CHALLENGES FACED BY UNIVERSITIES IN MASS EDUCATION: WHAT TYPE OF TECHNOLOGY WILL SUFFICE FOR THE ODL STUDENT?

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ABSTRACT

The University of South Africa (Unisa) is one of the world's largest 'mega universities' with a population of more than 250,000 students. The Department of Marketing and Retail Management (DMRM) is one of six academic departments within the School of Management Sciences, which in turn is one of three Schools within the College of Economic and Management Sciences, the largest College within Unisa. The challenge of the Chair of Department of the DMRM is to plan and manage the DMRM in such a way as to ensure that the department continues to deliver relevant marketing education to students, while still meeting the broader University objectives. This planning and management task needs to take into consideration the challenges facing the DMRM in the delivery of marketing education. One such challenge is to decide on what technology to use to deliver and support learning amongst the DMRM's students. The process of choosing one or more technologies to adopt as a preferred learning technology within the DMRM can either be done by drawing on the current thinking on this topic in the academic literature, by speaking with peers and other educational and technology experts, by asking the lecturers involved in the every-day delivery of this education, or by surveying students themselves. This study focuses on the lecturers' perspectives. The Unisa lecturer, after all, is the key driver behind the delivery of education within the DMRM and will be instrumental in the successful adoption of any technology decided on. Their views were obtained using the Delphi methodology and analysed using a Chi-square analysis. The findings suggest that a learning management system is considered by lecturers as the preferred technology to use.

KEYWORDS

Learning technologies, Higher education, Learning management systems (LMS)

INTRODUCTION

A highly competitive and dynamic educational landscape exists throughout the world, brought about by numerous factors. These factors include the impact of globalisation, the move towards the knowledge society, the current global financial crisis, rising unemployment, the increasing pace of change, and the influence of the internet and other technologies in extending the regional, national and international reach of learning providers [1, 2, 3]. This last-mentioned factor has resulted in educational institutions which previously had a narrow, local focus now expanding their offerings and competing across borders. This has placed increased pressure on educational institutions which previously were protected by geographic distance.

This competitive and dynamic educational landscape has resulted in universities and further education and training institutions increasingly competing with each other globally for students [4]. When this situation is combined with the escalating political and business demands being placed on higher educational intuitions to produce qualified graduates (especially in the South African context given the disparity that exists in educational levels between the white and black communities), then the urgency to find workable solutions to improve throughput rates and reduce attrition rates in higher education becomes apparent [5]. One possible solution is to put technology to work to assist in facilitating the delivery of higher education and to improve and support learning amongst all student groups [6]. The conundrum that education providers face is which learning technologies to use in order to extend the reach, quality and success of existing and future educational offerings.

The academic departments within the five main Colleges comprising the University of South Africa (Unisa) serve as the primary academic 'touch points' with learners and it is these departments that will ultimately adopt and drive the use of learning technologies within the University. It can be further argued that it is ultimately the lecturers within these departments who will be responsible for the effective implementation of the chosen learning technologies in question. With this in mind, this study attempts to determine the lecturers' views as to the preferred learning technology to use to serve students within the Department of Marketing and Retail Management (DMRM) at Unisa.

BACKGROUND

Unisa, as a distance learning institution, is one of the world's largest 'mega universities' [7] with a population of approximately 250,000 students [8]. The DMRM is one of six academic departments within the School of Management Sciences, which in turn is one of three Schools within the College of Economic and Management Sciences, the largest College of five within Unisa [9]. The College itself has some 130,000 students across the world.

The challenge of the Chair of Department (CoD) of the DMRM is to plan and manage the DMRM in such a way as to ensure that the DMRM continues to deliver relevant marketing education to all students, while still meeting the broader University objectives. Currently, the DMRM has more than 22,000 module registrations per annum. One of the areas of consideration for the CoD is the possible use of new technologies to support the learning offerings of the DMRM.

In education, the role of technology has increased dramatically [10, 11]. Today, there are many different types of technologies that a University can draw on in order to facilitate the delivery of education to its learners. These technologies range from traditional paper-based learning materials and face-to-face classes, to electronic learning materials, tools and channels such as learning management systems, online technologies, email, mobile technologies, CD/DVD technologies, teleconferencing, interactive TV, radio, personal digital assistants, etc. [12, 13]. The question arises as to what technology options are available to the DMRM and which of these are the most suitable to be used by the DMRM in servicing its students.

