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AUTHOR	Durnin, John H.
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ABSTRACT

This paper describes a project in which inservice teachers, who were educated in technology, offered workshops to undergraduate preservice teachers. Project goals were to enhance inservice teachers' ability with technology and to prepare preservice teachers for the use of technology in the classroom. Workshops were held during two semesters. Evaluation involved questionnaires administered anonymously to participants following the workshops. Results for the first semester preservice teachers indicated that they tended to agree to statements affirming their ability to apply what was learned for classroom instruction through the workshops. Results were similar for the second semester preservice teachers for all items except those regarding their ability to help students with databases and spreadsheets. These overall affirmative answers were supported by the answers of cooperating teachers. Inservice teachers tended to view themselves as more capable of helping others with technology than did preservice teachers. Many preservice teachers made positive comments about having inservice teachers conduct the workshops. (Contains 16 references.) (SM)

Pre-service Teachers Taught Classroom Technology by In-service Teachers

This project was a two semester initiative through university courses to have graduate in-service teachers educated in technology offer workshops to undergraduate pre-service teachers. The goals of the project were to enhance in-service teachers' ability with technology and to prepare pre-service teachers for the use of technology in the classroom. Questionnaires were administered to assess the success of this initiative.

John H. Durnin

Associate Professor of Education

Department of Education and Human Services

Villanova University

Villanova PA 19085

610-519-4613

john.durnin@villanova.edu

John has been a teacher educator at Villanova for over 30 years and has been involved with methods for using computers in the classroom for over 20 years. He has been an invited lecturer, professor and Fulbright scholar at other institutions. He is an active member of PAC-TE as well as other educational organizations.

Pre-service Teachers Taught Classroom Technology by In-service Teachers

Educators (Fisher, 1997; Handler, 1992; Rodriguez, 1996; Schrum, 1999), professional organizations (e.g., Bradley, 1997; Pines, Seidel & DiTrani, 1998; Wills, Thompson & Sidera, 1999) and political leaders (Clinton, State of the Union Address, 1997; Trotter, 1999) in the past decade have stressed the need to instruct pre-service teachers on how to integrate technology into classroom instruction as part of a larger systemic movement to improve the quality of American education. Colleges and universities, either through their own initiatives or in response to these recommendations, have initiated technology integration courses and programs (Brush, 1998; Poftack, 1999: Strudler & Wetzel, 1999). Several of the programs (e.g,. Balli & Diggs, 1996: Balli, Wright & Foster, 1997: Hornung & Bronack, 2000) also incorporated technology field experiences for their pre-student teaching candidates. The candidates, following their own instruction, taught technology based lessons in elementary or secondary school classrooms under the supervision of mentors in the schools.

In order to facilitate the use of technology for instruction by Villanova pre-service teachers, a project was proposed to incorporate the use of technology into the general methods course for undergraduate secondary pre-service teachers. An integral component of the course was the planning and delivery of practice lessons incorporating technology by the pre-service teachers. Since the faculty also believed that the pre-service teachers would benefit from the application of technology in their field experiences, another component of the course was the delivery of lessons using technology by the pre-service teachers under the supervision of cooperating teachers in the field. In addition, however, we wished to increase the interaction between pre-service teachers and in-service

teachers. Although some programs (e.g. Smaldino & Muffoletto, 1997) would have in-service teachers give lectures to their students on technology, we decided to incorporate more of a collegial approach similar to teacher to teacher workshops (e.g., Meeks & Soeffing, 1995). Therefore, an element by which in-service teachers would offer workshops to pre-service teachers was inserted into the project. In this way interactions and discussions between pre-service and in-service teachers about integrating technology into instruction could be furthered. This article is a description, with evaluations, of the project over two semesters.

Two overarching goals were set for the project. The first goal was to prepare pre-service teachers for the instructional use of technology in the classroom. The second was to enhance the ability of in-service teachers to assist their colleagues and students with technology through the experience of planning and offering workshops to pre-service teachers. The objectives of the project for both the pre-service teachers and in-service teachers were the following:

1. To develop instructional materials and lessons that involve students in the investigation of content areas through the use of technology.

