

A GLOBAL DIGITAL “SANDBOX”:  
CAN SMALL COLLEGE COMPUTER CLASSES  
PLAY IN IT AND HOW?

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**Abstract**

This paper examines the growth and success factors of digital/online education methods and how small colleges could utilize them to their advantage. Partial application of digital technological tools by the author in an attempt to augment the learning process of computer literacy classes and lower level computer information systems classes and the experience gained by such attempts are discussed in detail. The paper concludes with some thoughts for planning future directions of online education in small colleges.

## **A global digital “sandbox”: Can small college computer classes play in it and how?**

### **Introduction:**

Advances in digital and telecommunications technology and information technology during the past 30 years have a pervasive effect on all walks of life, including the educational arena. The Internet and the World Wide Web are utilized by a large number of educational institutions to augment traditional campus-based methods of delivering instructions in a distributed environment; in some cases, this environment encompasses the entire globe. The early adopters of electronic/distance education in some disciplines of many higher educational institutions have successfully augmented, enhanced, and even expanded their student clientele. In this paper, the author examines the success factors of distributed/digital/distance education methods of early adopters, and techniques for small colleges to utilize these methods. The paper reveals the author's observations and experiences in applying some of these methods to teaching computer literacy courses and Computer Science/Computer Information Systems courses at Valley City State University (VCSU) in North Dakota and Arkansas State University in Mountain Home (ASUMH), Arkansas.

### **The rationale for online education:**

A typical feature of a traditional educational setup is the existence of a classroom, a physical place where an instructor and a number of students meet at a specific period of time, within which they engage in a learning experience. In such a classroom, students usually sit facing an instructor who delivers a lecture that is ideally intended to motivate and provide guidance for pursuit of further knowledge on the theme of the lecture. The configuration of a classroom and the delivery mode of such lectures could vary depending on the class size, academic level of students, complexity of the material presented, and discipline of study. For instance, a lecture delivered for a small class with 10-15 students in a senior level class of a four-year undergraduate college in a compiler design class would be considerably different from a lecture delivered by a distinguished professor in a renowned large university to a class of five to six hundred freshmen in an introductory level chemistry class.

The traditional classroom is also closely tied to student assessment practices in colleges. Since most examinations in colleges, whether large or small, are primarily based on lectures, the tendency would be for students to prepare for examinations using lecture notes taken at the same time as they are delivered. In some reputed universities, students take turns in taking and distributing lecture notes to classmates in an attempt to help each other; furthermore, such notes are even sold at college bookstores in some colleges. The professors who deliver lectures are not only considered authorities in their fields of study, but they also conduct research, perform consulting work for industry, publish findings of their research in refereed journals, and make contributions to the progress of knowledge

by writing books and making presentations at conferences, in their respective fields of expertise.

In a way, this era of the traditional pedagogical/professorial model of academe seems to be vanishing today, as if rapidly becoming an antiquity. Like in most other industries, technology has significantly impacted the course of higher education during the past few decades. Some writers on information technology revolution have referred to this process as “the automation of mental labor.” This impact has been phenomenal in the 1990’s after the Internet and the World Wide Web started making their presence in the classroom. Today, there is fierce competition among colleges, universities, computer manufacturers, computer software companies, telecommunications companies, textbook publishers, and companies producing electronic classroom management software packages in the lucrative online education market.

### **Electronic Education:**

Precursors of electronic media for training purposes can be traced back to the late 1950’s when computer companies such as Science Research Associates (a division of IBM), Control Data, and many other computer manufacturers and software companies produced a variety of computer systems and educational software. Control Data’s PLATO system was used in the employee training programs of many large companies including United Airlines, and the U.S. Navy.[1] Computer Aided Instruction (CAI) was used by teachers in the 1960s to allow students to drill and practice, learn through instructive tutorials, and perform explorations by using simulation methods. Nevertheless, the impact of such early attempts of electronic education was mainly limited to training specific skills within limited geographical boundaries.