Answering this question can be done by either drawing on the current thinking on this topic in the academic literature; by speaking with colleagues, peers and other experts in the field of education and educational technology; by asking the lecturers who are involved in the every-day delivery of learning to students; or by surveying students themselves. This study focuses on the lecturers' perspectives. The lecturer, after all, will be the key driver behind the adoption and use of any technology that is decided on within the DMRM.

With this in mind, the research problem, question and objectives are outlined below. This is followed by a description of the research methodology that was used, as well as the findings and conclusions that can be drawn from these findings.

RESEARCH PROBLEM

While there may be a strong argument supporting the idea that learning should be learner-centric [14], the reality is that to a large extent it is the academic that takes responsibility for developing the learning content and who is often the key driver behind pursuing and using new technologies for the delivery of education within an academic department. Any research that is aimed at determining the best mix of technologies to use in delivering learning to students therefore needs to take the lecturers' views into consideration.

RESEARCH OBJECTIVE

The objective of this particular study is thus focused on determining the opinions of the lecturing staff within the DMRM as to the most suitable learning technology (ies) to use in delivering learning to students in the distance learning sphere.

RESEARCH QUESTION

This study strives to answer the question as to which new learning technologies are viewed by the lecturing staff within the DMRM as the most appropriate for reaching and serving the Department's learners, as well as the challenges that are facing the implementation of these technologies. The term 'new' is used in conjunction with the term 'technologies' to depict all non-paper-based learning methods. Learning technologies can be defined as various technologies that can be used to deliver, enhance, support and generally facilitate learning to and by students [15].

RESEARCH METHODOLOGY

As mentioned earlier, this particular study focuses on only one aspect of the broader picture. Ultimately the results of this study will need to be combined with the findings from the other components of the larger study, namely a survey of students, peers, technology experts, and of the literature. The methodology that was used for this study is based on the Delphi technique. The Delphi technique is an iterative questioning process that serves as a way of obtaining a collective view from individuals where there is no or little evidence and where opinion is important [16].

A total of fourteen junior and senior lecturers were involved in the study; the authors did not contribute in any way to the input and resigned themselves only to providing written explanations introducing each step of the process and recording the results. Of course, the collegial nature of this research could have had some influence on promoting participation which one or more lecturers may otherwise not have agreed to. In addition, this factor might also have contributed to lecturers giving more scathing input than might otherwise have been the case, although this is not necessarily a negative aspect. The process that was followed in the gathering of data can be outlined as follows:

- **Step 1**: All the lecturers in the DMRM were initially asked to identify at least five different new learning technologies that they believed would help support the learning offerings of the DMRM within the distance learning context. At the same time, they were asked to identify the major challenges (advantages and disadvantages) of implementing these technologies, and to suggest what might be done to overcome any potential problems identified in using the technology.
- **Step 2**: The responses from the various lecturers were then combined into a single table with common technologies and challenges clustered together in the table only once. There were a number of commonalities identified by the various lecturers, but there were also a number of unique challenges identified by some of the lecturers that were not mentioned by their colleagues. This ensured that a broader spectrum of challenges was identified in association with most of the technologies in question; more so than might have been the case had the research only been conducted on a one-on-one basis. It should be mentioned, however, that several technologies were identified without any challenges having been highlighted for the technologies in question.
- **Step 3**: This single table was then resent to all the lecturers, asking them to 'fill the gaps' especially where no challenges had been identified or where they felt there may be some shortcomings. Once again, the answers were synthesised into a single – but now expanded and more complete – table. This table is quite extensive and too long to serve as an attachment to this article. It can therefore be accessed at http://www.cbothma.co.za/ME/list_of_technologies.htm. A shortened list highlighting just the technologies without the additional explanation of the benefits/drawbacks is attached as appendix A.
- **Step 4**: The next step involved listing the various technologies identified by the lecturers – 25 in all – in the form of a checklist (without the accompanying explanations and challenges) and then asking the lecturers to identify their preferences for the ten most important or relevant technologies (i.e., they simply had to tick the ten technologies of their choice and not rank them). A frequency table was created and the ten most popular technologies thus identified.

- **Step 5**: Using this revised list of the ten most popular technologies, the lecturers were then asked to prioritise the list from 1 to 10, with 1 being the most important and 10 being the least important. Once again, a new list was developed based on the mean score for the priorities indicated for each technology across all the lecturers concerned. From this revised and prioritised list, the five most important technologies were then identified. Table 1 outlines the findings from steps 3 to 5.
- **Step 6**: Finally, the lecturers were asked to evaluate the five technologies in a pairwise fashion. In each instance, the lecturer was requested to compare the two technologies involved in each pairwise comparison and to allocate a score of '1' to the technology that they thought was the most appropriate of the two, with a '0' being allocated to the alternate (or least preferred) technology. In the case where both technologies were considered equally important, a score of '0' was allocated to both. These findings were then transposed into a data table and analysed statistically using the Chi-square method. The results of these statistical analysis findings are outlined in the findings below (see tables 2-3 below).