2. To implement the Word Wide Web (WWW) as an educational resource for both teaching and student learning.

3. To develop computer generated verbal and graphic presentations to use with classroom instruction.

Additional objectives for the in-service teachers included the following:

1. To be able to assist their own students and colleagues in the use of technology in the classroom.

2. To instruct their own students and colleagues on applications of technology for communicating about a subject.

Project Implementation

Semester one. To accomplish the objectives for pre-service teachers, a multiple sections undergraduate professional development course for secondary pre-service teachers was developed and offered during a 14week semester. The content of the course covered various instructional strategies and assessment methods. The instructional strategies were demonstrated using technology. The undergraduate sections met on Tuesday, Wednesday and Thursday in a room serving as both a computer laboratory and classroom. The room was equipped with 16 networked computers, a server, two printers, a projection system, and a large screen television monitor. Each computer station could be monitored and its display could be controlled and projected through the network. The sections of the professional development course consisted of 15, 16, and 12 pre-service teachers, respectively. The course was required for Villanova pre-service teachers seeking secondary certification. For Villanova pre-service teachers seeking elementary certification through an affiliated college, the course was an elective. The pre-service teachers were, at least, in the second year of their undergraduate programs.

During the same semester a graduate course on using technology in the classroom was given to 12 in-service teachers. The in-service teachers were elementary and secondary teachers pursuing a Masters degree at Villanova University. The graduate course met for two hours once a week in the early evening on Monday in the room described above. The undergraduate sections met for 2 ½ hour sessions once a week on a late afternoon schedule to make them available to the graduate in-service teachers

conducting the workshops. The in-service teachers received intensive instruction on technology with respect to operating systems, minor maintenance and troubleshooting, functions of computer networking and printing, and demonstrations of classroom applications using word processing, data base, spread sheet, slide show and presentation software, CD ROM, laser disc, DVD and the World Wide Web. The in-service teachers, in turn, were divided into three teams of four to present three 2 ½ hour workshops each, under the supervision of a university professor, to the pre-service teachers. The first workshop introduced students to the computer systems and demonstrated how the computer's word processing capabilities could be used in classroom instruction. The second workshop focused on using and creating databases and spreadsheets in lessons. In the third workshop the in-service teachers demonstrated using the Internet for creating lessons, visiting interactive sites for lessons and developing slide shows to use in the classroom. Table 1 shows the objectives for the second workshop as well as a suggested outline for the workshop. The teams were rotated through the three undergraduate sections so that no section was taught by a team more than once. In total, each section of the pre-service teachers received three workshops on the use of technology in the classroom. In this manner the pre-service teachers learned from and interacted with the in-service teachers concerning technology. It was, also, anticipated that in this manner the in-service teachers' own expertise would improve beyond the novice level and aid them in the facilitation of technology among their colleagues.

Insert Table 1 About Here

As a requirement of the undergraduate course the pre-service teachers were to create two lesson plans and present the lessons in class using the technology learned. The first lesson requiring the use of technology was a practice lesson to be given solely in the professional development class. The second lesson was to be created in conjunction with a voluntary cooperating teacher in an elementary or secondary school.

Arrangements were made with the administration of a school system in the greater Philadelphia region to solicit voluntary cooperating teachers. Although the project had the assistance and cooperation of the administrators of the participating school system in publicizing the project and requesting volunteers, only 13 cooperating teachers in the system volunteered to mentor the pre-service teachers. Five other teachers volunteered to cooperate from other school systems. Thus, we were only able to place 18 pre-service teachers from the undergraduate sections. The cooperating teachers who volunteered were faculty from three urban and five suburban schools in the Philadelphia region. Each voluntary cooperating teacher received a letter of thanks, guidelines for the pre-service teacher's field experience, an evaluation questionnaire and a postage paid return envelope.