The greatest impact of electronic media on education is seen after the emergence of the Internet and the World Wide Web. Terms such as “online,” “digital,” “distance,” and “electronic” are currently pervasive in the higher education field. A multitude of electronic classroom management tools have emerged in the recent past. Web CT[2], Black Board CourseInfo[3], and Top Class[4] are few of the known leading contenders in the market. One common feature in all these electronic tools is that they all are efforts at providing tools to educators to automate the instruction and evaluation of online educational process. Some of the features available for automating “non-productive/low-efficiency” classroom management tasks in these packages are: customized e-mail for class management, a private e-mail program that enables students to communicate with each other and with instructor; an electronic bulletin board; security with logins, passwords, and userids; the ability to create exams, tutorials, syllabi grade books and class lists; ability to automatically record students’ work in the grade book, and systematically monitor student progress by tracking the amount of time spent on the system.

“Online” education in its broadest sense is “education from anywhere, any place, any time.” Some educators that are very excited about online education believe that electronic

education must be similar to doing business online; for example, like buying goods on ebay[5] – from anywhere, any place, anytime with no hassle. Their rationale is that with the emerging technologies and communication methods, there is no necessity for students to gather in a traditional classroom at a particular hour of the day when they could have the same material coming to them electronically, rather than having to go to the place where the material is delivered, usually a college or a library from anywhere in the world at any time of the day. Some label this method as “asynchronous education,” illustrating that the professors and students are “separated in time.” In other words, they are not in “sync” or synchronized or scheduled in time or space. When the learning material is available “online” anytime, the learners could access the material at their leisure “anytime” from “anywhere.” Unlike a book that is available anywhere anytime even without the need to have a computer to access it, the online information could be dynamically changing to satisfy the needs of time and the consumers.

### **The early adopters of online education:**

One of the primary reasons for offering online classes by the early adopters of online education was to attract off-campus students. It is uncertain whether offering classes online to students living on campus was even considered at the time when online education was in its infancy. However, with the success of online offerings to off-campus students, many early adopters of online education extended online courses to large lower-level on-campus classes as well. Economies of scale in online offerings helped large universities save the costs, space, labor, and time while simultaneously increasing the revenue. At the same time, students found online offerings convenient, easily accessible, available 24 hours/7 days a week, and they did not have to attend classes at a particular time. Working students, and others who were unable or unwilling to attend classes at a scheduled hour could now take classes at their convenience from anywhere any time. The colleges needed more students and more revenue, while students needed education from anywhere at any time. Online education provided the happy medium.

The early-adopter-instructors who invested time and energy on making their courses available online found teaching online was easier because after making the initial investment of time on a course, they could use the same course material without having to do much revision. They did not have to prepare for giving lectures in front of “live” audiences any more. Also, the classroom management tools like Web CT, enabled them to automate class lists, exams, and grades without having to spend much time on “unproductive and low-efficiency” house-keeping activities associated with classroom management. This worked very well for large universities where most faculty members were heavily involved in research and have very limited time for classroom teaching.

Advancing technology has impacted the textbook publishing industry too. Some textbook publishers like Thomson Publishing Company (Course Technology) adopted new instructional media sooner than others focusing on Computer Based Training (CBT)[6]. Some early adopters of distance education of the academe partnered with textbook publishers in producing computer based training kits on compact disks.

Technological advances in digital communications within the past 15 years and growing enthusiasm of educators in asynchronous education have resulted in the emergence of two different online/electronic delivery systems in the higher education arena. They are: 1) Fully online “virtual universities” (e.g., Western Governors’ University). As stated in their website, “WGU is a real university, just without a physical campus... you can take some of the best courses from institutions all across the country, all without ever leaving home”[7]. 2) Hybrid or partially-online programs offered by campus-based universities and colleges. These institutions provide online/electronic classes in an attempt to augment traditional teaching methods and at the same time increase enrollment and revenue.

### **Online education in small colleges – experience in two small-colleges:**

Unlike the prestigious land-grant universities that produced most of the early adopters of distance education in the early 1990’s, most small colleges are situated in the less-fortunate side of the “digital divide.” They are mostly situated in rural areas where they have limited resources and limited communication infrastructures. High-powered digital communications lines having broader bandwidth are available only in a few critical locations in these rural areas. Both Valley City State University (VCSU) and Arkansas State University at Mountain Home (ASUMH), the two small colleges discussed in this paper, are situated in such rural areas.

