
Distance learning: An empirical study

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Abstract

Distance learning (DL) is a popular option in higher education. Information technology (IT) has made education more available for students without regard to location or time. Universities are now offering online degrees at all levels. This study presents an empirical investigation designed to identify some advantages and disadvantages of distance learning. Ninety students from seven different courses at two various universities took part in this investigation. The study supports that online teaching could be more than 35% of the total credit hours in a graduate program. Also, the study supports that online teaching has gone too far. The study suggested four hypotheses which were tested using a series of t-test. The author hopes that this paper provides valuable insights into application of distance learning and educational design as an important part of an academic's routine activities.

Keywords: Online Learning, Information Technology (IT), Distance Learning (DL), Advantages, Disadvantages, Management in Education.

1. INTRODUCTION

Online learning is being introduced as a primary part of the student learning experience in higher education. It is no longer core business only for those universities with a mission for distance education, Its affordances are being systematically integrated into the student learning experience by predominately campus-based universities (Ellis, et al., 2009, McLinden, et al., 2010). Online distance learning has attained a degree of acceptance in many work environments, mainly in the government, high-tech segments and academia. For a variety of reasons, online learning is an attractive option in higher education (Hollenbeck et al., 2005; Bennett et al., 2009, Cheng, 2008, Donal et al., 2009).The technologies behind successful e-learning programs are no longer considered new or untested; they have been in existence for decades. The newest generation of distance learning tools relies mainly on personal computers and the Internet to distribute high volumes of educational materials over long distances. The future of e-learning looks promising, but it may not be a solution for all organizations. E-learning, also known as online

distance learning can be defined as any curriculum delivered to a student separated by time or space from an instructor. The utilization of information technology (IT) removes a number of the defects related with traditional correspondence education: namely, the lag in communication between instructor and student, the high cost of shipping learning materials, and the ability to rapidly and effectively modify teaching materials to reflect changes in the learning environment or syllabus. Online distance learning still accounts for only a small percentage of courses in academia and corporate and government training courses, but the potential for growth is great as more organizations begin to realize the potential savings and ability to reach a wider audience. Distance learning is used interchangeably with on-line learning, web-based learning, computer-based learning, and E-learning. E-learning covers web-based learning, digital collaboration, and virtual classrooms and the delivery of content via the Internet. Distance education is not a new concept. As Christner (2003) indicates, distance education was known as far back as the mid-19th century when it was referred to as "correspondence courses". However the

information technology revolution has allowed universities and potential students to pursue distance education to a degree. New delivery technologies in terms of networks and computers have contributed to this process (Moore, Kearsley, 1996). There are numerous differences between e-learning and traditional learning. Besides the delivery method, e-learning can be self-paced, live, or a combination of both. It can also be performed independently or in a group setting. Regardless of the methods or modes, e-learning give organizations alternatives to in-house training. Many businesses select e-learning options because of the cost savings which result from eliminating travel costs and instructor fees. Therefore, it is important to investigate the advantages and disadvantages of online courses in order to assess the positive and negative impacts of the online educational environment. The purpose of this study is to determine the advantages and disadvantages of online courses to see differences in levels of satisfaction by students regarding face to face teaching versus online teaching.

2 RESEARCH QUESTIONS, METHOD, AND LIMITATION

The research presented here draws upon social system theory in the functionalist sociology defined by Burrell & Morgan (Burrell, Morgan, 1979). This paper approaches its subject matter from an objectivist perspective. The research presented here is based on the "holistic view" school (Social System Theory). The author has direct experience with some of the advantages and disadvantages of online learning and the role that it is playing in higher education today. The research approach is based on a literature review and the author's experiences as a CIS/MIS/IT professor at various universities.

2.1 Questions

Some of the research questions (RQ) and hypotheses (H) are as follows:

RQ-1: What are the advantages and disadvantages of online courses?

H1: The main advantage of online courses is flexibility and allows working at any time and location.

H2: The main disadvantage of online courses is no face to face contact with instructors and others.

RQ-2: How should be the online courses within a program?

H3: Online teaching could be more than 35% of the total credit hours in an under graduate or graduate program

H4: Has online teaching production gone too far.

