

The Adoption and Diffusion of Computing and Internet Technologies in Historically Black Colleges and Universities

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Keywords

Computing, Computer Science, Information Systems, Adoption, Diffusion, Technology, Internet, African Americans, Innovation, Online Education, Historical Black Colleges and Universities, Computing and Internet Technologies

Abstract

The rapid growth of technologies is providing the opportunity for innovative design and delivery of curriculum and instructional materials to college students; yet many college faculty members, especially in historically Black Colleges and Universities (HBCU), are not using this technology. With a widening gap in access to technologies for minorities, this is a significant issue. In this study, specific research questions focused on HBCU faculty's current use of technology, desire to incorporate new technology, view of organizational support, and potential gender or age differences. Surveys were conducted at five HBCU with established records of leadership in education. Using quantitative statistics, the results showed there is a strong willingness of HBCU faculty to incorporate new technology. Faculty members, however, were handicapped by the lack of organizational support, access to computing resources, and availability of technology support staff. The result did not show gender or age differences in the adoption of technology in the classroom. It is recommended that HBCU consider upgrading aging computing and network infrastructures. Sustainable technology-related training and professional development workshops should also be made available to the faculty members. These initiatives could help faculty in HBCU move to increased use of technology to deliver instructions, encourage the use of technology by minorities, and foster the growth of online instruction in this important segment of our society.

Introduction

The use of technologies for instructional delivery has become a common practice in educational institutions. According to Kelly (2005), the rapid growth of innovative technological developments in education has greatly impacted, and contributed to today's

revolution in the design and delivery of the curriculum, and instructional materials to college students. A national survey report by Netday in 2003, which was jointly sponsored by the US department of education, revealed that students today are very knowledgeable in the use and application of technology. The report declared that these students “feel very strongly about the positive value of technology and rely upon technology as an essential and preferred component of their lives” (p. 10). These tech-savvy students will only seek admission to colleges or universities that are fully technology enabled and wired for educational purposes (U.S. Department of Commerce, 2004).

Today, freshman students who grew up in a technology pervasive society are demanding interactive multimedia educational systems. In response, many colleges and universities have begun the implementation of quality online education systems to meet the on-demand needs of both the incoming freshman and working professional students (Duderstadt & Womack, 2003).

In today’s classroom, the role and function of a typical college faculty member has been redefined by the use of technology (Kelly, 2005). This, understandably, has met with resistance by some faculty members who are not comfortable with their level of technological skills (Baldwin, 1998; Feist, 2003). Faculty members with some level of skills in the use and application of technology are enthusiastic while many others displayed attitudes of indifference (Carliner, 2003). The different reactions by faculty members are indicative of the problems involved in the development for professional enhancement program for the faculty members.

It is essential therefore to provide answers to some fundamental questions, as these questions pertained to faculty and institutional readiness. Society is moving toward a marketplace that has become fully dependent on technologies for the delivery of goods and services. Higher education is a necessary component of this marketplace.

Statement of the Problem

The problem addressed in this study was that the use of technology for instructional delivery on college and university campuses has reached the critical point, yet many college faculty members are not using technology as part of their teaching strategy. There is a lack of academic research to determine the reasons for this reluctance, especially in historically black colleges and universities, HBCUs. Given that technology can be very helpful in the education of college students, faculty members who are not using technology in their classrooms may not be giving their students a full range of opportunities to learn.

Two important and unique factors have separately aligned as the driving forces behind the necessity for change in the traditional classroom settings. The first driving factor is that many freshmen students arriving on college campuses today are technologically literate and are putting the demands on the faculty members for more use of computing technologies in the classrooms (Anderson, 2002). The second factor is that these technologically savvy students are being taught by faculty members who grew up in a non-technological society who were educated without the benefit of technology in their daily lives (Kelly, 2005).

Purpose of the Study

The purpose of this study is to determine the level of the computing skills of faculties as these are related to the adoption and implementation of computing and Internet technologies. The organizational factors and the willingness of faculty members to accommodate and adopt the use of such technologies in instruction and communication will be explored. The findings and insights can be used as improvement tools by university administrators. If university administrators understand faculty members' attitudes toward change and the factors that influence their ability to be innovative, they might be willing to provide the necessary enabling resources and support systems to the faculty. The findings will benefit the faculty members, students and the administrators of HBCUs. Findings will be provided to HBCU institutions to assist administrators in designing technology training program to meet the needs of faculty members to adopt and adapt more readily.

