Integration of Computer Technology into Teacher Preparation Programs at Historically Black Colleges and Universities

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Abstract

Computer technology and instructional media are increasingly becoming an integral part of the teaching profession. Most educational material, including textbooks, has some form of instructional storage media and Internet address that teachers and students can use to obtain supplements and actual course material. Such infusion of technology into the classroom requires that teachers receive sufficient computer related training in their preparation programs. This study examines teacher preparation programs and how computer technology is integrated into their curriculum. Specifically, this study focuses on how Historically Black Colleges and Universities (HBCUs) are integrating technology into their undergraduate education curriculum. In particular, this research study identifies and examines computer technology courses offered and what classes are required for the baccalaureate degree in the area of education. The results of the this study should be of interest to school counselors, educators, school administrators, boards of education, social equity experts, legislators, curriculum evaluators, educational agencies and accreditation associations involved with teacher certification and teacher preparation. Federal and state legislators, attorneys, special interest groups, and current and prospective students will also find the results of this study useful.

Keywords: Teacher Preparation, Curriculum, Computer Integration, HBCU

1. INTRODUCTION

Administrators and faculty at institutions of higher education, principals and teachers of school districts, and parents and academic experts of special interest groups and agencies have been working continuously to improve the quality of teacher preparation programs. This initiative has received much more attention in the last two decades due to an increasing number of reports about students failing to pass state mandated standardized tests. One of the factors blamed for student failure was the academic preparation of teachers. In response to this concern, the Congress commissioned a study to evaluate the state of quality of teacher preparation programs in 1998 ("The Initial Report of the Secretary on the Quality of Teacher Preparation", U. S.

Department of Education 1999). Mandated under Title II of the Higher Education Act, a major area studied was whether new teachers were provided adequate preparation with the integration of technology into classrooms ("Educational Technology: Preparing America for the 21st Century", U. S. Department of Education 2000).

In addition to the United States government, the teaching profession has also responded to the problem by being a proactive partner in the effort to improve student performance. One of the more active organizations, The International Society for Technology in Education (ISTE), for example, has developed some standards to address teacher preparation programs and technology competency. According to the ISTE,

teachers should have working knowledge about technology in (a) Basic operations and concepts, (b) Social, ethical, and human issues, (c) Technology productivity, (d) Technology communication tools, and (e) Technology research tools ("Program Standards", NCATE 1999).

A second organization that has made major contributions toward the development of technology competent teachers is the National Council for Accreditation of Teacher Education (NCATE). The NCATE is the official agency that accredits baccalaureate programs in the United States. Graduates of programs accredited by NCATE are expected to have the abilities to use technology effectively as a teaching tool (Wise 2000; "Technology and the New Professional Teacher", NCATE 1997).

Education Programs at Historically Black Colleges and Universities

Like institutions of higher learning that serve a predominantly Caucasian population, Historically Black Colleges and Universities (HBCUs) in the United States have implemented diverse programs for preparing individuals for careers in the respective industry segments. Unlike their counterparts, the majority of HBCUs are primarily "open admission" universities. Their mission is often focused on providing educational opportunities to all students, including those classified as "at risk" students that are often not afforded an opportunity for a college education at other institutions. Moreover, HBCUs rarely have an instructional technology department. As a result of that, the responsibility for delivering the computer technology component is often carried out by computer sciences or information systems faculty.

There are about 103 HBCUs in this country. Eighty of the HBCUs have a teacher preparation program. Of 80 HBCUs with teacher preparation programs, 48 HBCUs have NCATE accreditation of their education programs ("Technology and Teacher Education", NCATE 2000). Six other HBCUs are currently candidates for NCATE accreditation and 7 more are in the pre-candidacy stage for NCATE-accreditation. Collectively, the 80 universities compute to about 74 percent of the total number of education programs at HBCUs that are accredited or are in the process of attaining NCATE accreditation. The NCATE accreditation of education programs at HBCUs is especially important because these institutions of higher learning enroll nearly 44 percent of African American teacher candidates in their undergraduate teacher programs.

2. STATEMENT OF THE PROBLEM

Computer systems and information technology enable students to learn in ways not previously possible. Students can now develop, edit, and produce beautiful reports using popular and relatively low cost computer systems. The advent of the Internet has enabled students to access large amounts of information from around the globe. This revolution has also changed the way teachers teach. Access to computer technology and faculty competencies with information technology has become major factors in the assessment of the total educational system.