2.2 Methodology

The objective of this study was to find out about the advantages and disadvantages of distance learning (DL). A questionnaire was designed based upon the concepts of distance learning advantages and disadvantages. The survey was approved by the institutional review board at the institutions. The first version of the questionnaire was comprised of 22 questions and the second version of the questionnaire was comprised of 26 questions. Some of the questions were designed as open-ended questions. The questionnaires were pre-tested by some students before sending them out. The first version of questionnaire was sent out to forty six MBA students taking an online course, Management Information Systems at university Y (see Table-1). For the purpose of confidentiality, the name of university is not disclosed.

The second version of questionnaire was sent out to forty four students taking five different online courses at university Z (see Table-1). For the purpose of confidentiality, the name of university is not disclosed.

An earlier version of similar study was published in 2008. Based upon the feedback received, the second version of the questionnaire was produced. The answers they provided were confidential and did not affect their course performance/grade in any way. Participants were not required to identify themselves; the name of the respondent on the questionnaire was optional. Over 85% of the students who participated in the study had full time jobs. In total 66 questionnaires out of 90 questionnaires (73%) were returned. After collecting the questionnaires, the author analyzed each question from each respondent and summarized the data in almost thirty tables.

2.3 Limitation

As with any research, this study has limitations. The data were obtained in seven online courses which had ninety students (see Table-1). Furthermore, the questions in this

study focused on the concept of advantages and disadvantages of e-learning. Further studies might identify additional factors related to the pros and cons of distance learning.

3. CONCEPT DEVELOPMENTS

3.1 Advantages:

3.1.1 Learn more, faster and location free-24/7

Distance education has been in existence for a very long time. The medium has changed from paper and pencil correspondence courses to real time Internet courses. Considering the information technology in real-time Internet courses has provided the opportunities for students to learn more and faster (Cookson, 1989; Galusha, 1997). Online education is ideal for non-traditional students who may be working full-time and cannot take face to face courses. Unlike traditional universities, online learning can be worldwide and location free. For most on-line courses, all a student needs is a computer and Internet access. Education is therefore available to nearly everyone in any location. There are many universities which believe in this philosophy. Because online classes are real time, they allow people to go home from work, get on the computer, and work on their course assignments regardless of the time of day.

3.1.2 Lower cost and additional university income

The universities which offer online degrees are able to reach students throughout the world. Traditional teaching services may no longer be required. The university certainly raises its income by adding more and more students to class rosters. A traditional single class could have 20 or 25 students whereas online class can have 50 or more students. This improved enrollment increases the tuition base generated by the university. Many universities today are faced with financial problems. State funding is limited so offering online courses reduces the overhead cost and increases the university's income. With declining funding joined with improved enrollment, some faculties are being asked to increase output. There is no doubt that on-line education is more cost efficient for universities. A university may add more students to the online course while maintaining or even decreasing the number of faculty needed to provide the required services. Brick and mortar may not be really needed for online education. Therefore universities can close buildings, reducing air

conditioning, maintenance, heating, security, and other similar costs (Moore, Winograd, Lange, 2001; Shaw, 2006). The universities which offer online degrees may, however, require a greater investment in technology support.

3.1.3 Bring disparate students from anywhere

Key changes have taken place in higher education institutions that have led to significant transformations in their practices and policies. For example, the UK has experienced growth and diversification in its higher education systems. Student bodies are now comprised of students from a wider range of ages, backgrounds and qualifications, and also from groups traditionally disadvantaged - ethnic minorities and people with disabilities (Ashwin, 2006). This growing demand for higher education placed colleges/universities in a new situation where they needed to respond to the needs of the new student body, considering limited funding, in order to be able to succeed (Jara & Mellar, 2007). Considering the large body of potential students, the variety of the student body is possibly much greater than what is normally found in a traditional class. This diversity contributes to improved discussions and enhances the number of ideas and perspectives examined when looking at a given topic. This leads to increased learning for all of the students as the material is viewed and analyzed in the class from the various experience bases (Moore, Winograd, Lange, 2001; Draves, 1999). Generally public universities in many states have a service area assigned to them by authoritarian bodies. Within this service district the university draws most of its student body and provides educational services to people inhabiting this region. By providing on-line education, schools are no longer limited to their geographical service district. In other word, the school can offer its services to the citizens of the state that provides the volume of their funding while reaching beyond its borders. Online courses present registration possibilities to individuals located anywhere in the world making the service district much bigger (Moore, Winograd, Lange, 2001; Kearsley, 2000; Draves, 1999).