Comments on the Methodology

Although it might appear tedious, the iterative Delphi methodology proved effective in ensuring that each lecturer (from junior to senior) had an opportunity to contribute to the overall decision-making in selecting the most suitable technology (ies) for the DMRM to use. Not only did everyone have an opportunity to contribute, but they could also build on the comments that went before (much like with sharing ideas in a focus group). What is more, with each iteration, lecturers became more familiar with the technology options that had been identified and with the terminology being used.

The iterative nature of the Delphi technique also gave everyone a chance to think about their options. This could have been achieved by means of a focus group, but it is thought likely that (a) the junior lecturers would have 'stood aside' for the senior lecturers and (b) the less vocal lecturers might not have had a chance to contribute to the discussion.

In gathering and consolidating the feedback from lecturers about the various learning technologies that the DMRM could use, it also became apparent that it is problematic to view all of these technologies as being of the same type. Some technologies, for example, are primarily transmission channels or environments (the internet, cellular technology and radio), while others are tools that reside within or 'ride' on top of these channels (such as instant messaging, SMS and blogs). Some technologies are hardware-based (the internet), while others are software-based (learning management systems).

Furthermore, many of these technologies overlap with each other. Users may speak of learning management systems, web-based learning, online learning and other such phrases, all as being uniquely different things but actually they are all very similar, if not the same. This semantic confusion played a part in this study with several lecturers identifying some technologies as uniquely different when in fact they are essentially the same. In some instances this was overcome in the process of consolidating the technologies identified by each lecturer into a single table by the authors. Technologies that were clearly common (albeit phrased or termed differently by a lecturer) were grouped together under a common heading. Nevertheless, some of the listed technologies still overlap with one another – for

example, web-based learning versus a learning management system, and webinars versus YouTube.

It is also true that many if not most of these technologies are linked to the internet and as such can together be described as 'online technologies'. Nevertheless, even within the online realm, there are a number of internet-based *sub-technologies* that can be used separately or together in order to serve learners (for example, websites, discussion forums, webinars, instant messaging, email, etc.). Going forward, it is though prudent to consider these sub-technologies separately.

A final comment about the methodology relates to the issue of the distance education environment. The lecturers were asked to consider technologies that were suitable to this environment. The reality, however, was that as all of the lecturers work within this environment, this is the only frame of reference that they have to judge from. They were not able to practically compare or differentiate these technologies between residential and distance education institutions.

RESEARCH FINDINGS

The research findings can be divided into three main groups:

1. The initial list of 25 technologies identified by the lecturers – this list is outlined in appendix A. A more complete list outlining the associated benefits and drawbacks of each technology can be found at:

   http://www.cbothma.co.za/ME/list_of_technologies.htm

2. The top ten technologies and their respective rankings as identified by the lecturers – this list is outlined in table 1 below.
3. The results of a statistical analysis of the pairwise comparisons of the top five technologies undertaken by the lecturers. This resulted in a total of n (n-1)/2 = 10 comparisons (where n equals the number of variables, in this case, the number of technologies, namely five). The results of this analysis are outlined in tables 2-3 below.

Ranking the Top Ten Technologies

Table 1 below highlights the top ten technologies selected by the lecturers and provides a mean ranking score for each technology where a lower value represents a more preferred technology. These rankings represent the outcome of steps 4 and 5 in the research methodology.

Table 1. Ranking and weightings of top ten technologies*

OVERALL RANK	PROPOSED TECHNOLOGY	MEAN RANKING**
1	**Learning Management System**	**1.9**
2	**CD/DVD technologies**	**5.0**
3	**Email**	**5.6**
4	**Web-based learning sites**	**5.7**
5	**Automated telephone self-help services**	**5.7**
6	SMS/MMS	5.8
7	Satellite/video/teleconferencing	6.0
8	Online discussion classes	6.0
9	Webinars/podcasting	6.1
10	Cellular/mobile technology	7.2