Since the infusion of technology into the classroom, a number of research scholars have studied how technology has been integrated into teacher preparation programs and their effectiveness on student learning (Archer 1998). Some of the reports are indicated below:

- Technology can improve learning effectiveness because different approaches are available for different learning styles (Tissue 1997).
- Teacher preparation programs must do a better job with preparing the number of technology competent teachers (Hawley 1998).
- About 99 percent of full-time regular public school teachers reported they had access to computers or the Internet in their schools. However, there is a lack of preparedness on the part of the teacher to use the technology. Only 23 percent of public school teachers felt very well prepared to use computers and the Internet in their teaching ("Teacher Use of Computer and the Internet in Public Schools", U. S. Department of Education 2000).
- According to The CEO Forum School Technology and Readiness Report, only 20 percent of the teachers reported feeling very well prepared with the integration of educational technology into classroom instruction ("The CEO Forum on Education & Technology Teacher Preparation STAR Chart", NCATE 2000).

The studies reported above are most alarming because the majority of teachers are reporting that they do not feel prepared with the use of technology for instruction. Such reports are most discouraging because proper usage of technology is found to have a positive effect on student learning. A reason for this problem is given by Beck (1998). In many teacher preparation programs, "… technology is not central to the teacher preparation experience … most technology instruction is teaching about technology … not teaching with technology across the curriculum." For HBCUs, this problem is complicated by another factor. According to reports on the Digital Divide, the gap between White and Black households and Internet access has continued to widen in the last year alone ("Fulfilling the Promise", U. S. Department of Education 1998). Put together, these two reports show that the students of education programs at HBCUs have two major obstacles rather than one. First, they have less access to technology because of their race. Second, their preparation program needs to prepare them to teach with technology and not just teach about technology.

3. STATEMENT OF OBJECTIVES

This research is focused on the preparation of teachers at HBCUs in the integration of technology for instruction because African American do not have as much access to technology as Caucasians (Malveaux 2000). Specifically, this study examines the course descriptions and technology requirements for baccalaureate degrees in the area of education. In particular the following variables are reported in this study:

- Number of technology related courses offered.
- Number of technology related courses required for the degree.
- Types of technology related courses.
- Course level distributions.

This study should be of interest to administrators, teachers, counselors, current and prospective students, members of Advisory Boards, educators, program consultants, and social equity experts. Federal and state legislators, attorneys, special interest lobbyists, curriculum evaluators, educational agencies and accreditation agency experts involved with teacher certification and assessment will also find the results of this study useful.

4. DATA GATHERING

The targeted population of this study included Colleges of Education at HBCUs that offer baccalaureate degrees in the areas of elementary or secondary education. At the time of this study, eighty of the 103 HBCUs in the United States are offering elementary or secondary degrees in education. Collectively, these universities enroll about 44 percent of the African American teacher candidates in the Unites States. Information needed for this study was obtained from the Web sites of the respective universities. When the information was not available via the Web, alternate methods of data collection were used. E-mails, faxes, and telephone calls were made to the Colleges of Education of those universities. An inquiry was made for a copy of the current catalogue or curriculum guide and course descriptions.

After all the information was obtained from the respective universities, their curriculum was examined. The following procedure was used for gathering and tabulating the data needed for this study:

- Identify the computer and media technology related courses from the course inventory.
- Examine and map the courses to the National Council for the Accreditation of Teacher Education (NCATE) model based on the course description provided.
- Classify the courses in levels (freshmen, sophomore, junior, senior, or others).
- Identify the number of computer and media technology courses required for graduation.
- Gather the demographic information about the HBCU.

5. METHOD OF PRESENTATION AND ANALYSIS

The raw data gathered was organized and presented in tables. The demographic information presented included university name, location, NCATE accreditation, and regional accreditation. HBCUs and the available computer and media technology courses in their course inventory were examined and presented in tabular form. Using the course descriptions, the courses listed in the catalogs were mapped to the NCATE standards. The five standards are: (1) Prerequisite Preparation, (2) Foundation, (3) Specialty Content Preparation in Educational Computing and Technology Literacy, (4) Professional Preparation in Educational Computing and Technology Literacy, and (5) Specialty Content Preparation for Educational Computing and Technology Leadership. The courses identified could be mapped to all the five categories specified in the NCATE standards. A list of the NCATE standards description and the corresponding course titles used is presented in Appendix A.