Colleges in rural communities do not have thousands of students in any single class as in larger universities; instead, they have smaller number of students, sometimes as few as 6 students per class. They also do not have technology budgets enjoyed by most large land-grant universities, which allocate this money towards technology infrastructures or supercomputers. Also, small towns/communities where the small colleges are normally situated do not have communication companies investing in high-powered digital communication lines having broader bandwidths. Therefore, application of online educational methods in small colleges tends to be a slow process with an uncertain future. Further, colleges that are part of a state educational system (this is the case with both small colleges discussed in this paper) are guided by standards and constraints set forth by the policies and procedures of a superior governing body like a state board of higher education. Both VCSU and ASUMH are subject to such constraints. The challenges of the two small colleges studied in this paper are therefore significantly different from those of the early adopters of electronic/distance education in larger universities. The single most important challenge that they face is learning how to apply the already available electronic/online educational methods to enrich their learning environments, thereby increasing on-campus student enrollment, rather than using online methods to cope with larger classes (as in the case of larger universities).

In Valley City, North Dakota, except for a few persons who would pay a high price for a digital phone line (in this case cable modem), the college (VCSU) is the only place in the entire county that has a T1 connection to the statewide digital backbone known as the

NDIN- North Dakota Information Network. The state government and North Dakota Higher Education Computing Network (NDHECN) use this electronic backbone for digital communications. In Valley City, the extent of online education under its normal definition is therefore possible by, and limited to a few who would enroll as college students and gain access to the college's local area network either being physically present at the college or by making a connection to the college's Local Area Network (LAN) via local phone lines (28,000-31,000 baud). The modem pool of the LAN at VCSU has its limitations. Gaining an uninterrupted connection, as well as full access to all network resources, has always been a problem.

The situation in Arkansas State University in Mountain Home, Arkansas, is not far different from that of Valley City State University in North Dakota, except that many students own home computers with access to the Internet on phone lines at 28,000 baud. The latter college has only a 384kb communication line and is connected with the Arkansas State University Educational Network (ArkNet). Students are not given e-mail accounts by the college. Most students obtain digital lines from the local telephone company (CenturyTel). They use Hotmail, Yahoo, or Juno accounts for email communications for educational and personal use.

The author introduced the following electronic/distance education methods in his computer literacy classes and some lower level computer information system classes for several years (1995-present) at VCSU and one year (1998/9) at ASUMH:

- 1) Use of e-mail on a daily basis before classes are scheduled to meet to communicate with all students, including those who are unable to attend classes regularly. Course syllabi giving detailed schedules of daily activities performed in class were made available electronically in shared network drives on the local area network of the university, and on the Web.
- 2) Use of electronic media produced by book publishers (computer-based training kits) stored in shared network drives of the local area network of the university, with e-mail instructions for their use.
- 3) Use of the Internet to search for most current materials relating to technological developments in the computer field.
- 4) Use of at least one electronic classroom management tool (Top Class) in the 1998-9 academic year to manage a sophomore level computer information systems class.

The above mentioned measures were aimed at giving an equal opportunity of learning to every student in a class, allowing them to make a choice of physically attending a class or learning material independently, without having to worry about spending "seat time" in a classroom.

In both of these institutions, particular classes utilized this concept of "partial" electronic education. These classes included BVED 180 Introduction to Computer Information Systems at VCSU and CIS 1203 introduction to Computers at ASUMH. In both these courses, students were given an orientation in the use of Windows 95/98, use of E-mail,

and the World Wide Web within the first week of class (approximately 2 ½ hours). They were also introduced to online tutorials available for Windows, World Wide Web, MS WORD, MS EXCEL, MS ACCESS, and MS Power Point software packages. Two other courses in which email, the Internet, and shared network resources were used at ASUMH by the author were: CIS 2603 Internet Telecommunications, and CIS 1303 Funeral Science Information Systems. Most students who attended these classes had their own computers and modem/digital connections to the Internet from their homes. Those who did not have computers or access to the Internet used the college's computer labs to gain access to shared network resources of the college network, as well as the Internet.

