

VIRTUAL UNIVERSITIES — FUTURE IMPLICATIONS FOR STUDENTS AND ACADEMICS

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Abstract

Virtual Universities, or as many term them 'virtual learning environments', have taken the education world by storm. However, because this learning approach is so new, little study has been conducted on the implications that this phenomenon will have for students and academics who study and teach in this environment. Harasim and Teles in Harasim, Hiltz, Teles, and Turoff (1995), suggested that the aim of virtual universities is to provide totally online course delivery through the use of computer networking. By researching this topic, through a critical review of existing literature and case study research, this paper highlights important issues associated with the advantages and disadvantages associated with virtual universities. This paper also provides the reader with practical and useful guidelines to follow when undergoing the transformation from traditional university, to virtual university. Lastly, this paper provides a discussion of future implications that the benefits, problems, and guidelines have for students and academics.

Introduction

Virtual Universities are one of the latest forms of 20th century education. However, because this learning approach is so new, little study has been conducted on the implications that this phenomenon will have for students and academics who study and teach in this environment.

A background on virtual universities

It has been suggested that the aim of virtual universities is to provide totally online course delivery through the use of computer networking (Harasim and Teles in Harasim, Hiltz, Teles, and Turoff 1995). The Virtual University can be said to be a multimedia network learning environment that differs from more traditional learning environments in that it is customisable. It has been suggested that it is this customisation, achieved through tailorable education environments and with the use of special education tools, that distinguishes virtual university software from the more generic networking systems, like computer conferencing or communication tools on the Internet (Harasim et. al. in Harasim et. al. 1995). According to Harasim et. al (in Harasim et. al. 1995), virtual universities support the design and delivery of courses and programs for any form of post-secondary education, which could include university degrees, corporate education, professional development, and work place training.

Leidner and Jarvenpaa (1995), suggest a similar definition. They state that the vision of any form of virtual learning environment (ie. a virtual university) is to: redraw the

physical boundaries of the classroom; enable more teamwork; allow learning to be a continuous time-independent process; and to enable multilevel, multispeed knowledge creation through the use of information technology. There are several other views of what a 'Virtual University' is, however the definitions mentioned above are the most appropriate terms for this paper as the case study site mentioned in this paper defines its own environment in a way similar to the definitions provided above.

A critical review of virtual university literature has revealed that there are many different terms associated with virtual universities. Virtual universities are also known as virtual teaching/learning environments, online teaching/learning, web based teaching/learning environments, virtual learning communities, and flexible learning environments.

Existing literature from the virtual university field has identified some research issues associated with the transformation from a traditional classroom-based university to a virtual university. Some of these issues include:

- The effect that the introduction of virtual universities has on the learning approach.
- The effect that virtual universities have on academic research.
- The effects that virtual universities have on the knowledge base of students.
- The effect that virtual universities have on the required skill set for academics.
- How virtual universities change the role of the traditional student and academic.
- The advantages of virtual universities.
- The disadvantages associated with virtual universities.
- Guidelines that universities should follow when transforming to a virtual university.

However, it is important to note that current literature does not provide a very deep understanding of these issues, but tends to only acknowledge that they exist. Although all of the issues mentioned above are extremely important, this paper will focus on addressing the advantages, and disadvantages of virtual universities, as well as propose guidelines for educational institutions to follow when transforming to a virtual university. This is because it is important that universities gain an awareness of both the positives and negatives of virtual universities before they transform from a traditional to a virtual learning environment. It is also important for education designers to be aware of certain guidelines that they should follow in order to decrease the potentially detrimental impact of any, and enhance the advantages associated with virtual universities. Therefore, the purpose of this paper is to identify the advantages and disadvantages associated with the transformation from traditional university, to virtual university.

This paper will also identify and discuss the implications of the advantages and disadvantages associated with virtual universities. Lastly, this paper proposes some practical guidelines to follow when undergoing this transformation. These research issues will be addressed through a critical review of existing literature, and through the use of data collected via case study research.

This paper is broken down into four sections. Section one identifies the research methodology for this paper. Section two identifies the advantages and disadvantages of

virtual universities, according to existing literature. Section three discusses the case study findings in relation to the advantages and disadvantages of virtual universities. Lastly, section four proposes practical guidelines that universities can follow when transforming to a virtual university.

It is important to note this paper does not aim to make any assumptions about educational design. This paper has been written purely from an information technology perspective.

Research methodology

The focus of the research for this paper has been on answering three questions:

1. How do students and academics benefit from the virtual university?
2. What kinds of problems are associated with virtual universities, and what are their future implications for students and the academics?
3. What guidelines should universities should follow when transforming to a virtual university?

