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# Action Research as an Instructional Strategy for Faculty and Teacher Development in Educational Technology

## **Description**

This paper reports the outcomes of a preliminary study on embedding action research as an instructional strategy for faculty and teacher development in a Masters level educational technology course. An entry survey as well as pre- and post-tests based on NETS for teacher literacy were analyzed to determine the candidates' perceptions and progress as a result of the intervention. The results indicate an increase in perceived ability and marked progress in each of the six NETS performance indicators. Candidates attributed this improvement both to enhanced exposure to other educators' efforts in the field as well as their own individual project experiences. Keeping abreast of technological advancements and learning how to effectively integrate them into practice are ongoing challenges for 21<sup>st</sup> century educators. Embedding Action Research as an instructional strategy shows promise for directing both instructors and candidates on a positive learning trajectory towards improved practice.

## **Keywords**

Action Research, Technology Integration, Professional Development, Teacher Education, Online Learning, Instructional Design

## **Disciplines**

Education

## **Comments**

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# Action Research as an Instructional Strategy for Faculty and Teacher Development in Educational Technology

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**Abstract:** This paper reports the outcomes of a preliminary study on embedding action research as an instructional strategy for faculty and teacher development in a Masters level educational technology course. An entry survey as well as pre- and post-tests based on NETS for teacher literacy were analyzed to determine the candidates' perceptions and progress as a result of the intervention. The results indicate an increase in perceived ability and marked progress in each of the six NETS performance indicators. Candidates attributed this improvement both to enhanced exposure to other educators' efforts in the field as well as their own individual project experiences. Keeping abreast of technological advancements and learning how to effectively integrate them into practice are ongoing challenges for 21<sup>st</sup> century educators. Embedding Action Research as an instructional strategy shows promise for directing both instructors and candidates on a positive learning trajectory towards improved practice.

## Introduction

Understanding, integrating and utilizing technological advancements are ongoing challenges for the 21<sup>st</sup> century educator. Faculty, whose expertise has traditionally been in the specialization and dissemination of knowledge, are now expected to be highly technologically literate, demonstrate knowledge-in-practice and meet the diverse needs of their increasingly dynamic and diverse student populations (21<sup>st</sup> Century, 2002; Seddon, 1999). The same holds true for pre- and in-service educators. A National Education Association report (2005) states that teachers need to have a deep knowledge content, knowledge of how learners develop, and how to use tools to assess what students know and how they learn. Developing competency in these areas, however, presents a challenge for faculty and K-12 teachers alike, particularly with the advent of Web 2.0 technologies and the numerous applications this transition has introduced.

The goal of this study is to address this issue by evaluating the effectiveness of embedding action research as an instructional strategy in an educational technology course. Action research is defined as "... experimental research that focuses on the effects of the researcher's direct actions of practice within a participatory community with the goal of improving the performance quality of the community or an area of concern." (Dick, 2002; McNiff & Whitehead, 2006). An analysis of action research as both a framework for understanding emergent technologies and the pursuit of evidence-based practice is therefore an important and relevant contribution to teacher development. The study focuses on two questions: What are candidate's perceptions of their technology skill level and areas for improvement? What impact does the instructional strategy have on the candidates' learning experience?

## Description of the Research Process

This action research study was conducted by a faculty member during an education technology course in a Master's level Flex teacher preparation program. The Flex program is designed for candidates who work full-time while studying. For this reason, the course was scheduled as four seven-hour weekend classes over the duration of a four-month semester. The course was attended by 20 MAT students and 2 undergraduates with an Education Major. Three licensure groups were represented:

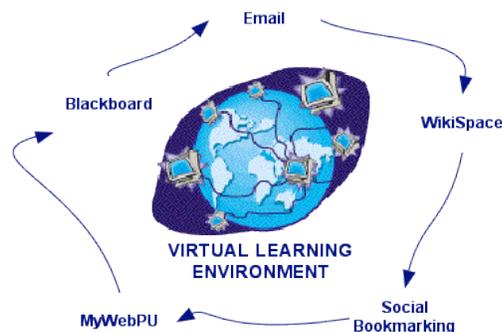
Early Childhood Education/Elementary - 9  
Elementary/Middle School - 2  
Middle School/High School - 11, broken down in the following specialization areas:  
Language Arts - 5,  
Math - 2,  
Spanish - 2,  
Music - 1  
Business - 1.