* The technologies in bold are the 5 selected technologies for further analysis

** Lower values = 'more preferred', while higher values = 'less preferred'

Interpreting Table 1

What the table above highlights is the importance that lecturers attached to the use of a Learning Management System (LMS) as their preferred technology. This issue is discussed in more detail in the conclusion section. Although not confirmed statistically at this point, it is clear that the mean ranking score for the LMS appears significantly different from the ranking score achieved by each of the other nine technologies. The *mean ranking score* was calculated on the basis of the mean or average ranking that the lecturers gave to each technology, where 1=top or 'most preferred' and 10= bottom or 'least preferred'. The next eight technologies following the LMS were all very similar in their mean ranking scores. The last-mentioned technology – namely cellular/mobile technology – was interestingly enough not considered very important at all, with a mean ranking score of 7.2, which sets it somewhat apart from the other top ten technologies.

The top five technologies (highlighted in bold in table 1 and located above the dotted line) are examined in more detail as part of step 6 of the research methodology, with the findings presented in tables 2 and 3 below. The question arises as to why technologies numbers 6 to 9 were not included in the last part of the analysis (namely the pairwise comparisons). The reason is (a) that this study is attempting to focus in only the top one or two technologies (and is thus not as concerned with the 'less preferred' technologies), and (b) undertaking a pairwise evaluation of all ten technologies would have resulted in lecturers having to consider 45 different combinations - an onerous task. The greater the number of comparisons, the less accurate the comparisons become, simply because respondents are lulled into making impulsive choices.

Selecting the Preferred Technology

In step 6, the study expands on what has gone before by asking lecturers to consider the five technologies identified in table 1 above, in a pairwise process. A frequency count of all of the preferred technologies from each pairwise comparison was then captured in a contingency table and analysed using a Chi-squared analysis and SPSS. Tables 2 and 3 below highlight the results of this analysis. The purpose of this analysis is to target in on the preferred learning technology (ies).

Table 2. Descriptive statistics of the data obtained from the pairwise comparisons

Variables	F	Mean	Std. Deviation	Min	Max	Expected F	Observed F (0)	Observed F (1)	Residual
CD/DVD	52	.3654	.48624	0	1	26	33	19	-7.0
AUTO/TEL	52	.3846	.49125	0	1	26	32	20	-6.0
WEB	52	.4615	.50338	0	1	26	28	24	-2.0
EMAIL	52	.2500	.43724	0	1	26	39	13	-13.0
LMS	52	.7115	.45747	0	1	26	15	37	11.0

Interpreting Table 2

The above descriptive statistics reveal that there were 52 frequency counts (F) of either a '0' or a '1' for each of the five variables. The 52 is computed on the basis that there were 13 respondents that completed four pairwise comparisons for each of the variables; thus 13 x 4 = 52. For each of these variables the mean is calculated on the basis of the observed positive responses (depicted by '1s') divided by F (i.e., 52); thus for variable LMS it is 37/52 = 0.7115. The standard deviation on the other hand is a measure of variability of the population from the mean. A value of .457, for example, suggests that 45.7% of the observations can be found within one standard deviation of the mean – a relatively good percentage suggesting a normal distribution for the observations.

The minimum and maximum values reflect the two possible options that respondents could choose from, where a '1' = "this variable is more important than the alternative" and a '0' = "the alternate variable is more important than this one" or "they are equally important". The expected N (26 for all five variables) suggests that it was expected that half of the responses would be 0s and the other half '1s'.

The observed F(0) reflects the number of actual '0s' allocated by the lecturers for the variable in question, while the observed F(1) reflects the number of actual '1s' allocated by the lecturers for the variable. In the case of the LSM variable, for example, there were 15 '0s' and 37 '1s'. Finally, the residual represents the deviation from the expected F (of 26). For LSM, for example, the residual is calculated as follows: 37 – 26 = 7. If the residual is a positive value, then this reflects a preferred technology ('1s' > '0s'), while if the residual is negative this represents an indifferent or lesser preferred technology ('0s' > '1s').

Table 3 below highlights the primary Chi-square parameters identified by this analysis.

Table 3. Chi-square test statistics

	CD/DVD	AUTO/TEL	WEB	EMAIL	LMS
Chi-square (X^2_{calc})	3.769*	2.769*	0.308*	13.000*	9.308*
df (degrees of freedom)	1	1	1	1	1
Asymp. significance	0.052	0.096	0.579	0.000	0.002

* Zero cells have frequencies less than 5. The minimum expected was 26.