In order to provide answers to these questions, two forms of research have been conducted: (1) a critical review of existing literature, and (2) case study research.

Case study background

The data collected for this paper was originally compiled for the purpose of identifying how the level of perceived usefulness reflects the level of information systems “Use Quality” in an Internet based Information System. However, the data collected has been utilised in this paper to explore the issues associated with virtual universities. The case study research site, Logan Campus (which is a new campus of Griffith University), opened at the beginning of this year, currently there are 474 students enrolled (Anderson 1998). The Logan Campus has a unique learning environment compared to the other campuses of the university, which have more traditional learning environments, as it has adopted a flexible learning environment (the differences between traditional and flexible learning environments are discussed later on in this section).

Four students (out of a total of 237) and four academics (out of 41) from three faculties were interviewed (Anderson 1998). Findings from the larger case study have revealed that the Logan Campus students and academics perceive the flexible learning environment as an environment that facilitates ‘flexible’ learning practices, meaning that the physical classroom is no longer the centre point of learning, and learning itself has become a time-independent process (Anderson 1998). This environment also facilitates multilevel, multispeed learning processes through the use of information technology. As part of these “flexible practices”, Logan Campus has implemented a web based learning tool which essentially embodies all of the criteria of a virtual university environment. Although many of the learning and teaching processes are similar to those at a traditional university, like the presence of an academic (or lecturer) to facilitate learning, and the use of computer technology and the Internet, there are some major differences as well. Firstly, flexible learning at Logan Campus means that all subject and course material is available online to students at the start of the semester, as academics are required to

develop this material about six months prior to the start of the semester. Secondly, there are no lectures or tutorials at Logan Campus, only weekly workshops which are not compulsory attendance. These workshops are similar to traditional tutorials in format and presentation, however, class contact time is minimal, meaning that it is not unusual for workshops in some subjects to be held only once a month. Teacher-dominated forms of teaching, where the emphasis is on covering considerable amounts of content in a given time, are discouraged at Logan Campus. At Logan Campus, the students' primary source of learning is through interactive, web based classes, and online class activities. Communication with peers and lecturers is primarily through electronic forums and notice boards, and e-mail. Based on these distinct learning and teaching characteristics, the flexible learning environment at Logan Campus can be said to reflect many aspects of a virtual university.

The unit of analysis for this case study was at the micro level, which means that the individual academic staff and students were studied and interviewed. Eight interviews in total were conducted. Two academics, and two students from the Computing and Information Technology faculty, one student and one academic from the Business faculty, and one academic and one student from the Nursing faculty participated in an interview session. The data used in this paper was originally collected to answer the larger research question: "Does the level of useability of an Internet based information system reflect the level of IS Use Quality?" However, the results of the questions on flexible learning have been utilised in this paper, as the students' and academics' perceptions about flexible learning can be analysed from a virtual university perspective.

Advantages and disadvantages of the virtual university according to existing literature

A critical review of existing literature on the virtual university and web based teaching disciplines has revealed that whilst the suggestions the authors make are well argued, many have based their main arguments solely on anecdotal evidence, whilst only a minimal number of authors have actually conducted case study, or survey research. Table 1 identifies the key advantages and disadvantages of the virtual university, according to existing literature.

Table 1: Advantages and disadvantages of virtual universities according to existing literature [Ahmad et al. (1998), Harasim et al. (1995), Ives et al. (1996), Janicki et al. (1998), Hadidi et al. (1998), Baldwin et al. (1998), Chao (1998), Mamaghani (1998)]

ADVANTAGES	DISADVANTAGES
Learning is time and geographically independent, and hence more flexible.	Faculty members must relearn their teaching and research processes.
Students actively participate in the learning process, and have more control over their learning.	Faculty members must learn to use the technology (eg navigate the Web, use the Web to enhance interaction with students)

Lower costs to students.	Academics need more time to develop subject material.
Access to current materials.	Limitations in time, and knowledge of the technology could impact on the completeness, and correctness of subject material.
Increased retention of knowledge.	Learning barriers can be created through hardware malfunctions, remote dial-in access problems, and heavy traffic on the Web.
Learning becomes more individualised, and hence suites the needs of all students.	Limited university funds could restrict the virtual university's teaching and learning environment.
Increased interaction and collaboration between students and academics.	
Students develop more independent learning skills.	
Provides students with more accessibility to peers and academics	

Advantages

Ahmad et al. (1998) conducted a critical review of existing literature on virtual learning environments (ie. virtual universities). They also conducted research on the implementation of a web based virtual learning environment that was created to offer an IT course to undergraduates in a business degree at a large American university. Although the purpose of this paper is unclear, it appears that it was written in order to provide comments on the advantages that this environment has provided to staff and students. According to Ahmad et al. (1998), virtual learning environments offer a wide range of advantages over traditional environments, including convenience, flexibility, lower costs, access to current materials, increased retention of knowledge, and elimination of geographical boundaries. Ahmad et al. (1998) also suggest that the virtual university enables students to learn 'any time' at 'any place'.