6. FINDINGS

Each HBCU was first classified according to geographic location and accreditation. The geographic location recorded consisted of the state name or the territory name. Accreditation information by the National Council for Accreditation of Teacher Education (NCATE) and the respective regional commissions were verified by searching the Web sites that disclosed the list of all accredited universities under their domain. NCATE accreditation covered the university's School of Education. Regional accreditation covered the whole university.

There were six regional accreditation commissions in the United States. However, the 80 HBCUs included in this study fall under the auspices of four commissions. They are the Northwest Association of Schools and Colleges (NWASC), the North Central Association of Colleges and Schools (NCA), the Southern Association of Colleges and Schools (SACS), and the Middle States Association of Colleges and Schools (MSA). The majority of the HBCUs, 76.25 percent, have SACS accreditation. Over half of the Colleges of Education examined, 52 percent, have NCATE accreditation.

The number of credits in computer technology and instructional media courses offered by the respective HBCUs and the number of credit hours required of their students exhibited minor differences. The number of credit hours offered at the 80 HBCUs ranged from 1 to 12 credits. The most common occurrence or mode was 3 because most of the introductory computer literacy courses were for 3 credit hours. Most HBCUs, 61

percent, required a minimum of 3 credit hours of computer related courses to meet graduation requirements. None of the HBCUs required more than nine credit hours of computer technology and instructional media courses. Surprisingly, twelve of the 80 HBCUs, 15 percent, required less than 3 credit hours of computer technology and instructional media courses. The rest of the information is shown in Table 1

Table 1. Number of Credits Hours Offered or Required by HBCUs

Number of Credits Offered	Number of HBCUs	Number of Credits Required	Number of HBCUs
1	5	1	5
2	7	2	7
3	49	3	49
4	3	4	3
5	2	5	2
6	11	6	12
7	1	7	1
9	1	9	1
12	1		
Total	80	Total	80
Mean	3.525	Mean	3.450
Mode	3.000	Mode	3.000

Table 2 shows the number of computer technology and instructional media courses offered and required by the 80 HBCUs. The data from both the tables showed only minor differences. In both cases, seventy-six percent of the HBCUs are offering one computer-related course and that course is most probably the course required of their students. As a matter of fact, that one course is also most probably the computer literacy course that is required of all students in the university. Only one HBCU is offering four computer technology and instructional media courses. That HBCU is Southern University at Baton Rouge, Louisiana. A minority, 23 percent of the HBCUs, was offering two courses. The rest of the information is shown in Table 2.

Table 2. Number of Courses Offered or Required at HBCUs

Number of Courses Offered	Number of HBCUs	Percent	Number of Courses Required	Number of HBCUs	Percent
1	61	76	1	61	76
2	18	23	2	19	24
3	0	0			
4	1	1			
Total	80	100	Total	80	100

Of the 19 HBCUs indicated above requiring at least 2 courses in computer technology and instructional media, 15 of them have separate courses classified as either prerequisites or foundations as defined by NCATE. The other four do not have separate courses that can be mapped to the two definitions offered by NCATE.

According to NCATE standards and guidelines for computer technology courses, there are five categories or areas of subject focus that the courses should be aligned with. These guidelines were used to categorize the computer technology courses offered by the HBCUs. Course descriptions contained in the catalogues were used to map the courses to the categories or guidelines. A summary of the outcomes is presented in Table 3.

There were 107 courses listed by the 80 HBCUs. Over seventy percent of the courses were classified as prerequisite courses. Combined with those courses classified as foundation courses, the firs two categories computed to 90 percent of all the courses. Only two of the 107 courses covered specialty content preparation for educational computing and technology leadership. In a nutshell, it can be implied that an overwhelming majority of the 80 HBCUs are merely providing the minimal computer literacy knowledge to meet the growing demands of students and the work place. The number of course offerings in the areas of advanced concepts and hands-on experiences that are related to specialty and professional preparations with instructional media were limited.

