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## Effective Distance Learning Methods as a Curriculum Delivery Tool in Diverse University Environments: The Case of Traditional vs. Historically Black Colleges and Universities

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**TEACHING**

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# **EFFECTIVE DISTANCE LEARNING METHODS AS A CURRICULUM DELIVERY TOOL IN DIVERSE UNIVERSITY ENVIRONMENTS:**

## **The Case of Traditional vs. Historically Black Colleges and Universities**

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### **ABSTRACT**

As educational institutions seek to maintain high quality of their course offerings while maintaining steadily growing number of graduates in the new American economy, a natural trend is a readiness to embrace information technology as a method of curriculum delivery. Many U.S institutions find Distance Learning as a means of striking this balance between quality and demand. For them, evidence exists that Distance Learning might well be what is needed to assure that extraneous factors such as location, work schedule, current work load and family pressures would not prevent an otherwise able and willing student from completing a college degree program. With the growing digital divide between the nation's mainstream population and the African American population, an issue rightly becoming a focal point for today's policy makers, it becomes necessary to explore the extent to which the Historically Black Colleges and Universities (HBCU's) have embraced Distance Learning (D/L), given that D/L is fast becoming a norm as a supplemental education delivery method in other American universities.

This study sets out to examine where the HBCU's are in comparison with other institutions, and attempt to explain why the institutions are placed in this

position. The study further attempts to suggest what must be done for the HBCU's to catch up with peer institutions. In the end, we conclude that more than traditional institutions, and given the growing digital divide in the new economy, the answer to closing the gap between the "IT-haves and have-nots" may well lie on the extent to which HBCU's could adopt Distance Learning as an education delivery tool. A further study is suggested as a means of explaining these differences empirically and equipping the nation's HBCU's with the tools they need to adopt Distance Learning effectively.

**Keywords:** distance learning, historically black colleges and universities

## I. INTRODUCTION

*By the year 2000, multiple and seamless links will exist between homes and industries, driven by the converging computer, communications and television technologies. Coupled with telecomputer, telephonic TV, cable and satellite access, such evolutionary phenomena will soon permit widespread availability of diverse forms of information, education, services, and entertainment for all.(Shure, 1994)*

If Rip van Winkle were to drop in on one of our classrooms today he would probably feel right at home. The single, isolated instructor in front of the classroom is still using a chalkboard with little else to support his/her craft. After all, this approach endured for hundreds of years and there is almost no convincing evidence that either television or computers changed the basic instructional model or challenged its underlying academic culture. So, why bother?

A reality check would say that today's instructor is not a dedicated craftsperson, but a highly trained professional needing the technological support of a wide range of developers and resources. This assertion is more true in the nation's Historically Black Colleges and Universities (HBCU's). Educators in these institutions need to understand that technology can provide the

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management and instructional resources that enable these institutions to meet the needs of every student, not just the few who would learn on their own, but also those located far away from our physical sites, but with strong historical ties to the institutions. These institutions should, therefore, optimize the use of technology as a means for increasing faculty productivity and student performance. To this end, this study set out to survey the structural preparedness and technological states of the nation's HBCU's in the emerging distance education delivery method.

*The question to be asked is not whether to use the technology, but rather how best to use the technology (Kolomeychuck and Peltz, 1991)*

The approach used in this study was quite straightforward. A survey of *Educause*<sup>1</sup> institutions was undertaken to determine the extent to which distance learning is being used in all colleges and universities. The results were divided into two populations, the general higher education population and the HBCU's. The two populations were compared to assess where the HBCU's stand with relation to distance learning.

## **II. DEFINING DISTANCE LEARNING**

It is probably an understatement to say that there are as many definitions of distance learning as there are techniques for teaching. Perhaps, it suffices to say that distance learning involves a wide spectrum of techniques, methodologies, and media. As a minimum, it is usual to describe distance learning as instruction that involves more than one of the senses, has an

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<sup>1</sup> Educause was formed in 1998 through a merger of CAUSE and Educom. It is a not for profit organization headquartered in Washington, D.C. For more information, go to <http://www.cause.org/defined.html>  
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educational purpose, and includes several modules of instruction, taught over time. A more formal definition is:

*Distance education can be broadly defined as the transmission of education or instructional programming to geographically dispersed individuals or groups.*(U.S. Congress, 1992)

Given this generalized definition, distance learning has been in existence for decades and now appears to be on an upswing. Correspondence courses, the earliest form of distance education, began in the late 19th Century and were formalized as an institutional option as early as the 1930s. Instructional television (ITV) was a much-touted distance learning model in the 1960s. However, ITV fell far short of early expectations. (Weitzenbaum, J. 1976). Perhaps, today's telecourses and educational programs designed with appropriate distance learning methodology, will reach many new learners in diverse settings, especially people of African-American decent, who constitute the main stake-holders at HBCU's .

In essence, distance learning takes many forms. From voice and audio-graphics to teleconferencing to microwave networks to full-motion video, distance learning involves many levels of sophistication, interactivity and costs. Evidence from several investigations on distance learning (Orlansky and Thorp, 1997; Salzman, Dede, and Loftin 1995; Goldman, Pellegrino, and Bransford 1998), suggests that no one delivery mode is superior to all others. Each system has its pros and cons. Research shows that learning can take place with all types of distance learning systems but, some subjects lend themselves to certain systems better than others. Cost is also a prime consideration in choosing a delivery system. Most institutions engaged in distance learning programs ultimately find themselves employing many different techniques, technologies and methods to accomplish their educational missions. All of these methods justify a structured investigation of distance learning as a course delivery tool, the task that this study aims to undertake.