The pre-service teachers were expected to meet, at least, three times with their assigned elementary or secondary voluntary cooperating teacher. Both pre-service teacher and voluntary cooperating teacher were matched according to the pre-service teacher's certification level and subject area. Of the 18 pre-service teacher placements two were in elementary schools and 16 in high schools. The pre-service teachers were required to develop under the guidance of the voluntary cooperating teacher a short lesson that would be a part of the cooperating teacher's curriculum and be presented by the pre-service

teacher to the cooperating teacher's students. Since all the voluntary cooperating teachers' schools had computer laboratories, the pre-service teachers developed lessons using those facilities. Thus, the pre-service teachers had an opportunity to apply their newly acquired technological abilities in the classroom and receive feedback from more experienced educators.

The project was evaluated through questionnaires administered anonymously to the pre-service and in-service teachers following the workshops. Each item was scored by assigning a value of 1 to Strongly Disagree with the item statement to a value of 4 to Strongly Agree with the item statement. Intermediate values of 2 and 3 were given to Disagree or Agree with the item statements, respectively. An average score for each item was computed across all respondents. In addition, with regard to the field experience the voluntary cooperating teachers evaluated the pre-service teachers' lessons through a questionnaire mailed to each. This feedback provided an independent evaluation of the skills gained by the pre-service teachers from the workshops and course.

Semester two. We offered the exact same course content to a second group of in-service teachers during a semester of the following year. And the same workshops' content was taught by the in-service teachers to the pre-service teachers. However, the in-service teachers were free, as in the first year, to plan the workshops as they saw fit, as long as the objectives were covered (e.g., see Table 1). Thus, the workshops differed in organization and presentation, but not content, from the previous year.

The graduate course consisted of eight in-service teachers. Also fewer pre-service teachers were enrolled the second semester in the undergraduate project course and only two undergraduate sections were offered. The Tuesday section had eight secondary pre-

service teachers and two elementary pre-service teachers. The Wednesday section had eight secondary pre -service teachers. The in-service teachers were divided into two teams of four and alternated between the two undergraduate sections. In this case out of the three workshops, each section received the same team twice.

For the classroom experience all the pre-service teachers were able to be placed in three suburban high schools. The secondary pre-service teachers were matched with cooperating teachers by subject areas. The two elementary pre-service teachers in the project course developed lessons on topics with which they felt comfortable. Both presented lessons in general science at their assigned high schools.

The cooperating teachers were also assigned. A repeat of the first semester's lack of cooperating teachers was unacceptable; so it was arranged for the participating school principals to place the pre-service teachers with appropriate cooperating teachers. Hence, the field placement for the pre-service teachers did not have to rely solely upon voluntary cooperating teachers. The school principals in consultation with departmental chairs assigned the second semester cooperating teachers. Again each cooperating teacher received a letter of gratitude, guidelines, a questionnaire and a postage paid return envelope. Table 2 provides a summary of the participants for each semester.

Insert Table 2 About Here

Evaluations

Table 3 shows the most pertinent results with respect to the aforementioned goals from the questionnaires administered to the pre-service teachers across all three sections

in the first year and two sections in the second year. The questionnaire averages were fairly similar across semesters even though the instructional methods varied. In both semesters students exhibited more confidence with word processing and slide shows than with instructional use of data bases and spreadsheets. The greatest difference between the two semesters was with respect to the creation of slide shows. The second semester pre-service teachers seemed to have almost 100% confidence in their ability to develop slide shows.

Insert Table 3 About Here

Table 4 shows the results from the in-service teachers who offered the workshops. Again the results are fairly similar across the semesters. As with the pre-service teachers, the in-service teachers also demonstrated greater confidence in using word processing and slide shows than with data bases and spreadsheets.

