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# TEACHING NEW TECHNOLOGIES: DEVELOPING A COMPUTER LITERACY COURSE FOR PROSPECTIVE

## TEACHERS

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## INTRODUCTION

The last few years has shown an increase in both the number and availability of personal computers in the home and workplace. The ability of any person to use a personal computer, be it for work or personal reasons, is a critical factor for success in today's society. This impact is felt through the call from society that individuals be "computer literate".

Computers are also fast becoming part of the educational process. Gupta determined that there was a need for the integration of computers into all facets of education, at least on the small college level<sup>1</sup>. In addition to the natural choices of mathematics<sup>2</sup> and economics<sup>3</sup>, computers are also becoming part of the humanities. The English Department, as well as the other departments in the Humanities, at UTPB strongly encourage that all papers be typed on a computer with one of the available word-processing programs<sup>4</sup>.

It then would be expected that teachers should have some ability to deal with computers. Prospective elementary and secondary teachers not only need to know how to use computers for their own work but also in their prospective classrooms. The question is thus asked "Are teachers capable of using this equipment efficiently and effectively?" It appears that prospective elementary and secondary teachers receive do not receive this type of preparation. The object of this paper is to first examine the computer literacy requirements for prospective teachers in the United States and Canada and then outline a course being developed at St. Cloud State University which prepares teachers to use computers effectively in their classroom.

## COMPUTER LITERACY SURVEY

At the beginning of 1992, letters were sent to selected listservs (AETS - Association for the Education of Teachers in Science; CNEDUC - Computer Networking Education; DEOS - Distance Education; DTS - Dead Teachers Society; ERL - Education Research) in which the

following questions were asked: "Is there a computer literacy requirement for prospective elementary and/or secondary teachers in your state?" and "If the answer to this question is yes, how is that requirement met (through course completion, competency, etc.)?" A second "mailing" was done in the spring to elicit additional information, comments, and check for accuracy. Members of the CTI-L (Computers in Teaching - Initiative) listserv also received the summary.

### SURVEY RESULTS

Kentucky<sup>5</sup>, Indiana<sup>6</sup>, South Dakota<sup>7</sup>, and Texas<sup>8,9</sup> have a computer literacy requirement which can be met by completing a basic computer course. Students in Kentucky must also take a computer literacy test. Indiana students may test out the computer literacy course if they already have the skill. In South Dakota, elementary and special education majors take a stand-alone course while secondary majors take another course in which computer literacy is part of the curriculum.

California has a requirement which is met by a series of competencies<sup>10</sup>. North Carolina has also stated that teachers should have the ability to use computers in instructional settings but has not clearly defined how that ability is achieved<sup>11</sup>. The state of Virginia, while not having a computer literacy requirement, does suggest that students should be computer literate<sup>12,13</sup>. The state of Texas also requires that students take a one semester computer literacy course while in junior high school and one year of computer science if they are in the advanced high school curriculum [8].

Alabama<sup>14</sup>, Massachusetts<sup>15</sup>, Michigan<sup>16</sup>, Minnesota, New York<sup>17</sup>, Pennsylvania<sup>18</sup>, and Ohio<sup>19</sup> do not have any type of computer literacy requirement. Massachusetts does not have a requirement but the city of Lowell expects teachers in its schools to be computer literate [15]. The Lakewood City School District (Ohio) requires that its middle school students take a computer course [19]. Bowling Green State University (Ohio) has a course requirement for Elementary Education majors<sup>20</sup>. Miami University (Ohio) requires pre-service teacher training students to take one of five courses as part of their preparation<sup>21</sup>. The College of Education at Ohio State University requires that students in its program take at least one course in computer applications. Most of these students take a course entitled "Computer Applications in Education". This course covers everything from word processing to the use of INTERNET and is done in a project-based approach<sup>22</sup>.