Table 3. NCATE Standards and Course Distribution at HBCUs

Description of Course	Number of Courses	Percent
Prerequisite: Preparation Educational Computer and Technology Literacy	76	71
Foundation in Basic Educational Computing Technology	20	19
Specialty Content: Preparation in Educational Computing and Technology Literacy	3	3
Professional Preparation in Educational Computing and Technology Literacy	6	5
Specialty Content Preparation for Educational Computing and Technology Leadership	2	2
Total	107	100

One hundred and four of the 107 courses could be categorized into the four university classification levels. Three of the courses listed in the catalogues did not have course numbers. One of the universities that listed courses without numbers was Fayetteville State University in North Carolina. About 40 percent of the courses were at the freshmen level. Again, this finding is consistent with those results presented in previous Tables. The courses are primarily introductory and literacy courses that all students must take to meet graduation requirements. There were only a few courses classified at the senior level. As can be seen in Table 4, these courses were mostly the more advanced courses that contained specialty content.

Table 4. Course Level Classification Distribution

Classification Level	Number of Courses	Percent (%)
Freshmen	41	40
Sophomore	20	19
Junior	26	25
Senior	17	16
Total	104	100

7. CONCLUSIONS AND IMPLICATIONS

All the Tables used for examining the data set yielded consistent outcomes. In general, HBCUs are offering a curriculum that can provide their students with the minimum amount of computer knowledge. However, the curriculum at most HBCUs is not comprehensive enough to help their students to assume leadership roles in the area of computing and instructional technologies. All the HBCUs are offering and requiring their students to take at least one prerequisite course. However, twelve HBCUs listed prerequisite courses that are less than 3 credit hours. It is highly probable that these students may not even be receiving the minimum amount of computing knowledge as suggested by NCATE and as recommended by regional accreditation commissions. At best, these universities and colleges are requiring an additional foundation course. Some of the more troubling results are indicated below:

1. The one computer technology course required is normally the literacy course that is taken during the first year. Then, these students are not required to take any other computer course. In other words, the students are receiving minimal preparation at the beginning of their study. By graduation time, many of these hands on skills are obsolete. Moreover, these students that have only one literacy course have actually not received any instructional media skills necessary for the work place.

2. At best, even among the HBCUs requiring two courses, the courses tended to mostly cover the first two categories defined by NCATE. These two categories were prerequisites and foundations. Advanced professional and specialty topics that actually dealt with instructional media needed by schools are still missing.

3. Twelve HBCUs listed one or two credit hour computer technology courses for meeting graduation requirements. These one- or two-credit hour courses are predominantly prerequisite and foundation classes. Typically, it takes 45 meeting hours, i.e., a 3 credit hour course, to adequately cover basic concepts and to provide some hands-on experiences with the use of application software packages. There is a strong probability that students at these twelve HBCUs may not even be getting the minimal amount of computing knowledge needed by the employing schools.

4. Analysis of the course content using the NCATE guidelines showed that HBCUs are doing an adequate job of offering courses that can be classified as prerequisite or foundation classes. Some 90 percent of the courses are classified in

these two categories. However, courses that covered professional and content specific material in instructional media are extremely limited. Only 10 percent of the 104 courses can be classified into the latter 3 standards or guidelines. The outcomes showed that most HBCUs are offering a curriculum that produces students with the minimal amount of computing knowledge. However, their curriculum is not comprehensive enough to produce students that can take leadership roles in instructional technology integration and advancement.

The results from this study should be of concern to computer science and information systems faculty. At HBCUs, the task of training technology literate teachers is often the responsibilities of computer science and information systems faculty because an overwhelming majority of these universities do not have an educational technology department. To become certified teachers, students in educational programs must pass the PRAXIS examination that has a major test on computing knowledge. If these students are receiving only minimum or less than adequate training, there is a high probability for their failure. Ultimately, the blame will fall back on the computer science and information systems faculty that taught those courses. Finally, NCATE and holistic university redesign efforts are quickly becoming the norm around the nation. Computer science and information systems faculty, like it or not, will have to play an active role in these mandated activities in affected states. One possible solution to addressing this weakness is to require education majors to take computing courses that focus on essential concepts and general problem solving. Being equipped with an understanding of computer foundations should give education students the confidence to learn new productivity suites on their own, if needed.