No attempt was made to assess HBCUs management and the financial status of member institutions. Faculty pay structure was not included in this study and no attempt was made to compare HBCUs member institutions with peer or competing institutions. The results of this study will not be used for any purposes other than the provision of the findings to HBCUs.

Significance of the Study

This study is of critical importance as the use of technology has become a necessary requirement for accreditation for colleges and universities, and is necessary to meet the needs of a technology based workplace in an information based society (David, 2004). The dramatic change in the workplace has resulted in an increasing use of technology for information, communication, and research. The consequences for employment are very profound as companies now require personnel to have greater variety of computing and technology skills.

Technology has become a necessary part of higher education. It is therefore important that faculty members accept and utilize hardware and software in communication and instruction. The successful adoption of technology by faculty members will determine the level of success of the graduates in getting jobs in the information technology industry, and ultimately the future of the institution.

Literature Review

Theoretical Framework for the Study

The theoretical framework for this study was derived from three theories, namely, (a) the theory of adoption and diffusion of innovation by (Rogers, 1995) who defined “diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system” (p.5), (b) the theory of reasoned action by (Fishbein & Ajzen, 1967), who developed the theory of reasoned action to examine the relationship between attitude and behavior and (c) the Technology Acceptance Model, TAM, by (Davis, 1986) who suggested that when users are presented

with a new software package, a number of factors influence their decision about how and when they will use it.

The Need for Change in Higher Education

In the last decade, the U.S and the global economies have progressed significantly to an economic system that is fueled and driven by information technology. Currently, firms in the U.S have been very good in the development, creation, and application of innovative technological processes in the workplace. The manufacturing and the service industries have been engaged in applying information technologies as necessary tools to streamline and boost both employee and organizational performance levels (Blumenthal & Lin, 2005). Consequently, there is a primary concern which has given rise to many questions about the problematic issues of a possible lack of suitably trained personnel resources for the emergent technology based business sectors. The secondary concern has to do with the impact on the U.S economy that might result from the possible shortage of the required technical manpower. The availability of well trained technology savvy workforce is necessary for the U.S to maintain or keep its leadership role as the global focal point of innovation.

Cardilo (2005) reported that U.S College and University administrators have found out that it is critical for faculty to have access to a full spectrum of office productivity tools to aid teaching, research and communication.

Recent advances in internet and World Wide Web capabilities have posed the requirements for college administrators to incorporate computer-based technologies into the curriculum (Karber, 2001; De Verneil, & Berge, 2000; Andrews, Gosse, Gaulton & Maddigan, 1999). Several research literatures have shown that the use of technology in

the classroom resulted in increased in student learning (Baker, Gearhart, & Herman, 1994; Kozma, 2003; Kulik, 1994; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Scardamalia & Bereiter, 1996; SIIA, 2000; Sivin-Kachala, 1998; Wenglinsky, 1998)

Barriers to Faculty Adoption of Technologies

There are many barriers that have worked against the successful training of faculty to adopt technology in the classroom (CEO Forum on Education and Technology, 2000; Moursund & Bielefeldt, 1999; OTA, 1995; US Department of Education, 2000; Yildirim, 2000). Among the barriers include the lack of time by faculty members (Eifler, Greene, & Carroll, 2001; Wepner, Ziomek, & Tao, 2003), inadequate organizational and administration support for technology (Dexter & Riedel, 2003; Doering, Hughes, & Huffman, 2003; Stuhlmann & Taylor, 1999), faculty skills (Eifler et al., 2001; Strudler, Archambault, Bendixen., Anderson, & Weiss, 2003; Thompson, Schmidt, & Davis, 2003), the fear of using technology (Bullock, 2004; Doering et al., 2003), poor planning in the integration of technology into the curriculum (Cuban, 2001), lack of access to technology by many faculty members (Bartlett, 2002; Brush et al., 2003; Russell et al., 2003).