### III. A REVIEW OF DISTANCE LEARNING OPTIONS

A comprehensive and complete review and discussion of all the options that can be a part of distance learning is a heroic goal to be accomplished in a few pages. So, what is provided in this section is a list of the options, as a means of demonstrating the available range. A more detailed discussion of different Distance learning delivery methods is presented in the Appendix. Because the technology is moving at a rapid pace, the outline presented in Table 1 is at best a snapshot of today's options.

Table 1. Outline of Distance learning Options

| MAIN OPTION                    | SUB-OPTIONS   |
|--------------------------------|---|
| "Remote" the Facility          |   |
| Correspondence                 |   |
| Audio Conference               |   |
| Electronic White Boards        |   |
| Computer-Networked Interaction | -Internet Linkages<br>-Bulletin Board Systems   |
| Video-Based Learning           | -Video Tape (video taped lectures)<br>-Broadcast Video<br>--local origination TV channel or<br>--private (university) broadcast<br>-One-Way Video/Two-Way Audio<br>Videoconferencing<br>-Two-Way, Interactive Video |

In our survey, many versions of these methods are being used in colleges and universities and HBCU's today, but in conjunction with one another.

### IV. OVERCOMING RESISTANCE TO CHANGE

Regardless of the noble motivation, change is something we humans resist. Thus, going into a program of teaching at a distance will evoke reactions from the participants in ways that are hard to rationalize. Which is the point? Many reactions or responses are not rational. But, we should be prepared for

them and ready to work through them. Lack of know-how, loss of control, and loss of privacy are grounds for educators' reluctance to embrace distance learning programs. Resistance was found in our survey both in the general and the HBCU population.

## V. A SURVEY OF DISTANCE LEARNING

To understand better how distance learning can be applied at HBCU's, it became obvious that we must evaluate other studies conducted of other colleges and universities, to see where the general education population are on distance learning, leading to a better understanding of what HBCU's must do to catch up.

Through the auspices of *Educause* and its Institutional Database resources, a six-question e-mail survey was sent to the approximately 850 campus "institutional representatives" in the *Educause* database. Rather than follow the traditional, extensive, rigorous experimental design methodology and sampling process, a quick and dirty e-mail survey was used. The survey design was patterned after the highly effective *Educause* Postcard survey that has been used for several years to sample issues in higher education IT. The survey form is shown in Figure 1.

On October 25, 1999 the survey shown in Figure 1 was sent via e-mail to the sample institutions, which are located all over the world. The survey produced 300 responses, Fifty percent of those who responded via Internet replied in the first 24 hours. Figure 2 shows the frequency of response on the vertical axis and the date (month/date) across the horizontal axis.



**I. Institutional Profile**

How would you categorize your institution: (Check all that apply)

Private     State     Ivy League     Public     2-Year     4-Year     HBCU

What is the size of your institution:

Less than 5000     Less than 10000     Over 10,000

How would you describe the institutional investment in technological infrastructure (Hardware, S Network)

Very Adequate     Adequate     Less than Adequate     Below Standard     Poor

**II . Distance Learning Experience**

Has your Institution made any investment or plans towards distance learning?

Yes     No

2. Is Your Campus Involved in Distance Learning?

Yes     No

3. Does Your Campus Plan to Expand Distance Learning over the next 2 & 5 years?

(2 years):     Yes     No    (5 years):     Yes     No

4. What Method of Delivery does your institution use

Commercial Circuit     Do Up and Down Link  
 Fiber Optics     Down Link  
 Microwave     Other

5. Does your Distance Learning program have adequate Library Support?

Yes     No

6. Are the Tuitions charged for your Distance Learning Program same as fees for Traditional Curriculum?

Yes     No

7. What is the Average number of Students Registered in Distance Learning? What is the average number of courses?

Students: \_\_\_\_\_

Courses \_\_\_\_\_

8. If you currently offering courses using distance learning, how would you compare students in this program with those receiving instructions using traditional methods: Academic quality of D/L Students is