3.1.4 Undesirable weather, latest IT, force interaction, take breaks

Online education provides both faculty and students the ability to work at home if the weather is not favorable for commuting to

schools. Some people are not early morning persons so they have difficulty taking an early morning course. Many students have this problem, i.e., they do not like early morning classes and their learning is not efficient because they are sleepy. With online course this is not an issue. Online courses provide both student and faculty with the option to utilize the latest in technological educational advances as part of the class pedagogy. As the courses are Internet based, it would be logical to look for methods of instruction that profit from information technology. For example, an online course may include video clips and appropriate Internet site links.

One of the important learning practices in any class, is student discussion. As mentioned above, the faculty member needs to ensure that students are involved in this process. There are students who will avoid speaking out and the typical lecture discussion approach lets students hide even as they are sitting in the class room. Discounting the fear reason, there are simply some students who prefer not to involve themselves in the dialog. By using information technology, a professor can assess exactly who is and who is not participating in course activities. (Draves, 1999; Palloff, Pratt, 2001). By taking an online course one would gain a certain level of computer expertise. The more a person uses the computer, the more comfortable one becomes with the computer as a tool. It has been accepted that literacy rate contributes to a higher standard of living in a country. So online learning improves the computer literacy rate of individual in a country thereby leading to improvement of the living standard. By taking online course, both the professor and students have more opportunities to manage their breaks within the period of the course time (see Table-2).

3.2 Disadvantages

3.2.1 Face to face interaction

One of the main traits commonly sought by employers is the ability to communicate with other people. Online learning usually does not allow for the development of face to face interaction. Ability to state ideas clearly and the verbal skills are also important for the successful manager. More, presentation skills are also often required in the work place. Those talents are included in an on-line course. However, this author asks his online students to take the final exam and present group presentations in the traditional manner.

Conflicts among participants are not a big issue in online courses, because of minimal interaction between participants. Online learning may provide interaction with the use of chat rooms, discussion board and emails. Problems may arise, though, when trying to comprehend the personalities of the group's members if the only method of communication is computer! In a face-to-face course, student interaction can improve the learning effect for them. One student may describe what a particular phenomena means while the other can explain how something works. While other students did not know both answers, now they understand both. This kind of learning experience is not promising in an online course.

3.2.2 Complex concepts, feedback issues, interruption, computer fail

In online course you are not able to see your audience. So online learning does not permit for full feedback. Having a rich feedback helps to have an effective communication. Words can have various meaning to different people and they may have disparate meaning in various context. Verbal feedback with face to face communication can convey a very rich message along with our feelings. This lack of visual feedback can reduce the learning objective that takes place in the course.

One of the main tasks of a professor is to give details of a concept and material in a way student can understand. There are concepts that are rather easy, while others are more complex. Explanations frequently lead to more questions which in turn offer more questions. It is like an academic debate! There may not be a complete answer while there can be several inexact answers. What makes one answer better than the other one? It is the job of the professor to step in and guide students in making the best conclusion. The computer cannot replace the human element in this process. One may not be able to do these activities in an on-line course.

With an online course, the students still have all of the family duties and responsibilities. While the student is working at home on online course, someone may call on the cell phone or the doorbell rings. This can lead to distractions from the learning process. Computers are machines; they are not without drawbacks. Experience has shown that they will fail whether due to hardware failure, software failure, viruses or other issues. Online learning

depends on this machine. Once they (servers) fail, it can lead to interruption of the course for some period (see Table-2).