Barriers Impacting HBCUs Faculty Adoption of Technologies

Many historical black colleges and universities are using technologies in the classrooms and have begun the implementation of online education. However, Redd (2003), remarked that HBCUs are very far away from the realization of the full teaching potential of the Internet due in part to several barriers including the unreliability of campus network infrastructures. Many HBCUs faculty members and students do not have

computers at home and consequently must depend on campus based computing resources and thus, remained captive at the mercy of scarce institutional funding, unrealistic resources scheduling, inadequate technical support staffing, and network infrastructures that are poorly designed and unavailable most of the times (Redd, 2003, p. 363; NAFEO, 2000, p. 23)

The Impact of Organizational Support

The levels of Organizational support and assistance have been found to be related to faculty adoptive success (Black, 1990). However, the requirement for support varies by faculty. The level of the faculty commitment to the organization is related to the effectiveness of organizational support and assistance (Guzzo, Noonan, & Elron, 1994). Rothwell (2004) recommended the creation of a vision and mission statement that “will guide a comprehensive, long-term effort to develop the human talent of the organization systematically” (p. 1).

Methodology

Research Design

The design for this study was the survey research design. Data were gathered with a web-based self-administered electronic survey. Demographic variables and other variables such as organizational support, faculty computing skills, access and availability of computing resources at a faculty member’s home were examined. These are the variables that might have a positive or negative influence on the attitudes of the faculty members in historically black colleges and universities in the adoption and diffusion of computing and Internet technologies for the delivery of instructional materials.

Target Population

The target population of this study was all full-time faculty members, male and female, at the five selected historically black colleges and universities, HBCUs. There are about 102 historically Black colleges and universities from which five HBCUs were selected. By census, all fulltime faculty members, male and female, were surveyed using multifactor values questionnaires. The unit of analysis was any full time faculty member in any of the five selected historically black colleges or universities.

Sampling Procedure

By purposeful selection, the sample frame was five member institutions of HBCUs, namely, Howard University, North Carolina A&T, Jackson State University, Tennessee State University, and Southern University. By census, the population consisted of all of the faculty members, male or female in the five leading historically black colleges and universities.

Instrumentation

With permission, this study used an existing technology survey instrument with some modifications and add-ons. The technology survey model was developed by Kelly (2005). This model has been used successfully in an educational setting at a private liberal arts college comprised of two campuses.

The Web link to the survey questionnaires was included in the cover letter, which was electronically mailed to the entire faculty members of the sample frame consisting of the five purposely selected member institutions. The survey instrument was entirely web based and self-administered.

Data Collection Procedures

The public domain global email address list of the faculty members in each of the five selected HBCUs institution was available.

The survey instrument was self administered to all full time faculty members. The Web hyperlink to the surveys was included in the cover letter which was electronically mailed to the faculty members. In the case of non-responses, second notices were sent to remind those who had not responded. The cover letter explained the purpose of the survey, and the instructions for filling out and returning the survey. The cover letter also contained a statement assuring the confidentiality of the participants.

Data Analysis

The survey data were analyzed and categorized by using quantitative descriptive statistical tools. Descriptive statistics was used to organize and summarize the data at hand to make them more intelligible (Singleton & Straits, 2005). This researcher employed the use of descriptive statistics to summarize the collected data in a clear and understandable format. Graphical and numerical methods were used to explore possible patterns and the data characteristic

Results

Electronic mail with a link to the Web site for the survey questionnaires were sent to all of the fulltime faculty members at the five target HBCUs. There were a total of 308 respondents and each table total might not be exactly equal to 308 because some faculty members chose not to respond to some questions.

First, the current faculty use of technology for the delivery of instruction and the

desired future use of technology for the delivery of instruction are reported. Second, the current and the desired use of technology for communication by the faculty are presented. Third, the current involvement of the faculty in professional development and the desired involvement for future professional development in the use of technology are shown. Fourth, the faculty perceptions of the present organizational support and the desired organizational support for the adoption of technology in instruction and communications are shown. Fifth, the survey result showing the relationship between demographic variables such as sex, age, home computing access, and the willingness of the faculty to use technology for instructional deliveries and communications are analyzed and presented.

The survey codes presented in Table 1 were used in the survey instrument.

Table 1
Survey Codes, Scale, and Meaning

Code	Survey Scale	Meaning
1	Never	Never
2	Rarely	About once or twice a year
3	Occasionally	About once or twice a month
4	Often	Several times a month
5	Always	Several times a week

Demographics of Faculty Respondents

The following section presents the demographic data of the faculty members in the five HBCUs institutions that completed the survey.

		Response Percent	Response Total
Howard University		39.2%	120
Jackson State University		20.3%	62
North Carolina A & T		14.1%	43
Southern University		10.8%	33
Tennessee State University		15.7%	48
Total Respondents			306

Figure 1. HBCUs Institutions by faculty respondents.