Better     Same as traditional     Worse than traditional

Figure 1. Study Survey Questions

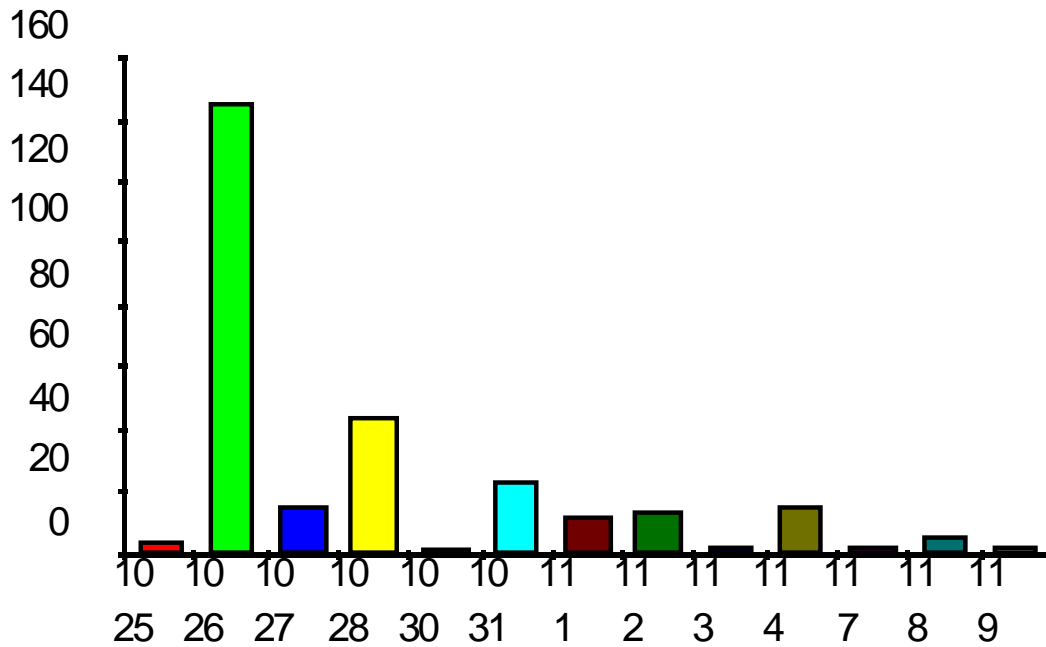


Figure 2. E-Mail Responses by Date

Also of interest was the 10 percent response coming from non-U.S. *Educause* members. Finally, about 6 percent or 18 responses came back by FAX. This situation occurs when that the campus *Educause* representative has an Internet connection but the people working in distance learning do not.

## VI. DISTANCE LEARNING – “THE FUTURE IN COURSE DELIVERY”

The basic question in any topical survey is whether the subject is “in” or “out.” Intuitively, we know that higher education is into distance education and has been since the 1930’s but how big is its involvement? Table 2 shows the details of the survey results for the general population. Section X compares the results to those obtained for the HBCU group.

Table 2: Distance Learning Survey Results – General University Population

| RESEARCH QUESTIONS   | GENERAL POPULATION |
|--|--------------------|
| 1.Aware of Distance Learning Methods as a Curriculum Delivery Tool             | 95%                |
| 2.Have plans in place to implement Distance learning                           | 85%                |
| 3.Campus Involved in Distance learning   | 57%                |
| 4.Average Number of Courses Offered through Distance Learning                  | 22                 |
| 5.Average number of Students Registered in Distance Learning                   | 500                |
| 6.Plan to Expand Distance Learning Program in 2 years                          | 80%                |
| 7.Plan to Expand Distance Learning Program in 5 years                          | 98%                |
| 8.Percentage of Faculty Involved with Distance Learning                        | 45%                |
| 9.Library Support Available to Distance Learning Students                      | 74%                |
| 10.Tuition/Fees the Same as Traditional Courses                                | 90%                |
| 11. Under what Administrative Function Does Distance Learning Fall?            |                    |
| Academic Vice President/Provost  | 48%                |
| Head of Distance Learning as a Separate Administrative entity                  | 32%                |
| Others   | 20%                |
| 12.Distance learning Centers Visited by Course Instructors                     | 70%                |
| 13. Distance Learning has been in Operation for:                               |                    |
| Over 10 Years  | 17%                |
| 5-9 Years  | 22%                |
| Less than 5 years  | 61%                |
| 14 Are Distance learning Students Getting Same Quality as Traditional Students | 76%                |
| 15 Is Distance Learning Part of Regular Academic Program                       | 52%                |

## CREDIT AND NON-CREDIT PROGRAMS.

Over 55 percent of the respondents said that their campus was involved in distance learning--the majority offering courses for credit. However, half of those involved in distance learning were also offering non-credit programs.

*Educause* also asked this question during the development of its 1998 *Educause* ID Survey. With a 38 percent response rate, *Educause* reported that 57 percent were involved in distance learning (Munson, Richter, and Zastrocky, 1998). Keep in mind that the following discussion of responses refers to about 165 colleges and universities that “do” distance learning.

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## **COURSES AND ENROLLMENT PER SEMESTER**

Another interesting aspect of these programs is that when they get started, they seem to be fairly large. For example, on average, campuses engaged in distance learning offered 22 courses each semester. In terms of student enrollment, the campuses reported that they had an average of 500 plus students enrolled each semester

## **PLANNING TO GET STARTED IN DISTANCE LEARNING.**

Of the 42% of the institutions that indicated that they were not yet involved in distance learning, half of them said that they plan to get started in distance learning within the next 3 years. And, almost all (98 %) of those doing distance learning said that they would expand their programs over the next 3 years, a figure very similar to our finding at HBCU's. One could conclude that distance learning is on the move.

As a means of reviewing the various factors affecting the adoption of distance learning by various surveyed institutions, the following section provides a list of factors which participants in the study identified as critical in their decision to embark in implementation of any form of distance learning program.

## **VII. TRANSMISSION METHODS**

An integral component of the technology used for the delivery of distance learning is the "how." That is, what technology is used to transmit the materials to students.

The survey showed that colleges and universities involved in distance learning use many methods to deliver the "signal." Interestingly enough, there was a dominant response, namely commercial circuits (Fig. 3).