As an experiment, the author used Top Class classroom management software for managing one class from Arkansas during the fall semester of 1998/9 to teach a sophomore level computer information systems class (CIS 280 Systems Development Methods) at VCSU. This was also a time when the author spent one year in Arkansas at Arkansas State University in Mountain Home, taking a year of absence from VCSU. Twelve students were trained in Top Class software in preparation for this online course. While all the instructions relating to the course were given online on a regular basis, the class met once a week with a substitute instructor at VCSU who coordinated and evaluated student performance in the class. Student activities on Top Class were visible to the author and the instructor at VCSU. Both the author and the substitute instructor at VCSU had full access to posting instructions including content material of the course and reviewing student assignment submissions.

Beginning in year 2000, VCSU adopted Blackboard CourseInfo for online classroom management. Although WebCT is still adopted by Access Arkansas project at ASUMH, some faculty members have started using [www.blackboard.com](http://www.blackboard.com) for online class management.

## **Discussion:**

The realities of electronic/online education in small colleges are significantly different from their counterparts, the larger universities. Most small colleges are still in initial stages of adopting and taking an active participation in electronic/online education due to limited budget availabilities for the acquisition of state of the art computer technology, absence of powerful communication lines connecting the communities in the areas they serve, and lack of trained computer/network professionals. However, the growing desire of the small colleges to be a part of the electronic/online educational process has enabled them to participate in a partially online/electronic educational system. This is true of both VCSU and ASUMH. The main emphasis of this partial/hybrid educational system is to make electronic/distance education available to students within the traditional campus-based educational system. The delivery of instruction in electronic media in these places only serves as an enhancement to the existing traditional instructional delivery system by enabling students to receive course material/instructions electronically/online even when they are unable to attend classes in person. The author's attempts to use electronic media for classroom management tasks, delivery of course-content material, and computer-

based tutorials for self-study of end-user skills are examples of efforts to enhance the traditional lecture method of teaching with electronic/distance learning methods.

Does it work? The ultimate goal of a novel method is to make the existing system better. However, a full-scale evaluation of the efficacy of electronic/distance education in small or larger colleges is not an easy task in the absence of systematically collected reliable data. Such an undertaking is beyond the scope of this paper. Nevertheless, based on his experience in teaching computer literacy courses at the introductory computer science/computer information systems classes in 5 different universities in the U.S. for 16 years, the author has the following observations to make:

1) The depth of course material (both conceptual and content) covered in introductory level computer science/computer information systems classes in most colleges has been systematically lowered during the past 10 years; teaching students to use popular applications packages like MS WORD, MS EXCEL, MS ACCESS, and MS Power Point has become the main emphasis of this course. A quick examination of the hundreds of different textbooks published by textbook companies for introductory computer science and computer literacy classes would bear testimony to this trend. Although such introductory level courses are still considered prerequisites for computer science and computer information systems majors, they do not provide a solid foundation for computer science or computer information systems major programs.

2) Since attendance in the classroom is not a requirement, absenteeism among students in partial/hybrid, distant/electronic classes has significantly increased. This is to be expected in an “asynchronous” learning environment, where an instructor and a student do not have to be synchronized in time and space. Such a situation has resulted in general frustration among hard-working and disciplined students who regularly attend classes and “expect their money’s worth from a 50 minute college-level course material” from a 50-minute lecture. For such students education is a competition, like a football game. They want to know how they perform and how they are rated in a class. In a partially electronic classroom where students’ presence/participation is compromised, a teacher (or a “guide on the side”) is faced with the challenge of having to find new methods of assuring and maintaining the quality of education. The author chronologically organized all e-mail instructions/messages sent to each class in shared folders of the college LAN in an attempt to help students cope with classes that they missed.

3) In general, students pay less attention to the instructor in a partially electronic environment, where the computer in front of them mostly absorbs their concentration. In a way, this is inevitable in a “hybrid-learning” learning environment where students would be engaged in sending and receiving e-mail or engaged in a chat room, while the instructor is addressing the class. Under the traditional system, computer laboratory work was strictly separated from learning concepts and theory, but with the emergence of partially electronic education, the lecture room has practically taken the shape of a computer laboratory in which the instructor himself has become a participant in using a digital device to communicate with the students in a class.