The data in Figure 1 reflects the varying proportions of the participants in this study and consistent with the population sizes of the target institutions. Faculty at Howard responded at almost twice the rate as the next highest responding university and almost four times the rate of the lowest responding university.

		Response Percent	Response Total
Female		44.7%	136
Male		55.3%	168
Total Respondents			304

Figure 2. HBCUs faculty respondents by sex.

Figure 2 suggests that African American female faculty members in HBCUs are enjoying an equally engaging experience as African American male faculty counterparts. There is a small difference between male and female faculty at HBCU. The survey data did not show a big difference in the adoption and diffusion of technology between male and female faculty member from the five HBCUs institutions.

		Response Percent	Response Total
24-40		11.2%	34
41-55		57.4%	174
56+		31.4%	95
Total Respondents			303

Figure 3. Faculty respondents by age bracket.

Figure 3 shows that the faculty members between the ages of 41 and 55 responded at almost twice the rate as the next highest responding age group and almost five times the rate of the lowest responding age group. The data suggests that the HBCU faculty members in the 41 to 51 age group are the most active in the use of technology in instruction and communications.

		Response Percent	Response Total
Instructor		7.6%	23
Lecturer		6.6%	20
Assistant Professor		20.8%	63
Associate Professor		28.4%	86
Professor		36%	109
Other (please specify)		0.7%	2
Total Respondents			303

Figure 4. Respondents by faculty rank.

Is there a possible causal relationship between the faculty rank and the willingness of the faculty to adopt technology in the classroom? The data in Figure 4 indicate a high degree of interests exhibited by the response percentages of fulltime faculty members from the rank of professor, associate and assistant professor, respectively. This suggests a positive attitude on the part of the faculty in historical black colleges and universities towards the adoption of computing and Internet technologies in the classroom.

		Response Percent	Response Total
Arts and Sciences		28.9%	88
Business		19.1%	58
Communications		6.9%	21
Dentistry		1.6%	5
Divinity		2%	6
Education		10.9%	33
Engineering		7.2%	22
Graduate School		3.9%	12
Law		5.9%	18
Medicine		0.7%	2
Allied Health Sciences		2.3%	7
Pharmacy		2.3%	7
Nursing		4.6%	14
Social Work		3.3%	10
Other (please specify)		0.3%	1
Total Respondents			304

Figure 5. Faculty respondents by school/college.

Most of the respondents were from the School of Arts and Sciences. Given the current competitive job market, particularly for information technology positions, it is therefore consistent that many faculty members outside of traditional Business, Engineering, and Computer Science curriculums are turning to computing technologies in the classroom. This is in agreement with Wulf (1995) who pointed out advances in information technology has led to profound effects on the liberal arts faculty and students. The artificial division between academic disciplines has disappeared as the electronic world eliminates the reasons for the division.

Figure 5 also demonstrates that there is a strong willingness on the parts of different schools and colleges within HBCUs for the adoption of computing and Internet technologies in the classroom.

		Response Percent	Response Total
Undergraduate		55.5%	166
Graduate		41.8%	125
Post Graduate		2.7%	8
Total Respondents			299

Figure 6. Faculty Respondents by Primary Teaching Level.

Figure 6 demonstrates that both undergraduate and graduate faculty members in HBCUs are equally interested in the application of computing and Internet technologies in the delivery of instructional materials.

		Response Percent	Response Total
28.8 Kbps modem		4.9%	15
56 Kbps modem		29.8%	91
ISDN		2.6%	8
Cable modem		21.3%	65
DSL		20.7%	63
T1 or better		1.6%	5
None		14.1%	43
Do not know		4.9%	15
Total Respondents			305

Figure 7. Faculty Respondents by the Type of Home Connections to the Internet.

Figure 7 shows that less than half of the faculty members in HBCUs are connected to the internet from home via high speed Cable and DSL broadband connectivity. The serious implication of this finding is that less than half of HBCUs faculty members are adequately positioned for the high speed access to the Internet necessary for online education. Furthermore, Figure 7 suggests also that more than half of HBCUs faculty members do not have adequate access to the Internet from home and thus, are not ready for online education. This is in agreement with the United Negro College Fund, UNCF, who reported in a 2000 survey of its member institutions that less than 50% of the faculty owned computers at home.