Harasim, Hiltz, Teles, and Turoff (1995) have compiled a book on 'learning networks'. The book discusses different styles of computer networking for educational purposes, and includes a comprehensive section on online learning and virtual universities. The authors have been able to identify several advantages associated with virtual universities, based on previous research evidence. Harasim et. al. (1995) imply that virtual universities expand the time, place, and pace of education, and enable learning to become more individualised, and emphasise interaction and collaboration between students and academics. This re-enforces what Ahmad et. al. (1998) and Ives et. al. (1996) claim are key advantages of virtual university environments.

Janicki and Duncan (1998), studied existing literature within the distance learning discipline in an attempt to (1) outline and explore the evolution of distance learning technologies, (2) discuss emerging opportunities for education delivery, and (3) identify the variables in an emerging view of distributed education. They suggest, that the role of the student, will change from a passive learner, to an active participant in the learning process. They also imply that the role of the educator will change from the distributor of

knowledge, to the sharer of understandings and intellectual breakthroughs. As distance learning and virtual learning are very similar in design, the authors' suggestions can be interpreted from a virtual university perspective. This means that virtual universities may allow students to gain more independent learning skills by becoming more active participants in their own learning processes. This can be seen as a key advantage that virtual universities have over traditional university environments.

Another advantage that Ahmad et. al. (1998) identify is that virtual learning (and hence virtual universities) suits the needs of all students, that is it accommodates both day and night time learners, as well as students who have prior knowledge. They also assert that this type of learning environment allows students to learn at their own pace, meaning that fast learners are no longer constrained by the needs of the slower and inexperienced students who often control the pace of learning at a traditional university. This suggests that virtual universities could potentially provide for the needs of all types of students, without affecting their learning abilities.

Disadvantages

Chao (1998), suggests that when utilising web based course material, academic staff are not only required to undertake training on the new technology, but also need time to develop teaching materials, and need support from students and administration.

Mamaghani (1998) conducted a critical review of existing literature in order to assess the impact of the *World Wide Web* on teaching and learning. The author suggests that although there are several major advantages associated with the use of the web in learning environments, the author also highlights some important problems that can occur with the utilisation of the web for learning or teaching purposes. Mamaghani (1998) implies that problems with computer hardware malfunctions, setting up software to provide access to an educational institution, remote dial-in access, and heavy traffic on the web can create all kinds of learning barriers for students. To me, this indicates that if these issues are not addressed accordingly when a virtual university is established, the potential exists for major hindrances to the students' learning processes. Lastly, Mamaghani (1998) indicates that the utilisation of the web for teaching/learning practices has costs linked to the training of staff, provision of technical support, and professional recognition. Although Mamaghani (1998) identifies the cost of training as a potential problem, the author has not considered the implications to students and academics. It is possible that when the university funds are limited, the virtual learning environment is limited too. This in turn suggests that this cost factor could provide serious problems to academics and students as they would be limited in their abilities to teach and learn.

Discussion of case study findings on the advantages and disadvantages of virtual universities

Table 2: Advantages and disadvantages of virtual universities according to case study findings

ADVANTAGES	DISADVANTAGES
The pre-semester development of subject material allows more research time for academics during the semester.	Designing and preparing subject content is very time consuming, and costly because of the environments multiple users.
Students guide their own learning as the role of the academic becomes the provider of guidance and motivation rather than the provider of information.	Some academic staff do not redefine their teaching processes to suit the virtual university environment, but instead use the Internet as a resource instead of a learning environment.
Learning is more interactive.	Updating material can be a time consuming process if academics are not allowed to edit their own web sites directly from their office.
Students are able to see where a certain subject is leading because material is up at the start of the semester.	If the students are not willing to perform to the best of their ability, they will not benefit from the learning environment.
Students can learn at their own pace, and hence students can work to the best of their ability	The Internet is not always reliable (ie download time, accessibility etc).
The learning environment opens up access to a broad range of information.	Technical problems will affect the virtual learning environment's ability to perform well.
Students will have a higher level of computer literacy than students at tradition universities.	Students with poor computer literacy levels struggle initially.
Students perceive that they have more access to their lecturers.	Students who don't have remote access are disadvantaged.
Geographical study barriers are eradicated as students can study anywhere as long as they have access to the virtual university's web site.	Some courses (eg Nursing and Medicine) are not suited to virtual environments due to the need for physical interaction.
Facilitates communication between students and academics.	Security is very difficult to implement into the network.
	Subject material is not always up-to-date, and accessible.
	When academics availability is poor, overall performance of the students is poor.
	Students can be affected by information overload.