4) The average student's level of preparation before a class has drastically deteriorated. Some students are in the habit of occasionally showing up in the classroom in the hope of getting a passing grade at the end of the semester. Again, this is to be expected in a situation where some students are unable to fully engage in educational activities due to having to work full time outside of attending classes. A student taking a full-time credit load and doing full-time work with family responsibilities would certainly have less time to study and be less well prepared in any given learning environment. Although a partially online educational environment may enable these students to participate in the learning activities, whether they are able to fully utilize this opportunity has yet to be proven.

5) Judging by his own experience, the author believes that the level of preparation needed on the part of the instructor has diminished with the introduction of partial/electronic education. This too is to be expected in a classroom where students that are in attendance divide their attention between the instructor and the computer in front of them. Complex subjects that involve a deeper understanding and critical thinking would not be the perfect candidates to be taught in a partially electronic environment. At the end of winter semester 2000 after completing a junior level class CIS 330 Information Systems Management taught by the author, 8 out of 10 students responded to the following question in the affirmative: "if you were to take this class electronically would you have done it?" (responses appended)[8]. This semester-long class met twice a week from 7:30 A.M to 8:50 A.M had 14 students some of whom had perfect attendance and others who partially attended or never showed up in class. The course preparation besides attending lectures involved reading outside the textbook, participating in 4 guest lectures, and making presentations to the class. The course evaluation was based on several assignments, 2 exams, and a term paper. The author's observation is that students who did not find time to participate in the class did not read, study the material, learn, or understand the basic concepts of information systems management and did not care very much if they learned the material or not, so long as they received a passing grade for the course.

6) Top Class software package was used by the author to manage, communicate with, and partially evaluate the progress of class work of 12 students at VCSU from Arkansas. The students were exposed to an orientation on using Top Class software at the beginning of the semester. A new employee who learned Top Class management software on the job provided technical services for the courseware. Although the system worked smoothly to begin with, there were several occasions when the author and the substitute instructor who coordinated the class at VCSU had to trouble-shoot the workings of Top Class software on a regular basis. The students and the instructor/s found that the system was getting slower towards mid-semester: those students who were frustrated with the response time of the system abandoned it before the end of the semester. All course material loaded on this system was lost due to a hard-disk crash and unfortunately no backup was available for the author's Top Class class-material for subsequent use.

7) The author's experience with Web CT was limited to undergoing a training workshop in Arkansas. Web CT was introduced at ASUMH in addition to the Interactive Television

Network through Access Arkansas project in order that all colleges within the Arkansas State University System could communicate and make courses available electronically. However, after 3 years, this project has come to an end at ASUMH without much impact on distance/electronic education. Some faculty members are currently using Blackboard CourseInfo available for free on the Internet to augment traditional instruction delivery methods of teaching.

## **Conclusions:**

Although electronic media is novel and attractive, fully electronic/distance education may not provide the best educational environment or may not be suitable for every person preparing for higher education. This is evident from “Is distant education for me” questionnaires that most web-based distant education sites have for their potential students[9]. As for small colleges, implementing a truly electronic/distance or virtual education system is not economically or technically feasible. However, small colleges would stand to benefit from a properly planned partially distributed electronic/distance educational system. Identifying the most suitable courses for partially online delivery would be critical to such a planning process. The success of such planned action would ultimately depend on the quality of its outcome.

Although some online educators uphold the position that they trust that their online students are completing their assigned work, and not plagiarizing the work of others it is clear that quality assurance of online/partially online instructional delivery systems would present unprecedented challenges to both online and partially online educators.

The nature of electronic/distance education has a tendency to create a “learner centered” educational environment where the learner has to be self-disciplined enough to reap the benefits of the learning process. Small colleges participating in a planned partially distributed educational programs may provide just the environment for motivated self-learners who are unable to reach larger universities for their education. By entering into online educational alliances with larger universities, smaller universities/colleges may continue to preserve their campus-based undergraduate educational systems and at the same time, they would be able serve as “brokerage houses” for online courses developed by larger universities. Such an arrangement would enable smaller colleges to provide an enriched learning environment with enhanced student interaction and advisement for partially online students.