Research Question 1

What is the current faculty use of technology for the delivery of instruction and what is the desired future use of technology for the delivery of instruction?

Table 2
Current Use of Office Productivity Tools

	Never	Rarely	Occasionally	Often	Always	Response Total
PowerPoint	7% (21)	13% (39)	31% (94)	39% (121)	11% (33)	308
WordProcessing	3% (9)	6% (17)	27% (83)	41% (125)	24% (74)	308
Spreadsheet	8% (25)	15% (45)	31% (94)	40% (122)	7% (22)	308
Database	15% (46)	23% (71)	31% (96)	25% (77)	6% (18)	308
Desktop Publishing	17% (51)	25% (78)	29% (90)	24% (74)	5% (15)	308
Total Respondents						308

Table 2 shows that while it is true that some faculty members are presently using office productivity technologies in the classrooms, but in contrast, Table 3 shows that the number of HBCUs faculty members who want to use of technology for the delivery of instruction, exceeds the number of faculty members who are presently using technology. Table 2 reveals that 11% or 33 faculty respondents reported that they are presently using PowerPoint several times a week, while, in comparison, Table 3 shows that 63% or 195 respondents indicated that they desired the future use of PowerPoint for instructional preparations and delivery always, or several times a week.

Table 3
Desired Use of Office Productivity Tools

	Never	Rarely	Occasionally	Often	Always	Response Total
PowerPoint	3% (8)	2% (7)	13% (39)	19% (59)	63% (195)	308
WordProcessing	1% (4)	1% (2)	6% (17)	16% (48)	77% (237)	308
Spreadsheet	5% (14)	5% (15)	14% (43)	16% (48)	61% (188)	308
Database	7% (21)	5% (16)	22% (67)	21% (66)	45% (138)	308
Desktop Publishing	8% (24)	6% (17)	23% (71)	21% (66)	42% (130)	308
Total Respondents						308

Table 4
Current Use of Online Course Management

	Never	Rarely	Occasionally	Often	Always	Response Total
Course Management	13% (41)	21% (66)	39% (121)	17% (52)	9% (28)	308
Announcements	13% (41)	24% (75)	38% (118)	17% (52)	7% (22)	308
Course Information	13% (39)	22% (68)	40% (122)	16% (50)	9% (29)	308
Staff Information	19% (59)	25% (77)	35% (109)	15% (47)	5% (16)	308
Course Documents	13% (40)	22% (67)	39% (121)	16% (50)	10% (30)	308
Assignments Delivery	16% (48)	24% (73)	37% (115)	18% (54)	6% (18)	308
Communication Tools	14% (42)	27% (84)	35% (109)	18% (54)	6% (19)	308
External Links	15% (47)	30% (91)	36% (110)	15% (46)	5% (14)	308
Discussion Board	19% (60)	26% (80)	38% (117)	13% (40)	4% (11)	308
Online Grade Book	19% (57)	28% (86)	31% (97)	15% (46)	7% (22)	308
Groups	20% (63)	28% (85)	35% (108)	14% (43)	3% (9)	308
Assessment Manager	22% (67)	27% (83)	34% (105)	14% (43)	3% (10)	308
Total Respondents						308

Table 4 shows that at the present time, some HBCUs faculty members are using online course management systems, such as Blackboard, WebCT, eCollege, occasionally or about once or twice a month for the delivery of online educational materials, but however, Table 5 shows that an overwhelming numbers of the faculty members at HBCUs want to use online course management systems, always or several times a week for the delivery of online instruction.

Table 5
Desired Use of Online Course Management

	Never	Rarely	Occasionally	Often	Always	Response Total
Course Management	6% (17)	2% (6)	5% (15)	15% (46)	73% (224)	308
Announcements	5% (14)	3% (9)	6% (18)	16% (49)	71% (218)	308
Course Information	4% (13)	2% (7)	6% (19)	14% (42)	74% (226)	307
Staff Information	11% (34)	3% (10)	6% (19)	12% (38)	67% (207)	308
Course Documents	5% (16)	2% (6)	5% (14)	13% (40)	75% (231)	307
Assignments Delivery	6% (19)	2% (7)	7% (22)	16% (49)	69% (211)	308
Communication Tools	5% (15)	3% (8)	8% (25)	15% (47)	69% (213)	308
External Links	7% (21)	3% (8)	7% (22)	17% (52)	67% (205)	308
Discussion Board	7% (21)	3% (10)	10% (32)	13% (39)	67% (206)	308
Online Grade Book	7% (23)	2% (7)	5% (14)	18% (56)	68% (208)	308
Groups	8% (24)	4% (11)	8% (24)	15% (47)	66% (202)	308
Assessment Manager	9% (27)	4% (12)	7% (23)	15% (45)	65% (201)	308
Total Respondents						308

Research Question 2

What is the current faculty use of technology for communication and what is the desired future use of technology for communication?