4. RESEARCH FINDINGS

4.1 Data collection

The questionnaire was pre-tested by two MBA students and refined after the pre-test. Questionnaires were sent out via email to all 90 students who took those courses listed in Table-1. The online courses were conducted on diverse platforms such as WebCT (powered by Blackboard also), Blackboard, D2L and Coursecompass (powered by Blackboard) provided by Person Higher Education. Previously the author taught the same courses for numerous universities both face-to-face (past 16 years) and online. One course (MIS-Summer-2007) was not delivered 100% online. The lectures, quizzes and cases were conducted online. But, the orientation session, mid-term and final exams were delivered on campus; those sessions were mandatory. Sixty six (73%) questionnaires were returned. See Table-3.

4.2 Data analysis

Question six focused on advantages of an online course for MIS. The respondents had to rank the advantages by choosing "1" as the biggest advantage and "5" as the smallest advantage. The author used weighted scoring technique against those criteria (advantages) in the following table to find the biggest advantage. The 8th row in the following table shows the weighted score (WS). In order to obtain the weighted result (WR), this formula ($WR = R_x * WS_x$) has been used where x is the referred to related WS number in the column. As the last column, Total Weighted Result (TWR) in Table-4 shows the best advantage of online courses is "Flexibility" from the student's perspective. The next best advantage is location free ("Can be taken at home or work").

Before the findings of this study, the author as well as many of his colleagues anticipated the cost issue as one of the main advantages. But, the study showed that cost issue is the least important advantage from student perspective; it may be different from the educational institution's point of view.

Next, students were asked to rank the disadvantages of a MIS online course using a similar scale. The same weighted scoring technique was applied and results in Table-5.

The author used weighted scoring technique against those criteria (disadvantages) in the following table to find the biggest disadvantage. The 8th row in the following table shows the weighted score (WS). In order to obtain the weighted result (WR), this formula ($WR = R_x * WS_x$) has been used where x is the referred to related WS number in the column. Last column shows, Total Weighted Result (TWR). From the student's point of view the biggest disadvantage of online courses is "there will be no face-to-face contact with other participants and speakers " followed by "not having constructive feedback on complex concepts" and "more interruptions while taking the course online rather than interruptions in the classroom".

Question twenty three asked whether some online schools become degree producers. As Table-6 shows 75% agreed. Only 25% responded negative. This indicates that the perception about online degrees is not positive among students. This may be true for applying a job with an online degree.

Factors	#	%
Yes	21	75
No	7	25
Total	28	100

Table-6: Online schools become degree producer

The next question was directed at whether online teaching production gone too far. As Table-7 shows 75% disagreed while 25% reported agree.

Factors	#	%
Yes	7	25
No	21	75
Total	28	100

Table-7: Shows if the online teaching gone too far

Question twenty five was directed at how the online diploma prestige is compared with non-online degree. As Table-8 shows 43% responded little difference while 36% reported no difference at all. Only 14% responded very much difference.

Factors	#	%
No difference at all	10	36
Very much difference	4	14
Little difference	12	43
Other	2	7
Total	28	100

Table-8: Shows the online diploma prestige

The last question asked what should be the percentage of online courses within an undergraduate/graduate program. As Table-9 shows 39% reported 100% while 18% responded less than 75%. Only 25% reported less than 25% and another 25% responded less than 50%.

Factors	#	%
Less than 25%	5	25
Less than 50%	7	25
Less than 75 %	5	18
Online 100%	11	39
Total	28	100

Table-9: Shows the percentage of online courses

5 HYPOTHESES TESTING AND RESULTS

In order to test the hypothesis and hence answering the research questions of this study a series of t-test were conducted.

H1: The main advantage of online courses is flexibility and allows working at any time and location.

Based upon the facts extracted from Table-4, one may do the Chi square test using the following formula:

$$x^2 = \sum \left[\frac{(f_0 - f_e)^2}{f_e} \right]$$

Source: Lind, D.A., Marchal, W.G., Wathen, S.A, p.642

With k-1 degree of freedom, where

K is the number of categories,

f_0 is an observed frequency in a particular category,

f_e is expected frequency in a particular category (= 176.8),

$\alpha = 0.05$,

df= 9.488 (using table critical value of Chi square),

H_0 : Neutral response, i.e., there is no differences in advantages of online teaching, and

H_a or H_1 : Non-neutral (some have higher responses than other), i.e., the main advantage of online courses is flexibility and allows working at any time and location. After inserting all values in the formula then, $x^2 = 202$, as the value of 202 lies in the region to right 9.488, then H_0 is rejected at the 0.05 significant level in favor of H_a or H_1 , i.e., the data support H_1 . So, one can conclude that the main advantage of online courses is flexibility and allowing work at any time and location.