Insert Table 4 About Here

Table 5 shows the response averages of the cooperating teacher evaluations of pre-service lessons. All 18 of the voluntary cooperating teachers who participated in the first semester returned the questionnaires. In the second semester 15 of the 18 assigned cooperating teachers who participated returned the questionnaires. As can be seen from Table 5, the assigned cooperating teachers in the second semester gave lower scores.

Insert Table 5 About Here

Discussion

The results for the first semester pre-service teachers indicated averages between 3 (Agreement) and 4 (Strong Agreement) on statements affirming their ability to apply what was learned for classroom instruction through receiving workshops. The results for the second semester pre-service teachers evidenced similar averages for all items except those with regard to statements affirming their ability to help students with databases and spreadsheets. Those averages were between 2 (Disagree) and 3 (Agree). Compared to word processing and slide show averages, the lower averages with databases and spreadsheets, for both the pre-service and in-service teachers, may have been due to their prior experiences with word processing and exposure to slide shows. However, the overall affirmative responses of the pre-service teachers on their questionnaires were supported over both semesters by the positive responses of the cooperating teachers on their evaluations of the pre-service teachers' lessons.

The in-service teachers in both semesters had averages between 3 and 4 over all items. By comparison to the pre-service teachers they viewed themselves as more capable of helping others with technology. On all comparable items the in-service teacher averages on confidence responses were higher than the pre-service teacher averages.

In the first semester the only disappointment was the lack of voluntary cooperating teachers. Depending solely upon the willingness of teachers to volunteer was insufficient for placement of the pre-service teachers. But those who did participate gave

very high ratings to the pre-service teachers' lessons, and many expressed their satisfaction and pleasure with the experience. Nonetheless, for the second semester it was undesirable to have more pre-service teachers than cooperating teachers again; so through the assistance of school principals and department chairs the cooperating teachers were assigned. This may have had a negative effect, however, upon the assigned cooperating teachers' ratings of the pre-service teachers' lessons. An indirect indication of this was a question asking for future participation that was used both semesters. Of the 18 teachers participating during the first semester, 13 indicated a strong willingness to participate again and five indicated simply that they were willing. On the other hand, of the 15 teachers who responded to the questionnaire during the second semester six indicated an unwillingness to participate again. Thus, the lower ratings for the second semester may be due to the difference between cooperating teachers volunteering and cooperating teachers being assigned to work with pre-service teachers. The teachers' response in both semesters with regard to mentoring pre-service teachers was unexpected. Whether their reluctance to volunteer was due to the imposition of mentoring a pre-service teacher or due to the technology requirement was not established.

With regard to in-service teachers giving the workshops, many pre-service teachers' comments were positive. Some comments were, "It was great" or "Great job" or "They were helpful" and some asked for extra lesson plans that the in-service teachers used. The benefits that the pre-service and in-service teachers gained from this project have encouraged consideration of its continuation. However, for the future a more complementary method of placing pre-service teachers with cooperating teachers needs to be developed.

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Table 1

Objectives and Suggested Outline for Workshop 2

The student should for databases be able to: 1. Use sort function to reorder data. 2. Create a filter to isolate data of one column. 3. Create filters of data from two or more columns. 4. Enter data to a database. 5. Apply in combination sort, filter and subtotal functions. 6. Construct and save a database.
For spread sheets be able to: 1. Construct and save a simple spreadsheet. 2. Edit a spreadsheet. 3. Add clipart to a spreadsheet. 4. Create a chart from a spreadsheet using Chart Wizard. 5. Use fill across and fill down functions. 6. Perform simple arithmetic functions on a spreadsheet. 7. Identify lessons that can use a database or spreadsheet.
Suggested outline for the workshop 1. Place demonstration lessons on server and computers before workshop. 2. Cover objectives above. 4. Demonstrate 3 separate lessons using database and spreadsheet functions. 5. Put students in teams to construct a lesson that uses a database or spreadsheets. 6. Use Administrative Assistant to observe and project student lessons.