Table 6
The Current Use of Technology for Communications

	Never	Rarely	Occasionally	Often	Always	Response Total
Online Library Resources for Student Assignments	6% (19)	8% (25)	47% (145)	33% (100)	6% (18)	307
Online Library Database Collections	7% (21)	7% (23)	45% (139)	34% (105)	6% (19)	307
Search Engines (Google, etc.)	4% (11)	7% (23)	38% (118)	36% (112)	14% (43)	307
Faculty Web Pages for Instructional Materials	13% (41)	15% (47)	38% (116)	29% (90)	4% (13)	307
Digital Camera for Acquiring Images	13% (40)	18% (55)	37% (115)	29% (90)	2% (7)	307
Educational Multimedia Resources	8% (24)	18% (54)	40% (122)	31% (94)	4% (13)	307
EMail Communication with Students	3% (9)	11% (34)	37% (113)	35% (107)	14% (44)	307
EMail Collaboration with Faculty members	3% (8)	13% (41)	36% (111)	34% (104)	14% (43)	307
Voicemail	5% (14)	16% (50)	35% (108)	31% (96)	13% (39)	307
Personal Web Page	23% (72)	9% (29)	36% (111)	27% (84)	4% (11)	307
Online Web Portal for Rosters, Records, and Grades	14% (44)	14% (44)	36% (109)	29% (88)	7% (21)	306
Total Respondents						307

Table 7
The Desired Use of Technology for Communications

	Never	Rarely	Occasionally	Often	Always	Response Total
Online Library Resources for Student Assignments	1% (4)	3% (10)	8% (25)	13% (40)	74% (228)	307
Online Library Database Collections	2% (7)	4% (12)	6% (19)	13% (40)	75% (229)	307
Search Engines (Google, etc.)	1% (4)	3% (8)	7% (20)	13% (40)	77% (235)	307
Faculty Web Pages for Instructional Materials	3% (9)	7% (21)	6% (19)	15% (46)	69% (212)	307
Digital Camera for Acquiring Images	5% (16)	6% (19)	8% (26)	16% (48)	64% (198)	307
Educational Multimedia Resources	3% (8)	4% (11)	7% (21)	21% (63)	66% (204)	307
EMail Communication with Students	0% (0)	2% (5)	5% (14)	17% (52)	77% (236)	307
EMail Collaboration with Faculty members	0% (1)	3% (8)	3% (10)	20% (61)	74% (227)	307
Voicemail	2% (7)	4% (13)	4% (12)	18% (55)	72% (219)	306
Personal Web Page	5% (16)	7% (22)	10% (31)	13% (39)	65% (199)	307
Online Web Portal for Rosters, Records, and Grades	7% (20)	4% (12)	9% (27)	13% (41)	67% (207)	307
Total Respondents						307

Research Question 3

What is the current involvement of the faculty in professional development and what is the desired involvement of the faculty for future professional development in the use of technology?

Table 8
Current Technology-related Professional Training

	Never	Rarely	Occasionally	Often	Always	Response Total
Participation in College IT Courses	17% (51)	64% (194)	14% (41)	5% (14)	1% (3)	303
Participation in College IT Workshops	11% (34)	66% (200)	17% (50)	6% (17)	1% (2)	303
Participation in Outside IT Courses	24% (72)	59% (179)	13% (38)	4% (11)	1% (2)	302
Attendance at Regional or National IT Conferences	28% (85)	58% (175)	11% (34)	3% (8)	0% (1)	303
Attendance at International IT Conferences	31% (95)	57% (171)	9% (28)	2% (7)	0% (1)	302
Subscription to Professional IT Journals	28% (86)	56% (169)	11% (33)	3% (10)	2% (5)	303
Research work related to Technology	25% (75)	55% (168)	12% (35)	6% (17)	3% (8)	303
Total Respondents						303