The ages of the candidates fell into the following three groups:  
20-30 year old - 19,  
30-40 year old - 2  
40 and over - 1.

The study was designed in two stages: a) building of a virtual learning environment to support the learning community as it used action research; and b) creation of the course syllabus that integrated action research as an instructional strategy.

### **The Virtual Learning Environment (VLE)**

There are numerous possibilities for establishing virtual learning environments that can facilitate learning and support community building (Berry et al., 2006; Jonassen et al., 2008; Zijdemans et al., 2000). This course integrated the content management course and email system used at the university as well as other Web 2.0 technologies as seen in the following figure.



**Figure 1:** The Virtual Learning Environment

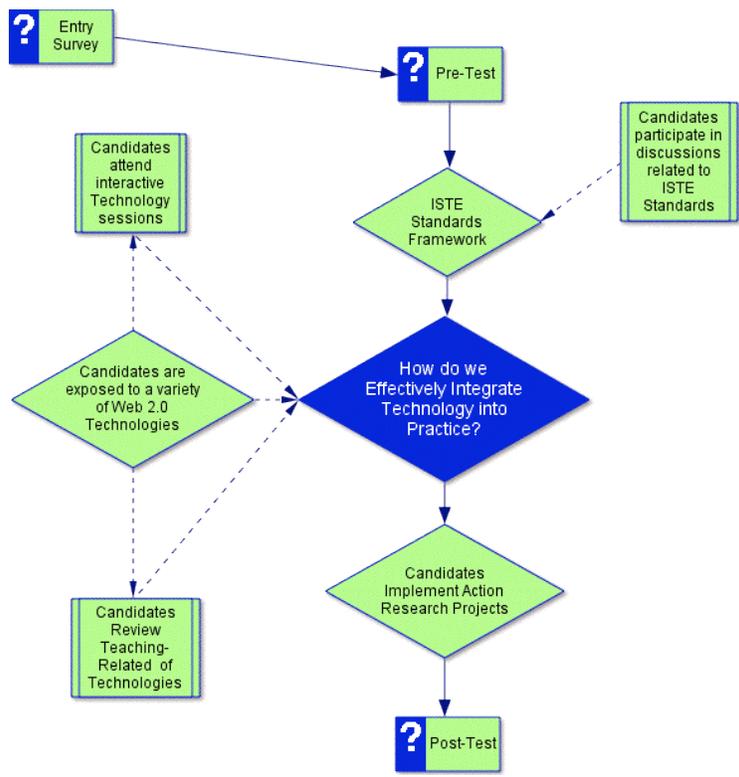
The course VLE was comprised of Blackboard, E-mail, MyWebPU – the university’s HTML page server, Delicio.us, a social book-marking space, and Wikispaces, the central organizer for the course [see: <http://edutac.wikispaces.org>]. A blog was also created but not used. The intent was to support the learning community and expose candidates to a variety of technologies.

### **The Action Research Instructional Strategy**

The action research instructional strategy involved the following activities: a) attending information sessions on Web 2.0 technologies, including the Oregon Technology in Education Network (OTEN) conference showcasing teacher research using technology in the classroom; b) hands-on exploration of different technologies; c) group research reviews on subject-related technologies; d) engaging in discussions related to the National Education Technology Standards (NETS) performance indicators; and e) pursuing self-directed research projects in the classroom.

Data collected included an initial entry survey to aid the instructor in determining the skill-sets, interests and experiences of each of the candidates. Following this, candidates completed a pre-test, which was a self-assessment based on the NETS and performance indicators for teachers. This was also included in the post-test results to measure any changes in students’ perceptions and progress. The following figure describes

the organizational flow of the instructional strategy and shows how the central question, “How do we effectively integrate technology into practice?” is pursued through the previously mentioned activities.