The case study research at Logan Campus of Griffith University revealed several important advantages and disadvantages of flexible learning environments (refer to Table 2). As stated earlier, the flexible learning environment at Logan Campus displays many of the characteristics of a virtual university.

The case study research revealed that lecturers felt that they benefited immensely from the pre-semester development of all subject material. This is because once the subject material was developed and posted online, the lecturers found that they had more time to conduct their research. It was also found that students benefited from the pre-semester development of subject material in several important ways. Firstly, students were able to see where the subject was leading to, and were therefore able to pace their learning. This means that within a virtual learning environment, like a virtual university, the opportunity exists for students to work quickly through material that they understand, and spend more time on areas of the subject that they do not comprehend, or are not skilled at. Secondly, it was found that students gained increased communication and interaction with their lecturers because (1) they had more access to communication devices like online forums, noticeboards, and e-mail than students in traditional learning environments; and (2) the time that lecturers normally spent throughout the semester developing subject material was eradicated with the pre-semester development of subject content.

This meant that students perceived that it was easier to consult with their lecturers regarding any problems or queries about their studies (Anderson 1998).

This is an important issue because as stated earlier, the objectives of a virtual university are to facilitate learning through the use of IT and the Internet, in order to redraw the physical boundaries of the classroom; enable teamwork, allow learning to be a continuous time-independent process, and to enable multilevel, multispeed knowledge creation (Leidner et al. 1995). This means that the virtual university environment implies that there is less physical interaction between students and academics, and hence communication and interaction through other means like online forums, and e-mail, are very important to the students' learning abilities. Research revealed that poor academic availability affects the students' overall learning performance. Thirdly, the pre-semester development of subject material suggests that lecturers had more time to refine and improve subject content throughout the semester. This in turn implies that students who attend virtual universities should benefit greatly by having access to up-to-date information. However, it is important to note that the case study revealed that some lecturers felt that the content updating processes at Logan were time consuming because they were required to go through a third party department. This suggests that the potential exists for virtual university lecturers to avoid updating subject content because they feel that it is too time consuming, which in turn implies that students' learning processes could be affected because the students are not receiving current subject material.

Another advantage that the case study revealed about virtual learning environments (ie virtual universities) is that students have greater access to a broader scope of information. However, the case study also revealed that students often found it difficult to locate all of the necessary information because the network was so vast. This suggests that the potential exists for students to miss important subject information if the structure of the virtual learning environment does not display a high level of user friendliness.

An important advantage that the case study identified was that virtual learning environments (like virtual universities and flexible learning environments) break down the geographical barriers that are imposed upon traditional universities. This means that as long as students have a PC, modem, and Internet access, they can literally attend university from the comfort of their homes. This is extremely useful to students who would normally have to travel long distances to attend university. The eradication of geographical constraints also means that lecturers do not necessarily have to be “on campus” to instruct their students. On the negative side, the case study revealed that there are some disadvantages to studying over the Internet (ie in a virtual learning environment). Firstly, Internet traffic can create accessibility difficulties for both staff and students trying to look up subject material, which implies that heavy Internet traffic would cut down the level of convenience of attending university from a remote location. Secondly, some virtual learning environments, like virtual universities and flexible learning, do not support courses which require a certain amount of human interaction, either because students need direct interaction with academics as the subject does not facilitate independent learning practices, or because the course requires physical interaction (for example Nursing or Medicine subjects). However, it is important to note that virtual universities can be selective in the courses offered, and should they choose to offer subjects that do require some physical interaction, it is the university’s responsibility to ensure that the students’ needs are met in respect to course work.

Guidelines and recommendations for transforming to a virtual university

Table 3 identifies guidelines and recommendations for transforming to a virtual university, according to existing literature.

