

PREVIEW

THE INTEGRATION OF TECHNOLOGY WITHIN PHYSICAL EDUCATION
TEACHER EDUCATION: PERCEPTIONS OF THE FACULTY

PREVIEW

THE INTEGRATION OF TECHNOLOGY WITHIN PHYSICAL EDUCATION
TEACHER EDUCATION: PERCEPTIONS OF THE FACULTY

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Kinesiology

By

Helena Baert
Hogeschool Ghent
Bachelor of Education, 1999
University of Manitoba
Bachelor of Physical Education, 2004
University of Manitoba
Masters of Science in Kinesiology, 2008

August 2011
University of Arkansas

UMI Number: 3459854

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent on the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI 3459854

Copyright 2011 by ProQuest LLC.

All rights reserved. This edition of the work is protected against unauthorized copying under Title 17, United States Code.



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

ABSTRACT

In 2008, the national Physical Education Teacher Education (PETE) standards included a more integrated approach to teaching pre-service teachers about technology and stated that teacher candidates should be able to plan and implement technology infused learning experiences that meet lesson objectives. With the inclusion of the 2008 standards, PETE faculty have the task to create instruction that effectively integrates technology. This study investigated the preparedness for technology integration of 198 teacher educators within nationally recognized PETE programs. The study utilized survey research design to identify current technologies used, analyze current level of technology proficiency in relationship to the level of integration, identify factors that aid or hinder the technology infusion process and examine approaches PETE programs use to integrate technology within PETE programs. Roger's Diffusion Theory (2003) and the Technological Pedagogical Content Knowledge Framework (Mishra & Koehler, 2006) were used as theoretical guides. Results indicated low proficiency and integration levels. On average, proficiency levels were that of basic use of technology and integration levels indicated that PETE professors were aware of the use of technology but often did not integrate it or teach it to the students. In addition, the level of proficiency predicted integration levels significantly. Computer technologies, pedometers and heart rate monitor were tools most often integrated within PETE programs. PETE teacher educators expressed concerns related to the abundance of technologies as well as the limited availability and accessibility of technologies both at the PETE level and within K-12 schools. The results and literature suggest PETE faculty can enhance technology integration by developing a clear vision of technology integration, creating a technology plan, constructing teaching technology labs, and encouraging faculty-practitioner

collaboration. In light of the 2008 national PETE standards, the results suggest that both the national and regional associations as well as PETE administrators should explore various professional development models in the area of both using technology (improving proficiency levels) as well as teaching effective teaching strategies related to technology (enhancing integration levels). Crucially, strategies where technology can assist in the enhancement of the overall quality of PE, in both PETE and K-12 PE, should be the main focus.

PREVIEW

This dissertation is approved for recommendation
to the Graduate Council.

Dissertation Director:

Dr. Dean Gorman

Dissertation Committee:

Dr. Cheryl Murphy

Dr. Jack Kern

Dr. George Denny

Dr. Steve Langsner

DISSERTATION DUPLICATION RELEASE

I hereby authorize the University of Arkansas Libraries to duplicate this dissertation when needed for research and/or scholarship.

Agreed _____
Helena Baert

Refused _____
Helena Baert

PREVIEW

ACKNOWLEDGMENTS

A dissertation is never really written on its own. Many people contributed to the completion of this document. I would like to thank my advisor, Dr. Gorman, for his encouragement and support throughout my entire program. I thank Dr. Kern for allowing me to explore my own teaching abilities at the higher education level and help me to understand the complexities PETE holds. I am grateful for the support Dr. Denny provided. Without his knowledge in statistics I would have been lost. Dr. Murphy helped me explore the world of educational technology and I have learned so much from all her classes as well as her guidance throughout the dissertation process. I also wanted to thank Dr. Langsner for helping me ask myself critical questions that helped me grow as a young scholar. To all my committee members, thank you.

I thank the University of Arkansas, the Office of International Students and Scholars (ISS) and the Graduate School for providing me with the encouragement, guidance and financial support to attend classes and complete my degree successfully. Thank you.