Interpreting Table 3

The purpose of the Chi-square analysis is to determine whether the observed frequencies (counts) differ markedly from what we would expect by chance [17]. The Chi-square formula is [18]:

$$X^2 = \frac{\sum(F_0 - F_e)^2}{F_e}$$

where X^2 = Chi-square
F_0 = observed frequencies
F_e = expected frequencies

In the table, DF represents the 'degrees of freedom' (i.e., 1) and at DF (1), the critical Chi-square value (X^2_{crit}) is 3.84 corresponding to a p-value of 0.05. Any calculated value (X^2_{calc}) above 3.84 (X^2_{crit}) suggests that the variable in question is significant. (The critical value was determined from a look-up table [19].)

The above statistics reflected in table 3 thus indicate that:

- The three variables CD/DVD, AUTO/TEL and WEB do not stand out as significant technologies in the context of this study, as their calculated Chi-square values do not exceed the critical Chi-square value. *(Clearly, they are still technologies worth considering but do not represent the technology of choice.)*
- Both the LMS and EMAIL stand out as significant variables in as far as this study is concerned. This is confirmed by the LMS's Chi-square of 9.308 and the EMAIL's Chi-square of 13.000 both of which are *significantly* higher than the critical Chi-square value. (Although the research question was not phrased as a hypothesis, had it been, the null hypothesis – that there are *no* preferred technologies out of the five – would have been rejected and the alternate hypothesis accepted, namely that there are preferred technologies, specifically in the case of EMAIL and LMS.)
- In the case of the asymptotic significance value, all three values for CD/DVD, AUTO/TEL and WEB are greater than p=0.05, suggesting that they *are not* significant, while in the case of both EMAIL and LMS the asymptotic value is less than p=0.05, indicating that they *are* significant. This supports the Chi-square value indicating that these two technologies are significant.

- The sign of the residual value gives an indication of direction of the significance, suggesting that that the *preferred* learning technology of choice for staff is the LMS, while EMAIL is equally so, *not* the technology of choice for staff (reflected in a high chi-square value of 13.000, but with a minus sign associated with the residual value corresponding to the '1s').

CONCLUSIONS AND RECOMENDATIONS

Given the abovementioned findings, the following *main* conclusion can be drawn:

Lecturers Support the Adoption of an LMS as the Preferred Learning Technology

The lecturers interviewed overwhelmingly supported the use of an LMS as their preferred technology of choice. This is a very interesting finding. Unisa has an excellent bespoke LMS in place called *myUnisa* [20]. MyUnisa is a web-based system for academic collaboration and study related interaction. Students are given the opportunity to engage with class mates and lecturers through the online discussion forums and email. Additional resources and files are easy to get to and official study materials can be downloaded if required. It includes access to administrative information such as biographical details, academic and assignment records, examination results and dates, and financial records. This service is provided at no additional cost to all registered Unisa students. Unisa is constantly working on improving this system.

The interesting fact is that most lecturers within the DMRM do not use myUnisa. The findings thus suggest that although lecturers are reluctant, unwilling or unable to use an LMS, they do appear to recognise the value that it brings to learning and as a means of supporting the student.

The findings might also mean that myUnisa is all that lecturers are familiar with (within their academic sphere) and their selection of an LMS as the preferred learning technology of choice is based on this familiarity. It could also mean that because the University has been pressing for the use of the LMS amongst academics (even making its use part of the individual's performance management agreement), lecturers feel obliged to recommend its use.

It is also interesting to note that web-based learning also appeared in the list of top five technology choices. Bearing in mind that the myUnisa LMS is essentially a web-based learning system, there is arguably a serious overlap between these two choices. This supports the view that lecturers consider the web (or the idea of 'online learning' as embodied in an LMS) as the route to go.

Another suggestion might be that lecturers feel that students are facing a medium-overload (i.e. the use of too many technology channels), which might impact on the effectiveness of many of these technologies, especially if they are used separately. An LMS, on the other hand, has the potential to incorporate many if not most of these technologies (such as webinars, blogs, email, SMS, discussion forums, etc.) into a single interface or online environment and could therefore serve as 'home' or 'base' for many of the other suggested technologies. This would make it a 'one-stop shop' of choice.

Recommendations

If it is accepted that the LMS is the technology of choice, then it is recommended that the CoD invest as much time and effort in pursuing the use of this technology within the DMRM. Perhaps the training of lecturers on how to use the LMS might be one option and/or the CoD might seek out new ways of using the features of the LMS in support of the DMRM's teaching efforts. Where certain tools are thought to be missing, the CoD might even work with the University's ICT Department, to serve as a test-bed for the development of these new tools. Certain policies and guidelines could be documented to assist lecturers in using this technology more effectively. Additional staff or assistants could be appointed to take charge of many of the administrative aspects of using this technology. The proposed second-phase of this research study that will examine the students' opinions of the best technologies to use, will delve deeper into their view and acceptance of an LMS.