Table 3: Guidelines for implementing virtual universities [Harasim et. al. (1995), Chao (1998), and Mamaghani (1998)]

GUIDELINES ACCORDING TO HARASIM ET. AL. (1995), CHAO (1998), AND MAMAGHANI (1998)
Invest significant time into the redesign of the courses to be offered in order to take advantage of all online learning opportunities.
Design and implement initial training programs for academic staff.
Promote user participation in planning from the first stages of development.
Ensure ongoing support and maintenance by regularly posting new material, removing dated material, and checking hyperlinks to ensure that they are still valid.
It is important to consider the establishment of support centers which assist faculty staff with the development of course and subject material.
In order to provide academics with more flexibility to develop and maintain online subject material, academics should have web servers in their offices.
Students should be able to participate in class discussions, download lectures, work on any interactive material that the lecturer has provided, and play games which are designed as part of the subject material.
Allow students to submit their assignments online, register for team activities, log on to protected materials, and make changes to any submitted assignments before the deadline.
Online interaction between students their subject material should be engaging and fun, and not restricted by time factors.
Integrate an evaluation tool into the planning of online courses in order to allow academics the opportunity to improve their online teaching effectiveness, based on student suggestions.
Encourage students to participate in subject work as much as possible in order to avoid the problem of students to falling behind.
Design and implement an orientation and training set of activities for students to take at the beginning of each course.
To reduce costs, ensure that the PCs are multipurpose learning tools, and are not simply used to get online.
Ensure that students are given step-by-step guides to show them how to get online.

The case study findings at Logan Campus of Griffith University, revealed that the recommendations suggested in Table 3 identify most of the guidelines to follow when transforming from the traditional university to the virtual university. However, the case study research exposed several more guidelines that institutions can follow when transforming from a traditional learning environment, to a virtual learning environment. Firstly, in order to ensure that all subject material is complete, academics should be given at least six months to develop content. This is because it was found that the academics at Logan were not given enough time to develop subject material, and consequently some material was not complete, which affected the flexibility of the learning environment. Secondly, it is imperative that students can gain remote access easily. Case study analysis (Anderson 1998) revealed that the students at Logan experienced extreme

difficulties when attempting to access the university web site from home. The students claimed that they were regularly unable to get onto their subject sites, or when they were able to gain access, it was not uncommon for the system to crash, and lock the students out. By following this guideline, institutions are able to avoid high levels of student frustration caused by their inability to study at their preferred time and location. The third guideline that this paper recommends, based on the research findings, is that academics must be able to modify their subject material at their own discretion and from their office. This ensures that academics do not become frustrated at the lack of control that they have over the up-dating of their subject material, and at the same time, decreases the amount of time spent going through third party departments in order to update content. The last guideline that this paper recommends is that the technology utilised within the virtual university is of a high level of quality, meaning that the technical quality is high in order to avoid systems crashes etc, and the level of systems useability (from the 'user' point of view) is high to ensure that the system meets its purpose.

Future research

Due to the new nature of the 'Virtual University' concept, there are many issues that need to be further addressed through future research. Future research is needed to be conducted on issues like: the affect that the introduction of virtual universities will have on the learning approach; the effects that virtual universities will have on academic research; the effect that virtual universities will have on the knowledge based of students, the effects virtual universities will have on the required skill set of academics; and the way the role of the student and academic will change.

Extensions of this paper are another area of research that needs to be addressed in the near future. Case study research, rather than literature reviews, needs to be conducted at virtual universities so that the speculation element is removed from issues that have been discussed in the literature review section of this paper. Case study research in the field of virtual universities would ensure that all bodies considering the transformation from traditional to virtual university would be fully aware of the implications associated with this evolution.

Conclusions

As education shifts and changes to suit current technological trends, and as the traditional, classroom-based university becomes a thing of the past, it becomes increasingly important to address the future implications for students and academics who conduct their learning and teaching in a virtual university environment.

Much of the existing literature on the virtual university concept is based on anecdotal evidence. This suggests that future research on issues associated with virtual universities should be addressed through research evidence such as case study research, or forms of empirical assessment.

This paper has highlighted important issues associated with the advantages and problems associated with virtual universities. This paper has also provided the reader with

practical and useful guidelines to follow when undergoing the transformation from traditional university, to virtual university.

Literature reviews have revealed that although there are papers that identify the issues presented in this paper, the authors have tended to base their arguments on anecdotal evidence, rather than research evidence.

Benefits like increased flexibility of study, convenience, eradication of time and geographical barriers, increased communication between students and their peers and lecturers have been identified within existing literature. However, the articles have not discussed the implications to students and academics of these advantages.

Problems associated with virtual universities include: training of academics to use the technology; security issues associated with electronic exams, remote dial-in access, costs associated with staff training, and provision of technical support. Once again, although the authors have identified the problems associated with virtual universities, they have failed to discuss the future implications for students and academics.

Lastly, literature reviews have revealed several guidelines to consider when undergoing the transition to a virtual university. These guidelines include: promoting user participation and planning, designing and implementing initial training programs for academic staff, allowing students to submit their assignments online, and providing students with the opportunity to participate in class discussions online.

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