESTIONS

How effective was the Bootcamp in helping you to become familiar with the scholarship on online learning and teaching?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very ineffective	1	4.2	4.2	4.2
	ineffective	1	4.2	4.2	8.3
	neutral	1	4.2	4.2	12.5
	effective	7	29.2	29.2	41.7
	very effective	14	58.3	58.3	100.0
	Total	24	100.0	100.0	

How effective was the Bootcamp in helping you to become familiar with various online tools that engage students?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very ineffective	1	4.2	4.2	4.2
	ineffective	1	4.2	4.2	8.3
	effective	4	16.7	16.7	25.0
	very effective	18	75.0	75.0	100.0
	Total	24	100.0	100.0	

How effective was the Bootcamp in helping you to increase your confidence level for teaching online courses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very ineffective	1	4.2	4.2	4.2
	effective	11	45.8	45.8	50.0
	very effective	12	50.0	50.0	100.0
	Total	24	100.0	100.0	

How effective was the Bootcamp in helping you to feel comfortable with creating online course content?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	effective	12	50.0	50.0	50.0
	very effective	12	50.0	50.0	100.0
	Total	24	100.0	100.0	

How effective was the Bootcamp in helping you to feel comfortable working in a course management system (MyCourses)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very ineffective	1	4.2	4.5	4.5
	effective	5	20.8	22.7	27.3
	very effective	16	66.7	72.7	100.0
	Total	22	91.7	100.0	
Missing	System	2	8.3		
Total		24	100.0		

How much time should have been spent on scholarship of online learning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	spend less time	3	12.5	12.5	12.5
	time was just right	16	66.7	66.7	79.2
	spend more time	5	20.8	20.8	100.0
	Total	24	100.0	100.0	

How much time should have been spent on tools for student engagement and online content?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	spend less time	2	8.3	8.7	8.7
	time was just right	15	62.5	65.2	73.9
	spend more time	6	25.0	26.1	100.0
	Total	23	95.8	100.0	
Missing	System	1	4.2		
Total		24	100.0		

How much time should have been spent on designing course content for MyCourses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	spend less time	1	4.2	4.2	4.2
	time was just right	16	66.7	66.7	70.8
	spend more time	7	29.2	29.2	100.0
	Total	24	100.0	100.0	

Did YOU have enough time to substantively redesign your course?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 days not enough	6	25.0	27.3	27.3
	3 days just enough	16	66.7	72.7	100.0
	Total	22	91.7	100.0	
Missing	System	2	8.3		
Total		24	100.0		