**Figure 2:** Action Research as an Instructional Strategy for keeping abreast of technological advancements and learning how to integrate them into practice.

## Findings

The findings represent data analyzed from the entry survey, and the pre- and post-tests based on the NETS literacy performance indicators. All of the class members participated, thus each of the outcomes represents an N=22. Entry survey results indicate, on a scale of 1 [weak] to 10 [strong], that when asked how they would rate their technology skills candidates’ fell into the range between 4 to 8 with a mean average of 6.30%. The following table indicates the kinds of applications candidates had previous experience with.

Tapped In	18	Multimedia	6	Web Presence	1
MSN Messenger	15	FaceBook	4	Inspiration	1
YouTube	13	Online course	4	Other: Ed Line	1
Website Design	11	Whiteboard	3	Adobe Acrobat	1
MySpace	10	Web CT/Blackboard	2	Wiki	0
PPT presentations	10	Web Conferencing	1	Moodle	0

**Table 1:** Summary of previous experience in technology

Tapped In, a content management system, had been used by 18 of 22 candidates due to a previous course that had required them to use that application. Following this, the most-used technologies were, in order, MSN Messenger, YouTube, Website design software e.g., Front Page and Dreamweaver, MySpace and PowerPoint. These results indicate that, with the exception of PowerPoint, these applications were primarily “social” software that is typically used in non- educational settings.

When asked, “What would you like to learn?” candidates’ preferences, indicated in the following table, were, Web page creation, learning how to use various technology tools in the classroom, using teacher programs and creating multimedia especially within PowerPoint.

Web Page	8	Blog	2
Technology in Classroom	8	Whiteboard	2
Teacher Programs	8	Online Publishing	1
Multimedia	6	Web Safety	1
PowerPoint	4	Excel formulas	1
Enhance student learning	3	Technology issues in low SES schools	1

**Table 2:** Summary of responses to the question, “What would you like to learn?”

Additional comments included: “I would like to learn how to use software and hardware to enhance the learning environment of my students” and “I hope to learn the basics, or to be at least familiar enough with common teaching technological aids, tools, etc. to feel confident upon entering the workforce as an educator.”

When asked to share any concerns, three students included remarks such as: “I forget when I am alone”, “I am a little ADD [Attention Deficit Disorder] with computers, I get stuck checking things out when I’m supposed to move on.” and “My concerns would be getting frustrated of not being able to keep up.” In summary, the results of the entry survey indicated that candidates had a basic comfort with their level of technology skills but recognized that there were still areas for growth.

The pre-test, based on the six NETS performance indicators, confirmed the candidates’ perceptions that their experiences were, in general, limited. Candidates were asked to evaluate their current understanding on each of the standards. The following tables summarize the pre- and post-test results. Total N=22. The line titled ‘*Invalid*’ represents instances where candidates spoke generally about what educators need to learn rather than to their specific understanding.

	1. Technology Operations & Concepts	2. Planning & Designing Learning Env’ts & Experiences	3. Teaching Learning & Curriculum	4. Assessment & Evaluation Techniques	5. Productivity & Prof. Practice	6. Social, Ethical, Legal & Hum Issues
Little/No Experience	2	14	13	6	4	4
Basic	12	6	7	14	16	16
Intermediate	5					
Advanced	1					
<i>Invalid</i>	2	2	2	2	2	2
<b>Total</b>	<b>22</b>	<b>22</b>	<b>20</b>	<b>22</b>	<b>22</b>	<b>22</b>

**Table 3:** Analysis of Pre-Test based on NETS performance indicators.

The post-test used the same pre-test format to assess changes in candidates’ perceptions and progress.