Table 9
Desired Technology-related Professional Training

	Never	Rarely	Occasionally	Often	Always	Response Total
Participation in College IT Courses	5% (16)	10% (29)	23% (69)	46% (140)	16% (50)	304
Participation in College IT Workshops	2% (7)	9% (28)	26% (80)	45% (138)	17% (51)	304
Participation in Outside IT Courses	5% (16)	12% (38)	23% (69)	44% (134)	15% (47)	304
Attendance at Regional or National IT Conferences	10% (30)	13% (40)	21% (65)	41% (124)	15% (45)	304
Attendance at International IT Conferences	13% (38)	13% (40)	20% (61)	39% (119)	15% (45)	303
Subscription to Professional IT Journals	11% (32)	13% (40)	19% (58)	41% (125)	16% (49)	304
Research work related to Technology	11% (32)	10% (30)	19% (57)	43% (131)	17% (53)	303
Total Respondents						304

Research Question 4

What is the faculty perception of the current organizational support and what is the desired organizational support for technology in instruction and communication?

Table 10
Faculty Perception of Present Organizational Support

	Never	Rarely	Occasionally	Often	Always	Response Total
Technology Resources – Computer Labs, etc.	6% (19)	57% (174)	20% (62)	10% (32)	6% (18)	305
Technology Service and Support	6% (18)	61% (185)	22% (67)	7% (20)	5% (15)	305
Support for Technology Activities	7% (20)	63% (192)	19% (59)	7% (22)	4% (12)	305
Funding for Instructional Technologies	9% (28)	68% (207)	16% (50)	4% (11)	3% (9)	305
Funding for Communication Technologies	10% (29)	69% (209)	16% (48)	4% (11)	3% (8)	305
Funding for Technology Development and Training	11% (34)	67% (204)	15% (46)	4% (13)	3% (8)	305
Support of attendance at Technology Activities	10% (32)	66% (201)	18% (54)	4% (12)	2% (6)	305
Release Time to learn Technology	14% (44)	69% (210)	11% (35)	3% (9)	2% (7)	305
Technology Criteria for Tenure and Promotion Decisions	16% (49)	67% (203)	13% (38)	2% (7)	2% (5)	302
Total Respondents						303

Table 11
Faculty Desired Level of Organizational Support

	Never	Rarely	Occasionally	Often	Always	Response Total
Technology Resources – Computer Labs, etc.	1% (4)	1% (4)	7% (21)	21% (63)	70% (211)	303
Technology Service and Support	2% (5)	2% (6)	7% (20)	21% (63)	69% (209)	303
Support for Technology Activities	1% (3)	2% (7)	7% (22)	21% (63)	69% (208)	303
Funding for Instructional Technologies	2% (6)	2% (6)	7% (20)	22% (67)	67% (204)	303
Funding for Communication Technologies	2% (5)	3% (8)	7% (22)	22% (66)	67% (202)	303
Funding for Technology Development and Training	2% (7)	3% (8)	7% (22)	21% (64)	67% (202)	303
Support of Attendance at Technology Activities	2% (6)	3% (8)	9% (27)	24% (73)	62% (189)	303
Release Time to learn Technology	3% (8)	3% (9)	13% (38)	25% (74)	57% (173)	302
Technology Criteria for Tenure and Promotion Decisions	5% (14)	4% (11)	9% (28)	22% (66)	61% (184)	303
Total Respondents						303

Research Question 5

What is the difference in the perceptions of organizational support and the adoption of technology for instruction and communication by faculty gender?

Table 12

Current Use of Office Productivity Tools by Female Faculty Respondents

	Never	Rarely	Occasionally	Often	Always	Response Total
PowerPoint	7% (10)	10% (13)	30% (40)	44% (60)	9% (12)	135
WordProcessing	5% (7)	3% (4)	26% (35)	43% (58)	23% (31)	135
Spreadsheet	10% (14)	12% (16)	30% (40)	42% (57)	6% (8)	135
Database	16% (21)	24% (32)	31% (42)	26% (35)	4% (5)	135
Desktop Publishing	18% (24)	26% (35)	30% (40)	24% (32)	3% (4)	135
Total Respondents						135