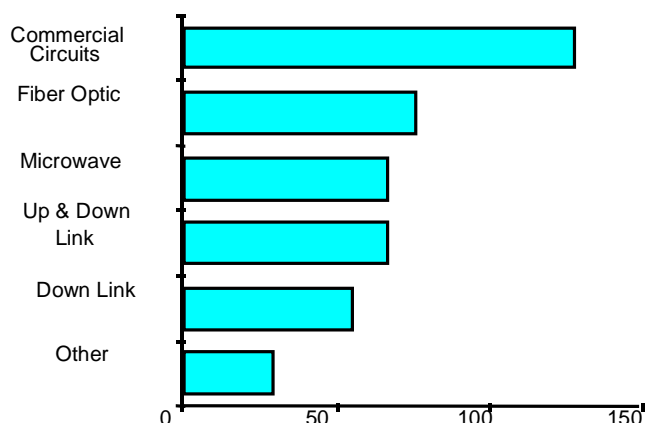


Figure 3. Transmission Methods

Regardless of whether you call it “land lines,” “commercial circuits,” or “the phone company,” the vast majority of colleges and universities use the public telephone system to deliver distance learning. Admittedly, the question allowed for multiple answers, but 128 out of 160 respondents indicated that they used commercial circuits or land lines to transmit their programs.

The next most popular transmission medium was fiber optics, referred to by 76 campuses. The confusion that might be associated with this answer is that we do not know if it is fiber on the campus or the respondent’s belief that most commercial circuits are now fiber, at some point in the system. So, one might add these two together as a single dominant medium. At any rate, we are doing a lot of “earth” transmitting and using microwave as the second most popular method (67 campuses).

## VIII. REPORTING RELATIONSHIPS

Another major issue in the establishment and implementation of distance learning programs is where the unit or function reports within the organization. Many would point out that effective programs are more a result of developing networks of relationships than of equipment.

Another lesson for success teaches us that leaders at the highest levels of the organization are involved, and success is more likely if visible support comes from the President. The University of Nebraska at Lincoln, for example, developed what is now known as Nebraska CorpNet with a Chancellor pushing from the top down through the vice chancellor for academic affairs, and thence to the dean of engineering. CorpNet provided on-site training for business and industry using live broadcast TV. And at Howard University, a HBCU, the president also has initiated a technological advancement program, aimed at addressing how technology can best be used in the classroom.

Yet, the bottom line is that the unit must report somewhere. Since presidents are busy people, it is normal to place the unit within one of the operating units. Again, the higher the level in the organization the better. So, what can we conclude?

## **SURVEY RESULTS**

Where units report within organizations is often an indicator of support and importance to the mission of the college or university. Thus, the campuses were asked where distance learning reported within their organization. Almost half (48%) said that distance learning reported to the Academic VP/Provost and 32% reported to the head of Continuing Education. The remaining 20 percent largely indicated that the program reported to their academic unit, department, school, or college. The reporting relations are shown graphically in Figure 4.

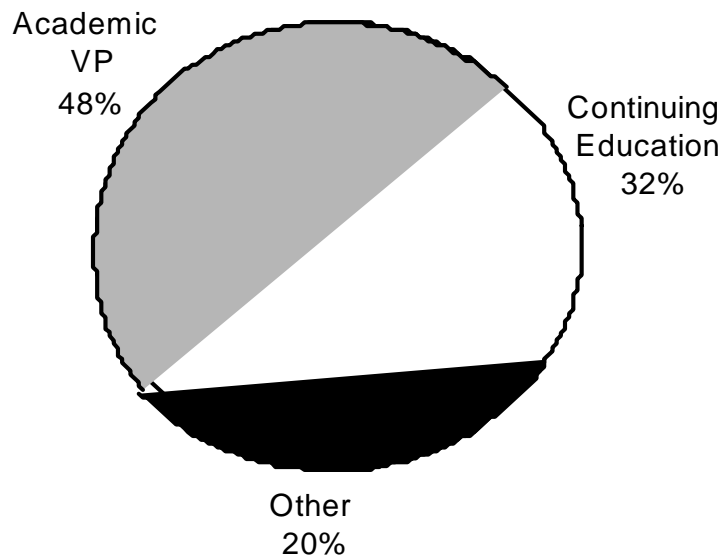


Figure 4. Reporting Relationships

## IX. OTHER ISSUES--LARGE AND SMALL

### LIBRARY SUPPORT

Effective distance learning often suggests that innovative consideration is given to several forms of student and academic support, such as the library. The idea is to provide staff resources and facilities to make the remote learning site comparable to a normal campus experience.

Of those institutions reporting distance learning programs, 74 percent of the general population said that they provided library support services to their students who are remote from the main campus.

### TUITION AND FEES

The popular perception is that the student must bear the financial burden for bringing education to them at remote sites. Yet, when asked if the tuition/fees are the same for distance learning as regular, on-campus courses, 90 percent said that they were the same or almost equal to that paid by on-campus

students. Of the 10% who said that they were higher, the average represented an 11 percent higher tuition or fee.

### **STAFF COMPENSATION**

Providing appropriate compensation for the faculty and staff in recognition for additional effort and gains in productivity has always and will continue to be a challenge in terms of fairness. As colleges and universities move into new teaching modes, whether at a distance or not, it would be ideal if the issue of changes in compensation packages would not need to be addressed until new models can be tested and refined. Experience demonstrates that once “bonus” or overload programs are begun, it is difficult to modify them, especially downward. Another issue in distance learning programs is whether faculty visits the remote sites.

In those cases where the instructor is “beamed” out via a video signal, is the faculty member obliged to go out and visit the students, person-to-person? Happily, it was reported that 70 percent of the institutions reported that main campus instructors visited the distance learning centers.