H2: The main disadvantage of online courses is no face to face contact with instructors and others.

In this case (facts extracted from Table-5) we may do a similar test, i.e., Chi square test, with

$f_e = 188.6$,

$\alpha = 0.05$,

df= 9.488,

H_0 : Neutral response, i.e., there is no differences in disadvantages of online teaching, and

H_a or H_2 : Non-neutral (in this case some have smaller differences), i.e., data support H_2 . So, the main disadvantage of online courses is no face to face contact with instructors and others. After inserting all the values in the formula then $x^2 = 35$, as the value of 35 lies in the region to right 9.488, then H_0 is rejected at the 0.05 significant level in favor of H_2 , i.e., the data support H_2 . So, one can conclude that the main disadvantage of online courses is no face to face contact with instructors and others.

H3: Online teaching could be more than 35% of the total credit hours in an under graduate or graduate program.

In this case, based upon the facts from Table-9, one may conduct a test of hypothesis for a proportion, using the following formula:

$$z = \frac{p - \pi}{\sqrt{\frac{\pi(1 - \pi)}{n}}}$$

With \bar{x} (mean) = 7,

π (0.35) is the population proportion,

p (0.571) is the sample proportion, (p is calculated by weighted average, for example regarding the first row in the Table-9, the average would be 12.5, then multiply it by 5. Do the same for all the rows and add them up and divide it by n),

n (28) is the sample size,

α is 0.05,

the z (critical value) value is 1.96.

$H_0: \pi = 0.35$, and $H_3: \pi > 0.35$.

After inserting these values in z formula and compute the value of z , obtaining $z = 3.890$.

As the value of 3.890 lies in the region to right 1.96, then H_0 is rejected at the 0.05 significant level, i.e., the data support H_3 . So, one can conclude that online teaching percentage in any graduate program could be more than 35% of the total credit hours of the curriculum.

H4: Has online teaching production gone too far.

Based upon the facts in Table-28, one may do the Chi square test using the following formula:

$$x^2 = \sum \left[\frac{(f_0 - f_e)^2}{f_e} \right]$$

With $k-1$ degree of freedom,

K is the number of categories,

f_0 is an observed frequency in a particular category

f_e is expected frequency in a particular category (= 14)

$\alpha = 0.05$

$df = 3.841$,

H_0 : neutral response, i.e., there is no differences in online teaching production, and
 H_4 : non-neutral, i.e., online teaching production has gone too far. After inserting all the values in the formula then $x^2 = 4.14$, as the value of 4.14 lies in the region to right 3.841,

then H_0 is rejected at the 0.05 significant level in favor of the H_4 , i.e., the data supports the alternative hypothesis. So, one can conclude that online teaching production gone too far.

6. CONCLUSIONS AND DISCUSSION

Online learning permits educators and students to exchange ideas and information, work together on projects, around the clock, from anywhere in the world (Hiltz,1994; Albert, D. et al, 2008, McLinden, M. et al, 2010). This study has discussed several advantages and disadvantages regarding online learning in the higher education environment as supported by research findings. The online learning environment is just another learning environment, in some ways similar and in some ways different than traditional classrooms. As we develop the environment, we adjust our teaching methods. This is true for online learning. It is evident that substantial growth has been seen in the whole world, by the number of institutions offering complete studies or courses via distance learning (Mateo and Sangra, 2007; Allen & Seaman, 2007). This was supported by the results of this study. The real question is how far can we go with online learning? Would you go to a physician that received an online MD degree? Would you employ a computer programmer that received an online degree? Would you go to a school whose professors/teachers have received online degrees? These questions were investigated by this study. I leave the answer to you, but one should consider the findings of this study. According to a report by the Sloan Consortium, online registrations nationwide are increasing (Allen & Seamon, 2006). This tendency is the fastest and most significant trend impacting enrollments in higher education today. From the author's point of view, there is no doubt that we should use online learning in higher education. This was supported by the findings of this study both from descriptive and inferential analyses. More, the online teaching may be used successfully for general corporate training exercises and advanced career-specific educational advancement. The question is how many courses (or percentages) within an undergraduate/graduate program? The study showed that it could be more than 35% (see H_3). Theory is important for researchers. Researchers who proceed without theory rarely conduct top quality research. Concepts are the main building blocks of theory (ST, 2006). This study presented a lot of data related to