Table 2

Number of Participants in the Project for Each Semester

	Number in Semester 1	Number in Semester 2
Total Pre-service Teachers	43	18
Tuesday Section	15	10
Wednesday Section	16	8
Thursday Section	12	--
In-service Teachers	12	8
Voluntary Cooperating Teachers	18	--
Assigned Cooperating Teachers	--	18

Table 3

Averages on Items Soliciting Pre-service Teacher Evaluations of the Workshops

Items	Semester 1 N= 43	Semester 2 N= 18
1. I think that I am able to identify lessons in my subject area with which I can use word processing as a tool.	3.39	3.63
2. I am able to construct lessons in my field that use word processing.	3.47	3.47
3. I am able to help students in the use of word processing.	3.66	3.39
4. I can identify lessons in my subject area where databases can be used.	3.31	3.29
6. I am more knowledgeable than when I started about the uses of databases for teaching.	3.56	3.35
7. I am able to help students develop and use databases.	3.17	2.83
8. I understand how a spreadsheet can be used for simulations in teaching.	3.47	3.59
9. I am more knowledgeable than when I started about the uses of spreadsheets for teaching.	3.39	3.53
10. I am able to help students develop and use spreadsheets for classroom projects.	3.16	2.78
11. I am able to use Search Engines to find sites with respect to a given topic.	3.66	3.65
12. I can create a folder on the desktop for downloading files from the Internet or to gather pre-authoring material.	3.56	3.65
13. I can find Internet sites using the Bookmarks on the lab computers that are interactive.	3.51	3.59

Table 3 continued

14. I am able to guide student searches of the Internet for school assignments.	3.55	3.39
15. I can create slides for a slide show.	3.59	3.94
16. I am more knowledgeable than when I started about the uses of the Internet and slide shows for teaching.	3.49	3.29
17. I am able to help students develop slide shows for classroom presentations.	3.46	3.39
18. I think that I am able to incorporate the Internet and slide shows into my lessons.	3.51	3.82
19. The workshops provided by the in-service teachers were helpful to my learning about the classroom use of computers.	3.39	3.06
20. The teachers showed me how the computer may be used in delivering lessons.	3.42	3.22
21. I feel confident about using computers in my lessons.	3.22	3.22
22. I am more knowledgeable about the use of computers for teaching than when I started the course.	3.16	3.11

Table 4

Averages on Items Soliciting In-service Teacher Evaluations of the Workshops

Item	Semester 1 N= 12	Semester 2 N= 8
1) I feel capable of showing students and colleagues how the computer may be used in delivering lessons.	3.45	3.88
2) Giving workshops to pre-service teachers increased my confidence to use the computer in the classroom.	3.18	3.06
3) I am able to develop lessons that use computer technology.	3.36	3.63
4) I am able to help students and colleagues use word processing.	3.73	3.88
5) I am able to guide student searches of the internet for school assignments.	3.64	3.63
6) I am able to help students and colleagues develop and use databases.	3.45	3.25
7) I am able to help students and colleagues develop and use spreadsheets for classroom projects.	3.36	3.5
8) I am able to help students and colleagues develop slide shows for classroom presentations.	3.55	3.75
9) I feel confident in using laser disc, CD and DVD technology in lessons.	3.36	3.5
10) I am able to show students how to obtain information and graphics from computerized encyclopedias.	3.64	3.63
11) I feel familiar enough with the technology to be able to operate a podium with a switcher, laser disc, VCR, server and network.	3.18.	3.5
12) I am more knowledgeable about the use of technology for teaching than when I started the course.	3.64	3.38

Table 5.

Averages on Items Soliciting Cooperating Teacher Evaluations of Pre-service Lessons

Item	Semester 1 N= 18	Semester 2 N=15
1) The lesson developed by the Villanova student was well prepared.	3.76	3.47
2) The lesson was well delivered by the Villanova student.	3.76	3.13
3) The Villanova student showed a facility with technology.	3.82	3.27
4) The students in my class were attentive to the lesson.	3.88	3.4
5) The lesson was well received by students in my class.	3.76	3.46

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