	1. Technology Operations & Concepts	2. Planning & Designing Learning Env’ts & Experiences	3. Teaching Learning & Curriculum	4. Assessment & Evaluation Techniques	5. Productivity & Prof. Practice	6. Social, Ethical, Legal & HumIssues
Progressed	19	16	16	12	19	14
Same						1
N/A		3	3	7		4
<i>Invalid</i>	3	3	3	3	3	3
<b>Total</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>

**Table 4:** Analysis of Post-Test based on NETS performance indicators.

Overwhelmingly, students indicated that progress had been made in each of the six NETS performance indicators. The two standards that showed the least improvement were 4. *Assessment and evaluation techniques*, and 6. *Social, ethical, legal and human issues*. Candidates' comments were related to their overall experience during the course as well as their individual projects. I have added illustrative comments for each of the six standards:

1. *Technology Operations & Concepts*: "With this project, even though I didn't know a whole lot about PPT, the end result does not show that. By exploring and by trial and error, I was able to create something that I was very proud of."
2. *Planning & Designing Learning Environments & Experiences*: "Prior to this course I had not seen a lot of web based learning environments. Visiting platforms such as Wikispace, WebCT, tapped in have improved my understanding of 'learning environments supported by technology.'"
3. *Teaching Learning & Curriculum*: "Since the beginning of the course I have more confidence in my introductory skills and am much more interested in the continual growth in technology."
4. *Assessment and Evaluation techniques*: "I had planned to offer grades on my website. I did not have time to figure out how to incorporate grades yet I plan to in the future. I did however create an authentic performance task in why my students must use technology to create a presentation" "I don't think I have made much progress here...with any type of technology an educator must decide what they want to record and keep data on and choose the technology that is appropriate tracking that type of data." and "My project did not have anything to do with assessment. However I do need to assess my Webquest and explain to students how I will be grading the work they are doing."
5. *Productivity & Professional Practice*: "The group research really opened my eyes to new technology out there..." and "What I have learned is that I MUST continue to learn about and evaluate emerging technology in order to keep pace with advancement."
6. *Social, Ethical, Legal & Human Issues*: "I do not have a lot of experience in this area. I would like to know about the legal aspects of using technology in the classroom." and "A huge concern of mine is how to facilitate equitable access to technology resources for all students AND families."

Finally, the OTEN teacher showcase conference received extensive praise as an invaluable learning experience. As summarized by the following student, "The OTEN conference was the most valuable part of the course. I got so MANY valuable ideas that I want to incorporate into my future classroom." The experience also motivated several candidates to pursue funding opportunities in this area.

## Plan of Action

Based on the lessons learned in this study the next iteration will incorporate the following changes as indicated:

**Action Research Model:** The candidates did not fully understand my use of action research as a tool for developing evidence-based practice until the projects were introduced near the end of the course. This experience indicates that a clear and comprehensive introduction of action research method is crucial for candidates' progress in this area of study. To address this, the next iteration will utilize the process presented in Sagor's (1999) *How to Conduct Collaborative Action Research*. This will help to integrate the action research process and provide an opportunity for the candidates to identify their interests at the outset of the course.

**Wikispace:** I will continue to develop the course Wiki as a knowledge management system as well as increase student engagement particularly in the areas of synthesizing discussion threads, and updating main level pages.

**Social Book-marking:** I set up a social book-marking space using del.icio.us but did not have a chance to fully utilize it. I will have candidates add their sources to the social book-marking site as the final step in the web reviews of their subject-related technologies.

**Online Survey Tool:** I intend to use an online survey tool such as Web Monkey to get immediate results on the entry survey as well as the pre- and post-tests so that they can be more easily shared with the class.

## Current Update

In the subsequent iteration of the instructional strategy, I have integrated the lessons learned from this preliminary study. The course Wiki has been made entirely private to members only and I am modifying both the group review and NETS discussions activities so that candidates take on more responsibility for updating main pages initiated by their predecessors. I am also encouraged to further investigate Wiki as a knowledge management system. Another exciting new step is that I am migrating the educational technology course into a hybrid delivery model – face-to-face and online – in an attempt to break up the four seven-hour course format into eight shorter sessions – four face-to-face and four online. For the virtual learning community, I have decided to explore the possibilities of interactive web conferencing: a) to provide yet another opportunity to explore Web 2.0 technologies; and b) to evaluate it as a tool for supporting the learning community. Details to follow.

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