To my friends and family, thank you for the support you all have given me not just through my PhD program but throughout the 30 years it took me to reach this milestone. As I continue my journey, I hope I can make you all proud. Thank you.

DEDICATION

I dedicate this dissertation to my parents, Jeannine Ringoir and Dirk Baert for supporting me, loving me, challenging me, and encouraging me to keep going even when I am across the globe and away from my family. I have never given up on my dreams and I know that is because of you both. I am forever grateful for who you are.

Dankje wel

PREVIEW

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	1
Introduction.....	1
Statement of the Problem.....	2
Concerned Engagement	3
Theoretical Background.....	6
Purpose of the Study	7
Research Questions.....	8
Significance of the Study.....	8
Definition of Terms	9
Limitations and Delimitations	10
CHAPTER 2: REVIEW OF RELEVANT LITERATURE.....	12
Introduction.....	12
Educational Technology	13
Benefits of Educational Technology	13
Technology in Higher Education.....	14
Technology in Teacher Education.....	15
Technology in Physical Education Teacher Education	16
Technology Integration.....	18
Definitions	18
General Diffusion Theory.....	20
Diffusion of Technology Theories	25
The Missing Link	30
Pedagogical Content Knowledge	31
Technological Pedagogical Content Knowledge.....	32
TPCK and Diffusion of Technology	37
Approaches to Technology Integration	38
Factors Influencing Technology Integration	40
Faculty Perceptions on the Integration of Technology.....	44
Technology Tools in Physical Education	46

Computer Technology	46
Online PE.....	49
Handheld computers / PDA / Tablet PCs	50
Video/Audio Media	51
Technology to Measure Physical Activity	51
Exergaming.....	53
Sport Video Games.....	54
Emerging Technologies.....	55
Conclusion	56
CHAPTER 3: METHODS	57
Research Design	57
Sampling.....	60
Selection of Sample	60
Sample Size	61
Instrument Development	62
Step 1: Survey in the Literature.....	62
Step 2: Survey Design	63
Step 3: Expert Evaluation and Field Test	66
Step 4: Survey Instrument Following Expert Panel Review	69
Step 5: Pilot Study.....	70
Step 6: Survey Instrument Following Pilot Study	70
Step 7: Final Review of Survey.....	76
Data Collection	76
Data Analysis.....	77
CHAPTER 4: RESULTS	81
Introduction.....	81
Participant Characteristics	81
Research Question #1: What types of technologies are currently included in PETE programs?	86
Research Question #2: What do current PE educators believe to be their technological proficiency levels?	89

Teaching Technologies.....	89
Physical Activity Technologies.....	90
Computer Technologies.....	91
Communication Technologies.....	92
Web-Based Technologies.....	93
Research Question #3: How are PE educators integrating technology in PETE courses?.....	96
Teaching Technologies.....	96
Physical Activity Technologies.....	96
Computer Technologies.....	98
Communication Technologies.....	99
Web-Based Technologies.....	100
Research Question #4: What factors affect technology use of PETE faculty within the PETE programs?.....	104
Personal Use.....	104
Multiple Regression.....	110
Additional Factors.....	115
Research Question #5: How do PETE programs approach technology integration according to the perceptions of the PETE faculty members?	117
Current Integration of Technology at the Program Level	117
Beliefs of Integration of Technology at the Program Level.....	119
Perceptions of the Integration of Technology in PETE: Qualitative Data	120
CHAPTER 5: DISCUSSION, RECOMMENDATIONS AND CONCLUSION.....	128
Introduction.....	128
Discussion.....	129
Technologies within PETE.....	129
Technology Proficiency.....	131
Technology Integration	133
Factors Affecting Technology Integration	135
Integration of Technology at the Program Level	140
Recommendations.....	147

Conclusion	156
References	159
Appendix A: IRB Approval	178
Appendix B: Original Survey	179
Appendix C: Final Survey	187