Table 13

Current Use of Office Productivity Tools by Male Faculty Respondents

	Never	Rarely	Occasionally	Often	Always	Response Total
PowerPoint	6% (10)	14% (24)	32% (53)	36% (59)	12% (20)	166
WordProcessing	1% (2)	8% (13)	29% (48)	38% (63)	24% (40)	166
Spreadsheet	6% (10)	16% (26)	32% (53)	38% (63)	8% (14)	166
Database	12% (20)	23% (38)	32% (53)	25% (42)	8% (13)	166
Desktop Publishing	14% (23)	24% (40)	30% (50)	25% (42)	7% (11)	166
Total Respondents						166

The survey result showed that male faculty respondents used technology more than female faculty respondents at the five HBCUs. Although very small, however, the difference is consistent across the five HBCUs. The survey data analysis revealed that 46 percent of the female faculty respondents or 58 female respondents used PowerPoint several times a month, while 9% or 19 female respondents reported that they use PowerPoint several times a week. In contrast, 36% of the male respondents or 59 male respondents reported that they use PowerPoint several times a month, while 12% or 19 male faculty respondents reported that they use PowerPoint several times a week.

Conclusions

The conclusion is that HBCUs faculty members are currently using technology for instruction to the extent of their capability and available resources. The number of HBCUs faculty members who want to use of technology for the delivery of instruction, by far exceeds the number of faculty members who are presently using technology. Historical Black Colleges and Universities, HBCU, have made considerable and significant progress in the provision of quality and affordable education for African Americans in particular, Africans, and African diasporas in general (Sissoko & Liang-Rong, 2005; Drewry & Doermann, 2001) However, there are several educational challenges and problems facing HBCU.

Recommendations for Action

The following recommendations for actions are offered to HBCUs administrations:

1. HBCUs member institutions should establish a technology implementation committee. The members of this implementation committee should consist of students, faculty and administrative staff members.
2. HBCUs member institutions should create a Center of Excellence in Teaching and Learning where technology-related training and other professional development workshops can be offered to the faculty members. Faculty members should be required to fulfill a minimum of one or two technology-related training workshop per year. Faculty Tenure and promotional decision could be tied to the fulfillment of a satisfactory of a minimum technology training mandate.

3. HBCUs member institutions should seek and get funding to buy and make better equipment and stable network infrastructures available to the faculty and students.

4. It is strongly recommended that online education should be implemented from one centrally based organization with the necessary resources to support viable online education offerings. In this scenario, online classes can be made available to students in other HBCUs member institutions as campuses. Thus, without incurring infrastructure overheads, students at HBCUs member institutions can attend online classes while HBCUs faculty can concentrate on teaching and administrators can focus on quality of services issues. It is recommended that Howard University, as part of its strategic framework for action phase II, should provide the leadership for this united front implementation.

5. HBCUs should take note and form a committee to study and explore the overnight success of the online education systems of Strayer University with a growing student population approaching 40,000 students world wide. Strayer University has a robust, well managed, well staffed, and a strong centrally administered online education systems with a growing number of traditional campuses in the US. Many of the Strayer University campuses are strategically located close to HBCUs locations in the South. Thus, Strayer University, with little or no infrastructure overheads at its remote campuses, is succeeding in providing online offerings and graduating many students, including African Americans, who otherwise, would have had no chance of education and would have been locked out for ever. As part of responses to the survey, many HBCUs faculty members commented that there were many administrative staff members and students of HBCUs who have availed themselves of the opportunities offered by

Strayer University online classes and have transferred their credits to meet their degree curriculum requirements at HBCUs.

6. Faculty members should be given the mandate to begin the use and integration of technology into all curriculums. It should be mandated that all traditional classes should also have the optional online components. For example, using Blackboard, eCollege, WebCT, it is very easy to automatically create the optional online class components to traditional classroom class offerings. This implementation strategy will encourage faculty and students to begin the use of online educational technology.

Implication for Social Change

There is a widening gap between the races in the access to computing and internet technologies in American schools, colleges, and universities. Thus, "The United States economy may also be at risk if a significant segment of our society, denied equal access to the Internet lacks the technological skills to keep American firms competitive" (Hoffman & Novak, 1998).

This study has many implications for social change. First, the provision of adequate technology education for individuals in any segment of the society for the purpose of employment in the IT industry plays a significant role in the ability of the United States to compete with other countries. Secondly, the findings will provide other researchers with a knowledge base containing relevant data, information, and answers to questions that can be adopted and readily applied by other colleges and universities in every segment of the society.

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