### **JUST PART OF THE REGULAR ACADEMIC PROGRAM.**

For 52 % of the campuses, distance learning is a regular part of their regular academic course offerings.

### **IT’S OLD HAT!**

One misconception is that everyone has been doing distance learning for years. Yet, the reality is that the technology, need, and interest must all come together in the new millennium for distance learning to become a popular thing for higher education to do. The majority (61 %) of the general respondents said that their distance learning program had been in operation less than 5 years.,.

### **PART OF A STATE-WIDE SYSTEM.**

All of us like to have company, especially with new technology and educational programs. Therefore, it is not surprising to learn that 52 % of the campuses in



the survey indicated that their program was part of a state-wide system or network.

### **KEEPING-UP WITH THE OTHERS.**

Seventy-six percent of the general campuses felt that the distance students fared as well as the campus students. This is an indication that the distance learning education delivery method, when it finally takes roots, constitute an effective means of training students since it costs about 65% on the average to educate student by distance learning than it would using the traditional classroom method, considering that fixed costs and overhead charges involved in a traditional education setting are not incurred in distance learning. (Russell, 1999)

## **X. COMPARISON OF HBCU'S AND THE GENERAL POPULATION**

Table 3 compares the HBCU colleges with the general population. The comparisons are based on data from 68 HCBU's and 242 institutions in the general category. The data in Table 3 show the following results

### **AREAS WITH SIMILAR RESULTS BETWEEN THE TWO POPULATION:**

- HCBU's show similar traits with the general population in terms of the fraction of institutions currently involved in distance learning (50% vs. 57%) , and those planning to expand distance learning within two years (98% Vs 90%).
- They also offer same tuition structure as the general population, allowing DL students to pay same fees as students registered in the traditional curriculum.

Table 3: Distance Learning Survey Results:  
General University Population Vs. HBCU's

| RESEARCH QUESTIONS  | GENERAL | HBCU |
|---|---------|------|
| 1. Aware of Distance Learning Methods as a Curriculum Delivery Tool                       | 95%     | 75%  |
| 2. Have Plans in Place to Implement Distance learning                                     | 85%     | 22%  |
| 3. Campus Involved in Distance Learning   | 57%     | 50%  |
| 4. Average Number of Courses Offered through Distance Learning                            | 22      | 10   |
| 5. Average Number of Students Registered in Distance Learning                             | 500     | 270  |
| 6. Plan to expand Distance Learning Program in 2 years                                    | 80%     | 50%  |
| 7. Plan to Expand Distance Learning Program in 5 years                                    | 98%     | 90%  |
| 8. Percentage of Faculty Involved with Distance Learning                                  | 45%     | 25%  |
| 9. Library Support Available to Distance Learning Students                                | 74%     | 72%  |
| 10. Tuition/Fees the Same as Traditional Courses  | 90%     | 95%  |
| 11. Under what Administrative Function Does Distance Learning Fall?                       |         |      |
| Academic Vice president/Provost   | 48%     | 20%  |
| Head of Distance Learning as a Separate Administrative entity                             | 32%     | 50%  |
| Others  | 20%     | 30%  |
| 12. Distance Learning Centers Visited by Course Instructors                               | 70%     | 95%  |
| 13. Distance learning has been in operation for:  |         |      |
| Over 10 Years   | 17%     | 0    |
| 5-9 Years   | 22%     | 10%  |
| Less than 5 years   | 61%     | 90%  |
| 14. Are Distance learning Students Getting Same Quality Education as Traditional Students | 76%     | 85%  |
| 15. Is Distance Learning Part of regular Academic Program                                 | 52%     | 87%  |

Survey Population: No. of schools: 300 General population: 242 HCBU's: 58

### AREAS OF DIFFERENCES BETWEEN HBCU'S AND GENERAL INSTITUTION POPULATION:

The survey indicates that HBCU would need to improve their position towards adopting DL as an education delivery method, with statistically significant differences existing in several key areas as shown below. The parenthesis indicates how HBCU's compare with other institutions:

- Awareness of Distance Learning importance (20% less)
- Distance learning course offering (54% less)
- Students registered in distance learning (46% less)
- Plan to expand distance learning program in 2 years (30% less)

- Plan to expand distance learning program in 5 years (18% Less)
- Percentage of faculty involved with distance learning (20% Less)
- Length of time institutions are involved with distance learning experience (Over 60% Less )

## **XI. CONCLUSIONS AND CLOSING THOUGHTS**

To close this discussion about distance learning, we record some of the thoughts of the faculty at Howard University as a means of reminding ourselves about some issues and concerns about distance learning.

Howard University, the nation's premier HBCU, formed a university-wide committee in Fall 1998 to examine the role of emerging technologies as a means of addressing the three concerns that dominate virtually all discussions of higher education in the past decade--student access, academic quality, and fiscal efficiency. The committee's observations (Howard University IT Committee Report, 1998) included:

- Teaching and learning in the information age will be less print-oriented and classroom-bound than ever before.
- It will need to be less labor-intensive and more portable and modular in format and delivery.
- The home and the workplace may become the classrooms of tomorrow.
- Instructional and support services will be based on the convenience of the consumers rather than that of campus constituencies.
- Education that is truly learner-centered ought to be delivered directly to the individual at a time and in a place determined by the learner.
- The recent "marriage" of computing and various forms of telecommunications can be expected to increase the scope and

pace of technological innovation almost beyond imagination.

- Most estimates suggest that the technical means for integrating the two dimensions of non-traditional instruction--delivery and format—are only a few years away.