PREVIEW

LIST OF FIGURES

Figure 1. Interpretive inquiry as an unfolding spiral (Ellis, 1998, p. 20).	5
Figure 2. Rogers (2003) model for adopter categorization.....	24
Figure 3. The technology learning cycle phases.....	30
Figure 4. Content knowledge and pedagogy knowledge combine to create pedagogical content knowledge.....	32
Figure 5. Technological pedagogical content knowledge (TPCK). Content, pedagogy, and technology, overlap to create four more types of knowledge.	33
Figure 6. Overview of Methods.....	59
Figure 7. Number of nationally recognized (NAPSE/AAHPERD) PETE programs in the USA.....	82
Figure 8. Perceived level of proficiency of teaching technologies.....	90
Figure 9. Perceived level of proficiency of physical activity technologies.....	91
Figure 10. Perceived level of proficiency of computer technologies.....	92
Figure 11. Perceived level of proficiency of communication technologies.....	93
Figure 12. Perceived level of proficiency of web-based technologies part 1.....	94
Figure 13. Perceived level of proficiency of web-based technologies part 2.....	94
Figure 14. Perceived levels of integration of teaching technologies in PETE courses.....	97
Figure 15. Perceived levels of integration of physical activity technologies in PETE courses.....	98
Figure 16. Perceived levels of integration of computer technologies in PETE courses.....	99
Figure 17. Perceived levels of integration of communication technologies in PETE courses.....	99
Figure 18. Perceived levels of integration of web-based technologies in PETE courses part 1.....	100
Figure 19. Perceived levels of integration of web-based technologies in PETE courses part 2.....	101
Figure 20. Percentages of personal use of teaching technologies.....	105
Figure 21. Percentages of personal use of physical activity technologies.....	106
Figure 22. Percentages of personal use of computer technologies.....	107
Figure 23. Percentages of personal use of communication technologies.....	108
Figure 24. Percentages of personal use of first group of web-based technologies.....	109

Figure 25. Percentages of personal use of second group of web-based technologies.109
Figure 26. Means of additional factors influencing the integration of technologies.117
Figure 27. Current technology integration practices in PETE programs.....118
Figure 28. PETE faculty's beliefs on technology integration within a PETE program...119

PREVIEW

LIST OF TABLES

Table 1	65
Table 2	83
Table 3	84
Table 4	85
Table 5	86
Table 6	88
Table 7	95
Table 8	102
Table 9	103
Table 10	111
Table 11	112
Table 12	113
Table 13	114
Table 14	115
Table 15	120

PREVIEW

CHAPTER 1: INTRODUCTION

Introduction

It is difficult to imagine life without technology. Cell phones, computers, iPods, and the Internet are only a few tools used daily by children and adults all over the world. Since 2007, the Census Bureau reports that 70% of Americans use computers and the Internet at home versus 41.5% in 2000 (U.S. Census Bureau, 2007). As of Fall 2003, all public schools in the United States have Internet access and students have classrooms infused with technology (National Center for Education Statistics, 2007). With the integration of technology in the daily lives of students, there is a concern of how well teachers are prepared to teach with technology (Hasselbring, et al., 2000). Physical Education teachers do not escape this concern. In 1998, DePauw (1998) stated that in every university Kinesiology department in the United States technology is used within instructional programs as a way to inform pedagogy.

Currently, the innovations of computerized gadgets and digital apparatus in physical education are noticed all around the globe. Pedometers count the steps students take each day and motivate them to adopt a more physically active lifestyle (Lubans, Morgan, & Tudor-Locke, 2009). Heart rate monitors provide teachers with vital information on the level of activity output of their students in order to effectively design instruction geared to the needs of specific students (Kirkpatrick & Birnbaum, 1997; Ratey, 2008). Digital video is used to help pre-service teachers observe, assess, and provide specific feedback to children on how to move in space in order to support motor skill development (Fiorentino, 2004; Lim, Pellett, & Pellett, 2009). By including such technologies, Physical Education (PE) teachers are bound to enhance their programs with

alternative lifelong physical activities and innovative fitness programs (Mears, Hansen, Fine, Lawler, Mason, & Richardson, 2009).