In summary, the conundrum is becoming clearer. The learning technology of choice from the perspective of lecturers is the LSM (myUnisa) and the DMRM should invest effort in embracing this technology within the Department. But the views of students still need to be understood.

Further Conclusions

Besides for this main conclusion outlined above, which is what the study set out to determine, a number of other secondary conclusions can be drawn based on the information obtained from lecturers (much of which is outlined in the table available at http://www.cbothma.co.za/ME/list_of_technologies.htm). These conclusions are briefly outlined below:

- **Why is email not popular? -** One suggestion is that lecturers are probably averse to email because it represents work and an intrusion in their already busy day.
- **Why automated telephone self-help services?** – It seemed an unusual technology for lecturers to suggest. It is believed that the answer lies in the fact that lecturers see this technology as helping them deal with the deluge of income telephone calls received daily from students.
- **Why CD/DVD technologies?** – The timeous delivery of study material is a recurring problem in the distance learning environment and a problem that students often approach lecturers about (albeit that it is an administrative matter). CD/DVD technology is seen as a means of study material delivery.
- **Technologies represent more work** – One of the side issues that came out of this study is that the implementation of these technologies represents more work. Lecturers already feel overburdened, and having to embrace a new learning technology in their already busy day is very daunting. This suggests that there should be a focus on only one technology such as the LMS, which in any case is an all-encompassing technology.
- **Lecturers' awareness of learning technologies is limited** – Another issue that was mentioned was that lecturers felt themselves to be out of touch or unfamiliar with many of the new technologies available on the marketplace. In fact, they felt that students were in some instances more familiar with these technologies than the lecturers themselves. Technology was thus seen as a barrier to effective teaching from the lecturer's perspective.

- **Unisa is driving technology adoption** – There was also a feeling that the University (in particular the ICT Department) was driving the adoption and implementation of new learning technologies within the broader University context, with lecturers expecting to comply and 'fit in'. This typical 'top down' approach does not encourage the use of technology amongst lecturers. In fact, it may instead create a level of resistance amongst lecturers.
- **What about the students?** – Most of the technologies suggested by lecturers are either web-based and/or they require the use of a computer. Unisa has a relatively poor student population, many of which come from disadvantaged backgrounds. These technologies may be of their reach. This potential problem needs to be considered carefully to see how the broadest spectrum of students can be reached. The University may have to embrace the use of Netbooks, Internet Cafés around the country, and other means that will bring access to the technologies to students. It is clear that the views and circumstances of students need to be taken into account. The second phase of this study – determining which technologies students would want the DMRM to use – is thus an important 'next step' to solving the conundrum of which learning technology to use.

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APPENDIX A

FULL LIST OF TECHNOLOGIES IDENTIFIED BY LECTURERS

	TECHNOLOGIES
1	SMS/MMS (Simple Message Service/Multimedia Message Service)
2	Cellular technology (non-SMS) – e.g. WAP/mobile web applications
3	Personal Digital Assistant (PDAs – similar to smartphones but without cellular connectivity)
4	CDs and DVDs
5	Learning Management System (LMS) (e.g. myUnisa)
6	Social networking services (such as Facebook, Twitter, etc.)
7	Automated telephone self-help service (e.g. "If you want ... then press #1", etc.)
8	Use of webinars/podcasting (short learning videos that are delivered to students via iPod, smart-/multimedia phones, or online)
9	YouTube (an online video delivery service that can also be viewed on some cell phones)
10	Internet/WWW (websites used to support module information activities, FAQs, simple assessments, MCQs, etc.)
11	Satellite and video conferencing (teleconferencing)
12	Campus radio
13	National radio
14	Blogs (by lecturers)
15	Email (interactive communications between lecturer and student)
16	Chat forums (involving student-to-student and lecturer-to-lecturer communications)
17	Computer simulation and educational gaming (online and offline – CD/DVD based)
18	Departmental software solutions (bespoke programs to assist lecturers in helping students)
19	Interactive TV (e.g. DsTV)
20	Online teaching (online discussion classes)
21	Keyword search tools
22	E-newsletter/e-magazines (run by lecturers for students)
23	Electronic provision of study materials (e.g. on Flash drives)
24	Automated assessment
25	Webcams to support teaching and communications