The College of Education at the University of Iowa offers a one semester hour course that makes the assumption that you know nothing. Science Education majors at Iowa take a series of methods courses which incorporate the use of word processors, spread sheets, and data bases<sup>23</sup>. The University of Georgia has a computer requirement for students seeking secondary certification but not for elementary or middle school certification<sup>24</sup>. Students seeking certification through the University of Alberta can take one of two courses (one in the Faculty of Education on computer literacy, the other in the Faculty of Science dealing with microcomputers) for certification<sup>25</sup>. Students at St. Thomas University in Fredericton, New Brunswick, Canada, also have a course which can be used to develop computer literacy<sup>26</sup>. The College of Education at the University of Central Florida also requires that their students have some degree of computer literacy<sup>27</sup>.

Students entering the school library media specialist program at SUNY - Geneseo are required to take at least one graduate level computer course<sup>28</sup>. Students earning a Master's Degree in Instructional Systems at the University of Central Florida are required to take at least four computer courses (a basic computer course, one dealing with CAI, one dealing with IVD, and a fourth dealing with on-line systems). Students seeking an Educational Leadership Master's Degree at UCF are required to be technologically literate [27].

### SUMMARY OF SURVEY RESULTS

An examination of state and/or university requirements suggests that, while prospective teachers (both at the elementary and secondary level) are expected to be computer literate, courses designed to meet that requirement take the form of rudimentary programming or are oriented towards teaching students how to use word processors, spreadsheets, and databases [1]. While these are important skills to have, they are not the only skills prospective teachers need. Gupta defined computer literacy "as the ability to use the microcomputer to perform the tasks in his/her major discipline." [1] Accepting his definition, we would argue that teachers need to learn how to use the computer as a classroom tool. This would mean that, instead of one general computer literacy course, two courses are needed. One would focus on basic skills, as identified; the second dealing with skills needed for future work. The second part of this paper will discuss such a computer literacy course being developed at St. Cloud State University which addresses the needs of prospective teachers.

### A COMPUTER LITERACY COURSE FOR TEACHERS

Classroom teachers today are expected to make full use of available computer technology, yet the training many receive in the acquisition, evaluation, and use of software is limited. If individuals can do computer programming, then they have the capability to create their own programs and software. However, many teachers do not have the time needed to write and test the programs, a process which can be very time consuming. For an individual to be skilled in using computers in an educational setting, that individual must know what software is available and how to utilize that software in the classroom. In addition, some consideration should be given to student-student, student-teacher, and teacher-teacher interaction via computer networks.

The course being developed at St. Cloud State University consists of three parts: using computer networks, evaluating computer software, and evaluating computer hardware. In addition, students will also examine the use of authoring software for the development of their own courseware for courses. The class is to be taught in what is known as the Beehive. This is a computer laboratory which consists of 9 IBM/clones and 31 Macintosh computers. Students also have access to the VAX mainframe through 52 terminals. There are 5 Imagewriters, 3 Epson printers, and a laser printer connected to these computers. It is anticipated that a laboratory fee will be established for use of the area.

The course starts with an introduction to the mainframe system and the establishment of student accounts along with a tutorial on the use of VAX NOTES. VAX NOTES is a conferencing system which enables the instructor to post assignments in the class without having to formally meet<sup>29</sup>. In having an account on the computer, the student has access to e-mail and is able to communicate with the instructor via that method. Using VAX NOTES enables students to share their work with the other members of the class and develop materials for future use<sup>30</sup>. In addition, this approach allows the class to be more self-paced than traditional courses.

Following an introduction to computer networks and LISTSERV<sup>31</sup>, each student will identify a listserv of interest and subscribe to that listserv, at least throughout the time of the course. Students should also be able to gain access to a separate site (one which has anonymous login facilities) using telnet procedures and use the file-transfer-protocol (FTP) to obtain a file from that site.

There are a number of reasons for including networks into a computer literacy course. Through the use of FTP, students and teachers can obtain public domain software, technical reports, and papers. Listservs serve as a means of communication and a way to exchange

ideas and research<sup>32</sup>. We have already described how computer-based networks can be used in the classroom<sup>33</sup>. Inclusion of networks in a computer literacy course also allows for the development of a multi-cultural approach. The increasing number of connections with the eastern Europe countries and the former Soviet Union provide students with untold opportunities for various classroom communications. As O'Lander pointed out, many countries also require their students to be computer literate<sup>34</sup>. Therefore, by showing how one can use computers as a communication tool, it would be possible to increase the multicultural awareness of the students. There are several projects oriented towards the communication between students of various countries<sup>35</sup>.