While technologies have been found useful within education, studies indicate that teachers do not feel prepared to use technology in their instruction (McGowen, 2003; Milken Exchange, 1999; National Center for Education Statistics, 1997; Willis & Mehlinger, 1996). To encourage the integration of technology, the National Council for Accreditation of Teacher Education (NCATE) together with the International Society for Technology in Education (ISTE) created national standards on how to infuse classrooms with technology (International Society for Technology in Education Accreditation Committee, 1998). In Physical Education Teacher Education (PETE), technology integration was first adopted in the 2001 national standards for beginning teachers (National Association for Sport and Physical Education, 2001). Later, in 2008, new national standards included a more integrated approach to teaching pre-service teachers about technology and stated that “teacher candidates should demonstrate knowledge of current technologies by planning and implementing learning experiences that require students to use technology appropriately to meet lesson objectives” (National Association for Sport and Physical Education, 2008, p. 15).

Statement of the Problem

Guided by national standards, one would think that teacher preparation programs would integrate technology into pedagogy courses and provide professional development for those teachers already in the field. However, according to the National School Health Policies and Programs Study (Lee, Burgeson, Fulton, & Spain, 2007), only 42% of PE teachers have received staff development on the use of physical activity monitoring

devices and 37% on the use of technology overall. Other training on administering fitness tests, assessing students' performance and developing portfolios was completed by 17% to 48% of physical educators (Lee, et al., 2007). With the inclusion of the 2008 standards for future PE teachers, PETE faculty have the task to create instruction that effectively integrates technology (National Association for Sport and Physical Education, 2008). Consequently, it is questioned whether or not current faculty members of PETE programs are adequately prepared to take on such a task.

While there are various practical research papers on the benefits of using technology in Physical Education, little empirical research has been done to understand the current scope of the perceptions of Physical Education Teacher Education faculty on the integration of technology. What technologies are currently being taught to pre-service teachers? How are these technologies introduced in Physical Education training programs? Understanding how and which technologies are used can provide insight into the need of technology guidance for PETE faculty members. In addition, it is important to understand the factors that may hinder or facilitate the integration of technology by educators so organizations concerned with the preparation of PE teachers (such as the National Association of Sport and Physical Education - NASPE and the American Association for Health, Physical Education, Recreation and Dance - AAHPERD) can assist Physical Education Teacher Education faculty in creating and offering quality programming to PE teacher candidates.

Concerned Engagement

As a former physical education teacher and a current graduate student and instructor within a PETE program, I often reflect upon my own practices both as a

teacher and a researcher. During my Masters' program, I investigated the use of wikis (editable websites that encourage collaborative writing) as a technology that can extend the learning experiences of teacher candidates while gaining a deeper understanding of the concepts around teaching games in Physical Education (Baert, 2008b). That experience allowed me to see the influences technology can have on learning and teaching in Physical Education Teacher Education programs. As I built upon these experiences I began to explore other forms of technology within Physical Education. By attending the national conferences in both Canada and the United States, I began to consider the effects of new technology on teacher education programs. Ellis (1998) refers to this process as an "interpretive inquiry", or a process of reading a situation to explore, question, and understand before one acts upon that understanding. The question I pose is: *"How can I integrate technology in pedagogy courses so that physical education teachers feel prepared to activate today's digital students?"*

By accessing the Internet for more information, I found an abundance of technologies that could and should be integrated into a teacher program. In her book: "Using Technology in Physical Education", Bonnie Mohnsen (2008) lists over 30 different technological devices that can be used to enhance the practice of physical education. These technologies include audio and visual apparatus, aerobic equipment, physical activity monitors, computer programs, instructional software, and online materials. Although there are other sources that offered similar options, these findings are exciting yet disturbing to me. As I prepare to become a new Physical Education Teacher Education faculty member, I wonder about my own preparedness to teach teacher candidates. Realizing the effect a teacher education program can have on the success and

achievement of new teachers, it is imperative to find out how faculty are meeting the need of today's teacher candidates.