It is clear that HBCU's are making strides towards distance learning, at least by having plans in place to embrace the technology. The evidence from our study shows that these efforts are justified. HCBU's can optimize technological advancements in the delivery of education to their core students, undeterred by time and space.

## **XII FUTURE STUDIES**

This work focused on identifying where HBCU's are with regards to their adoption of Distance Learning as a curriculum delivery method. It explored the areas where necessary improvements are needed for these institutions to catch up with their peers. An important question would be to measure how several dependent variables such as faculty compensation, student population, institutional policies, infrastructure readiness, and student cultural background contribute to the effectiveness of distance learning as an emerging tool for curriculum delivery in diverse institutions.

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## APPENDIX

### A SHORT TUTORIAL ON DISTANCE LEARNING

Distance learning, the transmission of educational or instructional programming to geographically dispersed individuals or groups operates in many formats. The most common formats used today by institutions in the United States are:

- print,
- voice,
- video, and
- computer technology.

This Appendix summarizes the four methods, their advantages and disadvantages, and provides guidelines on how best to adopt each method.

#### PRINT TECHNOLOGY

The earliest method of distance education was correspondence learning, believed to have started as early as the nineteenth century. In the correspondence system, print materials are mailed to students and the finished product is sent to the instructor through the postal system.

Print materials may serve as the primary source of instruction or they may be supplemental. As a primary source, distance students might use a textbook and read various units on a specific timetable. Other technologies could then be used to ask questions or send assignments back to the teacher.

As a supplement to instruction, text materials may take the form of work sheets or study guides that are used in conjunction with video or voice technologies. It is important to note that today the supplemental print materials may be disseminated via regular mail or over the Internet.

#### Advantages Of Print Technology

- *Extremely Portable:* Print materials can be used in any location.



- *Cost Effective:* Print materials can be created or duplicated with little expense.
- *Available:* Many distance learning classes can take advantage of existing textbooks, thus saving the time and expense of creating custom materials.
- *High comfort level:* Many students are comfortable using print materials.

### **Disadvantages of Print technology**

*No interaction:* print materials do not generally provide built-in interactions. Additional technologies, for example, e-mails, should be provided as supplements.

*Time delay:* It may take days or weeks for printed matter to travel between student and teacher.

*No audio/visual elements:* Print materials are static and are not appropriate for teaching languages and visual concepts.

*Reading skills required:* If the learners are non-readers or language skills are required, print materials are not effective.

### **Guidelines for Incorporating Print Materials**

- Distribute print materials well in advance.
- Include instructions or tips to aid students.
- Require interactions.
- Specify a timeline.

### **AUDIO TECHNOLOGIES**

Audio or voice technologies offer cost-effective ways to enhance distance learning courses. The audio component of a distance learning course can be as simple as a telephone with voicemail, or as complex as an audio-conference with microphones, telephone bridges and speakers.

## **Voicemail**

Voicemail is becoming extremely common. Voicemails can offer a great deal to distance learning instructions. For example:

- Allow students or instructors to leave messages for each other regardless of time or place.
- Can be used to administer quizzes (this method may require some programming).
- Serves as an alternative to e-mail for those students who do not have a computer.

Voicemails are generally used as a supplement to other technologies in a course. Two main advantages of voicemail are that nearly everyone has easy access to a telephone and voicemail messages can be retrieved at any time. The disadvantages of a voicemail system include limitation on the length of the message and the high cost that may be incurred by long distance callers.

## **Audiotapes**

Audiotapes (cassettes) are inexpensive, easily duplicated, and versatile. They can be used to deliver lectures, panel discussions, or instructions for the distant learner. Audio is especially useful in courses that require the nuances of inflection, such as foreign languages, or those designed for non-readers.

Audiotapes are cost effective and readily accessible to distance learners. Audiotapes are also easy to create, duplicate, and use. Disadvantages include their non-interactive format and their lack of visual elements. Audiotapes should be recorded on the best equipment available to optimize their usefulness. They should include print materials to enhance the tapes and should encourage interactions via voicemail, e-mail, or other means.

## **Audioconferences**

Telephones are one of the simplest, most accessible technologies used for distance learning. Telephone conversations can be used to mentor individual

students or to reach numerous students simultaneously via a conference call (i.e., an audio-conference).

Audio-conferences are relatively easy to set up and conduct. It may be difficult to maintain a student's interest for long periods of time without visual elements. Therefore, audio-conferences used for distance learning should be short, well planned, and supplemented with visual materials that are distributed in advance.

### **Advantages of Audio Technology**

*Cost Effectiveness:* All audio/voice technologies are relatively inexpensive.

*Easily Accessible:* People have easy access to the audio technologies available.

*Easy to use:* Almost everyone is comfortable using audio technology.

### **Disadvantages Of Audio Technology**

*May require scheduling:* Some of the voice technologies (such as audio-conferences) are synchronous, meaning they must be scheduled at a mutually convenient time for the students and the teacher.

*Not conducive for students requiring visual information:* A number of students find it difficult to focus and learn strictly through audio input.

*May be impersonal:* with audio-only interactions, there is no eye contact, body language. Some students may be "turned off" by a talking box.