8. CAVEATS

This report is limited to information that was disclosed in the Web sites, catalogue, curriculum sheets, and course inventory. It examined the required computer related courses as well as other instructional media courses that were disclosed in the respective documentation. Some of the courses listed may not necessary be available nor have been offered because the HBCUs may not have the qualified faculty to teach that class or the minimum number of students to take those courses. Such an examination of actual course offering is reserved to the visitation teams of the respective regional accreditation commissions. Most commissions are relatively careful that their members are actually offering the listed courses periodically. For this reason, the outcomes of this study should be interpreted with caution.

It is important to point out that the presentation and discussions of the findings of this study are accurate.

One hundred percent of the HBCUs offering undergraduate education degrees were included in this study. All the tables generated contained consistent results. Therefore, it could be accepted that the results reported were not biased. Even if some unknown form of bias existed, great care was taken to ensure that the findings were not compromised.

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Appendix A. The Mapping of Course Titles to the Five NCATE Standards

NCATE DESCRIPTION	COURSE NAMES
Prerequisite Preparation: A prerequisite to the advanced program, candidates must document knowledge and competencies contain in Educational Computer and Technology Literacy	Introduction to Computer Science Data Processing System Computer Literacy Using Computer Introduction to Computer Introduction to Computing Digital Computer Principles Computer Competency Computer Application Introduction to Data Processing Computer Fundamental to Teachers Introduction to Computer Education Introduction to C.I.S. Survey of Computer Applications Computer Literacy & Application Introduction to Computer Literacy Introduction to Computer Application Introduction to Computer with Applications Introduction to Micro Computer Microcomputer Application Education Computer Literacy Introduction to Personal Computer
Foundation: Professional studies in educational computing and technology literacy builds a foundation for applying computer and related technologies (hardware and software) in educational settings. The advanced programs must document the prerequisite preparation of the candidates or provide instruction to fulfill the Foundation program standards in the initial work.	Instruction Computing Media Computer/Instruction Technique Educational Technology Technology in Education Microcomputer Application Instructional Technology Computer Application Instructional Technology Technology & Media for Teachers Education Media & Computer Technology Instruction Technology in Education Application of Instructional Media Computer in Education Fundamental of Teaching with Audio-Visual Technology Instructional Computing & Media Audio Visual Technology Material Education Technology Media Technology Classroom Utilization of Instruction Technology Technology in Teaching Computers & Instruction Technology Introduction to Education Technology Computer Literacy for the Classroom Computer Application in Education Micro & Media in the Classroom Introduction Educational Technology Current Technology in Education

	Technology for Teachers Instruction & Technology Technology in Schools Instructional Media Introduction to Technology Instruction Technology Competency Education Technology & Media Introduction to Media Computerized Media Methods & Techniques Media Technology Education Education Technology & Media Computer Technology
<u>Specialty Content Preparation in Educational Computing and Technology Literacy</u>: Professional studies in basic educational computing and technology literacy provide concepts and skills that prepare teachers in the specialized and professional content for teaching educational computing and technology literacy and to use technology to support other content area. Advanced programs must document the prerequisite preparation of the candidates or provide instruction to fulfill the educational computing and technology literacy program standards in initial course work.	Computer Programming for the Classroom Children & Micro-Computer Technology Computer Science for Teachers
<u>Professional Preparation in Educational Computing and Technology Literacy</u>: Professional preparation in educational computing and technology literacy prepares candidates to integrate teaching methodologies with knowledge about use of technology to support teaching and learning. Advanced programs must document the prerequisite preparation of the advanced candidates or provide instruction to fulfill the educational computing and technology literacy program standards in initial course work.	Instruction Technology Instructional Technology General Methods & Technology Technology in Education Modern Instruction Technology Integrating Tech Through a Holistic Curriculum Computer Utilization in Instructional Technology Survey of Technology in Education
<u>Specialty Content Preparation for Educational Computing and Technology Leadership</u>: Professional studies in educational computing and technology computing and technology leadership prepare candidates to exhibit leadership in the identification, selection, installation, maintenance, and, management of computing hardware and software and the uses of computer and related technologies throughout the curriculum.	Instructional Media & Technology Modern Instructional Technology