Ellis (1998) asserts that when we wish to get closer to what we need to understand, the study can be viewed as “a series of loops in a spiral (Fig. 1), each loop in the spiral representing a separate inquiry activity within the study, and each loop starts through uncovering the previous loop” (p. 20). As I reflect upon my own practice I used this spiral to understand the needs of teacher candidates and teacher educators in order to design and select activities or instructional tools that meet those needs.

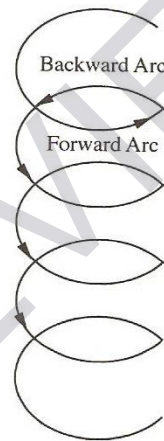


Figure 1. Interpretive inquiry as an unfolding spiral (Ellis, 1998, p. 20).

First, I questioned the current scope of the integration of technology in PETE programs by examining the experiences and perceptions of faculty members in such programs. Finding this information started another loop in the process. In an interpretive inquiry, research begins with such a question and continues with several data collection and analyses stages where new meaning guides the path of further research (Ellis, 1998). It is important to this type of study that the inquirer is vigilant about how he or she interprets each step in the process as new data and interpretation may evolve and

influence the path of the investigation. In combination with my own interpretation, I am guided by theory regarding teaching and learning with technology.

Theoretical Background

It is important to understand that technology is here to stay. In fact, new tools emerge each day and it is simply impossible to keep up with all technologies. Consequently, it is vital to locate and examine current teaching practices that demonstrate the effective integration of technology in preparing physical education teachers in the “Digital Age”. In order to investigate effective technology integration, it is fundamental to understand the theory of diffusion. Roger’s Diffusion Theory (2003) and the Technological Pedagogical Content Knowledge Framework (Mishra & Koehler, 2006) were used to guide an understanding of the implications of technology on teaching and learning.

According to Hasselbring et al. (2000), faculty should teach the “skills for the successful use of technology for learning as well as the pedagogical skills associated with the classroom uses” (pp. 22-23). Diffusion theory can help us understand the process of integrating technologies into a social system such as a teacher education program. General diffusion theory originated from Everett Rogers (2003) who conceptualized five distinct stages within the process of diffusion as a relatively linear process from (1) knowledge, (2) persuasion, (3) decision, (4) implementation, to (5) confirmation. This study explored the factors that affect the diffusion process. Numerous diffusion models were discovered through an in-depth literature review and the Technology Learning Cycle (Sprague, Kopfman, & Dorsey, 1998) revealed to be an appropriate model for the

integration of technology within teacher education. However, many diffusion models appeared to hold altered definitions of technology integration.

Within this study, effective technology integration is supported by the understanding that there are relationships that occur between three knowledge systems: content, pedagogy, and technology. An in-depth review of research and literature showed that technology should not be treated as a separate entity and effective teaching constitutes an understanding of how technology relates to the content and pedagogy (Hughes, 2005, Mishra & Koehler, 2006, Neiss, 2005). Mishra and Koehler (2006) enhanced Shulman's framework of pedagogical content knowledge (Shulman, 1986) to articulate such relationships within what they called the Technological Pedagogical Content Knowledge framework or TPCK. The TPCK framework is used to enhance the chosen diffusion model as conceptualized by Sprague, Kopfman, and Dorsey (1998) and extended by Howland and Wedman (2004). The aforementioned theories and models are described in more detail in the Chapter 2.

Purpose of the Study

The purpose of this study was to analyze the current status of technology integration within physical education teacher education programs as perceived by the faculty of such programs. This study aimed to 1) identify the types of technology currently taught to physical education teacher candidates in PETE courses within undergraduate and graduate programs, 2) evaluate the current technological proficiency of PETE faculty (as perceived by the faculty) and 3) its relationship to the level of integration within the PETE courses, and 4) examine the factors that affect technology utilization of PETE faculty within the PETE programs. In conclusion, the intention of this