### **Guidelines for Incorporating Audio Technologies**

- Distribute visual materials in advance.
- Set communication protocols.
- Encourage interaction.
- Record audioconferences on audiotapes
- Get to know the students

## **VIDEO TECHNOLOGIES**

The ability to hear and see an instructor offers opportunities for behavior modeling, demonstrations, and instruction of abstract concepts. Video techniques for distance learning are characterized by the transmission medium (videotapes, satellites, television cables, computers and microwave). Each of the media can be described as it relates to the direction of the video or audio signals – one-way video and audio, one-way video and two-way audio, and two-way video and two-way audio.

### **Videotapes**

Videotapes offer a popular, easy-to-use format for instructional materials. Videotapes can be used for demonstrations or documentaries. It is quite easy to videotape a lecture for a student who is unable to attend class. Advantages of videotapes for the delivery of distance learning include easy access to the hardware and inexpensive tapes. If a video camcorder is available, videotapes are easy to record. Disadvantages of videotapes include the fact that they are not interactive. They wear out with continual use and can be costly to send via the mail. Interaction through other media should also be encouraged.

### **Satellite Videoconferencing**

Full-motion video teleconferencing offers the “next best thing to being there.” Satellite transmission is one of the oldest, most established techniques for videoconferencing over long distances. In most cases, satellite delivery offers one-way video and two-way audio.

Two sets of equipment are needed for satellite systems. The uplink (a large satellite dish) transmits the video and audio signals to the satellite. The downlink (a small dish antenna) receives and displays the signals. When satellite videoconferences are used for distance learning, a studio classroom must be properly wired for the lighting, microphones and cameras needed to produce an acceptable lesson.

The receiving sites for satellite videoconferencing (in most cases located at other schools) must have satellite downlinks. These dishes select, amplify and feed the signals into the classrooms, where they can be displayed on standard television monitors. To provide two-way audio with interactions from the remote classrooms back to the teacher, a telephone bridge is usually employed.

Satellite videoconferencing is very expensive. It would not be cost effective for most school systems to use uplinks to originate distance-education classes unless the school systems were in a position to market the classes over wide geographic areas.

### **Microwave Television Conferencing**

Microwave transmissions provide a cost-effective method for videoconferencing in localized areas. Most microwave systems are designed to transmit video signals to locations that are not more than 20 miles from the source.

The most common microwave systems use frequencies designated by the Federal Communications Commission (FCC) as Instructional Television Fixed Services (ITFS) stations. When compared with satellites or commercial broadcast television, ITFS stations operate at a lower power, and the transmission equipment is relatively inexpensive. Reception equipment is also reasonably priced, as long as the receiving sites are located within 20 miles of the transmitter and there are no hills or tall buildings to block the line-of-sight signal.

A drawback to microwave ITFS communication is the limited number of channels available in any one area.

### **Cable And Broadcast Television**

Cable and public broadcast television have been used to distribute instruction for years. In addition to the educational networks – CNN, the Learning Channel and Jones Computer Program – almost all public cable television systems allow schools to transmit television courses. This type of connection can

be used to transmit one-way video and one-way audio to the community at large or between specific schools.

### **Digital (Desktop) Videoconferencing**

Desktop videoconferencing uses a computer along with a camera and microphone at one site to transmit video and audio to a computer at another site or sites. The remote sites also transmit video and audio, resulting in a two-way video and two-way audio communication.

With digital videoconferencing, all of the computers involved must have a videoconferencing board (called a codec) installed. These boards often have the ability to compress and decompress the digitized video.

Although desktop videoconferencing is considerably less expensive than satellite or microwave systems, they do have limitations. First, the images are usually transmitted at 15 images per second, half the normal video speed. This slower speed causes the video to appear somewhat jerky if any rapid motions takes place. A second concern is related to the connection between the computers. Most systems are demonstrated either through Local Area Networks (LAN) or through relatively fast connections, such as ISDN or T1 lines. Slower connections, such as a connection with a 28.8 modem, can negatively affect the quality of both audio and video.

### **Internet Videoconferencing**

It is also possible to conduct videoconferences over the Internet. Two popular software programs that allow videoconferences are CUSee-Me from Cornell University and NetMeeting from Microsoft. In both cases, a video camera and digitizing card are needed to transmit video signals. A microphone, speakers (or headset) and an audio card are required for audio.

Internet videoconferencing usually results in a small image about 1/16<sup>th</sup> the size of a computer screen. The video is generally jerky (about 3 or 4 frames per second), depending on the speed of the Internet connection. In most cases, a regular modem is far too slow to transmit effective video.

## **Advantages Of Video Technologies**

- *Allows Both Audio And Video Communications:* Video technologies provide the visual and audio realism of a face-to-face class.
- *Facilitates Transmission of Personal Feelings:* Video technologies allow students and instructors to see facial expressions and body language, adding personality to communication.
- *Enables high levels of interaction:* Most video communications are synchronous, allowing high degrees of interactions, questions, and answers.

## **Disadvantages Of Video Technologies**

*May be expensive:* Cameras and editing equipment can be expensive. In addition, the infrastructure at each site and the links between sites can be costly.

*Require a great deal of planning and preparation:* To be effective, the camera crew and the instructor must practice and become a team.

*Must be scheduled:* Video technologies are not spontaneous. There are planned and the necessary resources must be scheduled.

*Require technical support team:* Because of the complexities involved, a technical team is required to oversee the smooth running of things.

## **Guidelines For Incorporating Video Technologies**

- Avoid the “talking head”.
- Practice with the camera and the crew before the lesson.
- Encourage interaction.
- Use the best camera possible.
- Ensure quality audio.