The second portion of the course deals with the evaluation of software. Educational software, like most products, can range from the very, very good to the very, very bad. The types of software also ranges from simple drill-and-practice types to complex simulations. Students in this class should learn how to evaluate existing software, what criteria to use, and how to apply that software to classroom situation. An example of such an approach is the software evaluation project done by students in Theory of Reading courses taught by Judith Cochran of UTPB. Such evaluation would include, but not be limited to, the appropriateness for grade level, ease of use, dependency on manual (must you have a manual present at all times or is help included in the program). Because students have access to IBM and MacIntoshes in the Beehive and some Apples at other locations at SCSU, a variety of software can be examined in this manner. Students will also prepare lessons involving the evaluated software. We are currently developing a list of software for the course.

The third portion of the course is directed primarily towards, but not limited to, prospective secondary school teachers. Using computers is not limited to software applications. There are also a number of ways that computers can be used as an integral part of the laboratory process. Students in freshman chemistry courses at SCSU enter data from various experiments into a set of MacIntoshes for the purpose of analyzing the data and determining the accuracy of the gather information. If data gathering is part of the laboratory process, teachers must know how to use the computer. As with the software section of the course, students will evaluate current hardware and design experiments utilizing the computer's data-gathering ability.

The last area to be considered in the course is an examination of various authoring programs which offer the non-programmer the opportunity to develop computer-based courseware. While the approach to this course is decidedly non programming, examining authoring software should not be excluded as it provides the teacher with options not necessarily available through the purchase of specific software. Examples of this type of approach are the use of Hypercard with MacIntoshes and/or Hypermedia for IBMs<sup>36</sup>.

## CONCLUSION

In this paper, we described the development of a course in which prospective elementary and secondary teachers can develop the appropriate skills for using computer-based networks, evaluating software, and integrating the computer into the scientific process (i.e., computer interfacing). We believe that a course similar to that presented in this paper may be a better way of preparing teachers for their future work in the classroom. Depending on specific situations, such a course can either substitute for or complement existing "standard" computer literacy courses.

## REFERENCES

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2. See for example the description for a proposed calculus course in "The Computer as a Tool For Exploration in Math and Science", Daniel S. Yates and Russell E. Shea, The Journal of Computing in Small Colleges, 7(3), 1992, 64.
3. 90% of the instruction in some of the economic courses at UTPB involves the use of LOTUS.
4. Word processing programs available on the UTPB campus are WordPerfect, Microsoft Word, PC-Write, and Professional Write.
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27. Dick Cornell, University of Central Florida, DCORNELL@ucflvm.cc.ucf.edu.
28. Sean T. Reis, State University of New York at Geneseo, STR92@uno.cc.geneseo.edu
29. Norman Coombs, "Liberation Technology: Equal Access Via Computer Communications", Instructional Computing Update, 2(2), 1990, 2.

30. At the University of Texas of the Permian Basin, students in the Science Methods Classes used VAX NOTES to develop a book of demonstrations and experiments useful for elementary science. Each member of the class provided one demonstration and experiment in selected categories which then could be printed by other members of the class.
31. Tony Mitchell and Marcin Paprzycki, "An Overview of Computer Networks in Education: Computer Networks and Network Services", Journal of Computing in Small Colleges, 6 (5), 1991, 1.
32. As noted by the number of footnotes in this paper which include computer mail addresses, much of the research for this paper and the ones preceding it (see 31, 33) was done through the use of computer networks.
33. Marcin Paprzycki and Tony Mitchell, "An Overview of Computer Networks in Education: Using Computer Networks in the Classroom", Journal of Computing in Small Colleges, 7 (3), 1992, 27.
34. Richard O'Lander, "A Multicultural Approach to Computer Literacy", The Journal of Computing in Small Colleges, 7 (3), 1992, 133.
35. KIDLINK, KIDCAFE, and Project IDEALS are three projects devoted to children and communication between children.
36. Gene McGuire, "Integrating Hypermedia into the Curriculum", The Journal of Computing in Small Colleges, 7 (2), 1991, 100.