Although the small colleges are in a way “new kids in the online education block”, they are at an advantage of having the whole World Wide Web providing information on the success stories, as well as mistakes made by online educators in implementing online systems. With limited resources available, small colleges would be better off aligning with successful educational partners as “brokerage houses,” than trying to create their own online courses. Such an attempt would enable them to preserve their campus-based traditional educational systems and provide them with the opportunity of making online courses available to local students, advise them, and monitor their progress within their

individual campuses. The role of faculty members in such “brokerage houses” would perhaps be somewhat different from that of the traditional pedagogical institutions of higher education.

The implementation of online/electronic/distance education both in terms of material and human resources has proven to be extremely expensive.[10] The early adopters who have developed online courses have spent enormous number of hours in front of their computers learning computer software, producing course material, and testing them. While some promoters of online education have implemented fully Web-based online courses, others have introduced Web-assisted courses. Other university systems in some states, have formally adopted classroom management software packages like Web CT and Blackboard CourseInfo and made professional training available to faculty members that are interested in developing online courses using such packaged software. In a way, all these are systematic attempts by different higher education institutions to improve quality and standards of higher education through unified and coordinated planning efforts. However, so far there is no unequivocal evidence proving that online/electronic education is as effective as the traditional methods of education. Perhaps, such a comparison may be unwarranted when the role of online education is to supplement the existing educational system rather than replace it.

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8. see Appendix
9. A sample survey can be found at:  
[http://www.umuc.edu/distance/de\\_orien/dequiz.html](http://www.umuc.edu/distance/de_orien/dequiz.html)
10. <http://chronicle.com/free/v47/i23/23a04101.htm>

## APPENDIX

### Student Responses

*CIS 330 Information Systems Management taught by the author, 8 out of 10 students responded to the following question in the affirmative: "If you were to take this class electronically would you have done it?"*

1. Yes- On-line is taking the class over the Internet from home. I would like that because, I missed so many classes the way I was already. Most of what I learned was from doing it on my own anyway. It would rid my feeling of guilt for missing so much class and I feel more comfortable learning on my own.
2. Yes-I would take this class on-line. The class was only two days a week and I had another class the same time, which was four days a week. I feel I could have learned satisfactory reading on my own.
3. I think that I would not take the class on-line. The only thing that I could see that may become a problem and that would be in making sure I would be able to connect to the network. Also I feel that not coming to class a student in class would not have the personal attention in class. They would have to find their time to talk to the professor if the class was offered on-line. So I feel that if the class was offered on-line I would not take it that way.
4. Yes-I would take the class on-line. The reason I would take it on-line is because if you live out of town you don't have to get up early drive to town for one class and then drive back home again. Plus, if the weather is bad you can still do your class work. It is easy and helpful to people who have children, especially if they are sick.
5. Yes, I would take this course on-line, because this is an information technology class and we should be trying to do things using the technologies available.
6. First off, I agree with you that VCSU has a very stupid "on-line" course system. If the course was truly offered on-line as in world wide, then I would take it. I wouldn't have to leave my house and could attend class in my pjs. I like that idea. Also I think there would be more to learn on-line, with various companies, etc. I do believe, however, that there is a negative aspect to it all. That is laziness, however, if a student is lazy about it they deserve the grade they get.
7. If I was given the chance of taking this course on-line or in a classroom setting. I would take it on-line just because it is a great new experience. The only advantage that I would see is that you can stay home and still participate in the class.
8. Yes, I would take the class on-line if we would not have to come to the class room. If we have to be in the classroom at a specific time it is rather pointless to be on-line. The class would go well as an on-line class I believe because there is not much practical exercise part to the course.
9. I think taking the class on-line would be great. I think weekly quizzes would be a good idea for on-line. A lot of this stuff is reading and going over yourself but the class should still meet once or twice a month to keep every one on the same track. If this class wasn't 7:30 in the morning it would make me happy.
10. I would rather take this class in the regular "class room" setting. I feel that I have learned many things from Dr. J during class room discussions.