## **COMPUTER TECHNOLOGIES**

With the increased popularity of the Internet, computer technologies are receiving more and more attention as a means of delivering distance learning. The primary computer technologies used for distance learning are e-mail, online collaboration, and web-based education.

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Effective Distance learning Methods: Traditional vs. Historically Black Colleges and Universities by M.C. Aniebonam

## **E-Mail**

Sending e-mail is a common and inexpensive way for students to communicate with instructors. In some cases, an entire distance learning course can be structured using e-mail as the only method of communication. In other cases, e-mail may be used to supplement audio or video technologies.

In addition to e-mail messages, bulletin boards and listeners can also be used to conduct learning initiatives. Bulletin boards (also called discussion groups or newsgroup) are electronic forums where students can post messages or read messages that others have posted. Many faculty members establish bulletin boards or listserves for distance learning classes to facilitate the interactions among the students.

The advantages of e-mail communications include versatility and convenience. In addition to sending straight text, most e-mail systems now allow students to attach files. The convenience of e-mail is that it can be accessed at any given time and most are free.

The disadvantages of e-mail include the requirement to have an Internet connection and the complexity of learning to use e-mail software and attachments.

## **Online Collaboration: Internet Chat And Conferencing**

E-mail communications are asynchronous, meaning that they do not take place simultaneously. However, synchronous communications are possible through online chat, shared whiteboards, and videoconferences.

Online chat refers to a two-way, interactive exchange on the Internet. In chat mode, two or more people at remote computers connect to the same chat room and type messages. As each type out his/her message, the others can see the messages on a shared screen. It allows for communication in “real-time.”

Shared whiteboards are another form of collaboration of the Internet. If two or more people are connected to the Internet at the same time, they can



communicate through graphic images on a shared whiteboard. Simple drawing tools are drawn that allow them draw arrows, circles, and other simple symbols in the shared space. In addition, one or both of them can paste in images or text that was copied from another source.

The advantages of online collaboration through chat or shared whiteboards are that the communications are synchronous and the feedback for the students is immediate. The disadvantages include the need for similar software at both sites and the requirement to schedule the interaction in advance. The number of participants may be limited for simultaneous collaboration.

### **Web-Based Education**

The World Wide Web opened a whole new arena for distance learning courses and the access to remote resources. The Web can be used to enhance education through remote access to resources or experts or it can be used to deliver educational programs.

As an enhancement to education, teachers can locate relevant Web sites for students to explore or have students conduct searches for information related to a specific topic. Much as this technology has opened opportunities for both teachers and students, it poses a much greater security problem. A Web-based learning network opens up the institution to external intruders, who may have greater difficulty breaking into the institutions network prior to distance learning course offering. Most institutions, therefore must implement a fool-proof fire-wall as a major component of its distance learning network environment.

### **Advantages of Computer Technologies**

*Allow self-paced instruction:* Computers allow learners to proceed at their own pace, receive feedback immediately, and review as often as they like.

*May Incorporate Text, Graphics, Audio, And Video:* With the trend toward digital audio, video and computer animation, incorporating various media into computer programs is much easier than in the past.

*Allow high levels of interactivity:* Allows embedded questions and interactions, as well as online collaboration.

*Provide written record of discussions and instruction:* Computer logs can easily be generated for computer interactions in distance learning.

*Cost effective:* With access to the Internet, it is relatively inexpensive to both student and teacher to participate in computer technologies for distance learning.

*Worldwide access:* the Internet can be accessed by millions of people throughout the world. As a result, a school can reach a much larger audience, including people that could not attend previously.

### **Disadvantages Of Computer Technologies**

*Require hardware and software:* At a minimum, a computer and an Internet connection are required. These capabilities are often not available to disadvantaged students in their homes, although some public facilities exist, for example, at libraries.

*Generally rely on written communication:* Although the computer allows graphs and drawings, most computer communications is in text form.

*Require substantial planning:* Computer-based courses require a great deal of planning and preparation on the part of the instructor.

*Computer viruses:* The risk of contacting a virus is higher given that information including files, texts and images are distributed through a network of users, many with contaminated environment , with some users unaware of having been infected.

*No performance guarantee:* Computer networks are notoriously unreliable. The server may go down or a particular site may be moved.

### **Guidelines For Incorporating Computer Technology**

- Provide adequate structure and guidelines.
- Provide timely feedback to participants.
- Get to know the students.
- Ensure sufficient technical support.

## ABOUT THE AUTHOR

Dr. Manny C. Aniebonam is an Assistant Professor of Computer Information Systems at the Howard University School of Business. His background prior to pursuing a career in the academia in 1997 is deeply rooted in the Information Technology industry. A graduate of Computer Information Systems from the George Washington University School of Engineering and Applied Sciences, he had over fifteen years experience working in Fortune 100 companies as an IT resource and configuration manager, systems development manager, database administrator, programmer/analyst, and technical lead responsible for business process re-engineering; His special skills were in the areas of information systems development, including IT resource acquisition, evaluation, implementation and support. His involvement with the industry led to his building the necessary bridges towards application of academic research findings to the development and effective management of application databases and systems support tools. To this end, Dr. Aniebonam's research interests include evaluation of IT resources in business and educational environments, performance issues in distributed databases over wide area networks, and the automata of database objects in the systems development process. A member of several professional organizations including IEEE and ACM, he has published in several academic journals, and continues to seek collaboration with other researchers in his areas of interest.

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