distance learning (DL) which can be used for further research and concepts development. One may use the findings of this study for developing a conceptual model for distance learning. In addition, considering the findings of this study, this paper provides valuable insights into the notation of educational design as an important part of an academic's routine activities. Another direction for future study is to collect more data from more online courses from various universities to further validate the advantages and disadvantages. One may say that this is a kind of ongoing research as the IT advances.

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Appendix

No	Course Title	S	Term	No. of students	UN	G	UG	QT
1	Virtual Business	1	Spring-09	4	Z	yes		V2
2	Virtual Business	2	Spring-09	13	Z	yes		V2
3	MIS	1	Fall-08	11	Z	yes		V2
4	MIS	1	Summer-08	29	Y	yes		V1
5	System Analysis	1	Fall-08	11	Z		yes	V2
6	MIS	1	Spring-09	5	Z	yes		V2
7	MIS	1	Summer-07	17	Y	yes		V1
Total	7			90				

Table-1: Shows the Basic Information

- S = Section
- UN = University Name
- G = Graduate course
- UG = Undergraduate course
- QT = Questionnaire Type
- V1 = Version-1 (Appendix-A)
- V2 = Version-2 (appendix-B)

Factors	Advantages	Disadvantages
Location free	X	
Lower cost	X	
Additional university income	X	
Bring disparate students	X	
Bad weather	X	
Latest information technology	X	
Force interaction	X	
Any time take break	X	
No face to face interaction		X
Complex concepts		X
Feedback issues		X
Interruption		X
Computer Failure		X

Table-2: Advantages and Disadvantages

Factors	#	%
Total questionnaires returned	66	73
Total questionnaires not returned	24	27
Female students	33	37
Male students	57	63
Undergraduate participants	11	12
Graduate participants	79	88
University Z participants	44	49
Returned questionnaires from University Z	28	67
University Y participants	46	51
Returned questionnaires from University Y	38	83

Table-3: Data about Returned Questionnaires

Factors-Advantages	R*1	WR	R2	WR	R3	WR	R4	WR	R5	WR	NA	TWR
Flexible and allows to work at own pace and rhythm	46	230	13	52	0	0	1	2	2	2	4	286
Can be taken at work or at home	20	100	20	80	13	39	3	6	8	8	2	233
Will have clearly defined objectives and content	5	25	16	64	14	52	17	34	8	8	6	183
Can learn much more and faster	8	30	12	48	13	39	18	36	10	10	5	39
Lower cost	5	25	9	36	13	39	11	22	21	21	7	143
Others	0	0	0	0	0	0	0	0	0	0	0	0
Weighted score (WS)	5	-	4	-	3	-	2	-	1	-		-

Table-4: Shows data related to advantages

R^* = Rank

NA= Not Applicable

TWR=Total Weighted Result

X= Related Column

Formula: $WR = R_x * WS_x$

Factors-Disadvantages	R* 1	WR	R2	WR	R3	WR	R4	WR	R5	WR	NA	TWR
There will be no face-to-face contact with other participants and speakers	31	155	12	48	4	12	5	10	11	11	3	236
Will be frustrating to take considering the current state of hardware/computers in my office or at home	9	45	4	16	9	27	7	14	32	32	5	134
Will not provide constructive feedback on complex concepts	13	65	27	108	6	18	9	18	7	7	4	216
More interruptions while taking the course online rather than interruptions in the classroom	11	55	9	36	18	54	14	28	10	10	4	183
More time constraints on online quizzes and tests	12	60	6	24	17	51	14	28	11	11	6	174
Other	0	0	0	0	0	0	0	0	0	0		0
Weighted score (WS)	5	-	4	-	3	-	2	-	1	-		-

Table-5: Ranking of Disadvantages