RESEARCHING TRANSMODAL DELIVERY AT USQ: DIFFERENT HORSES FOR DIFFERENT COURSES

Michael Sankey
Learning and Teaching Support Unit
University of Southern Queensland, AUSTRALIA
sankey@usq.edu.au

Dawn Birch
Faculty of Business
University of Southern Queensland, AUSTRALIA
birch@usq.edu.au

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Abstract

This paper reports on a variety of research studies which have investigated how students perceive the delivery of hybrid/transmodal course resources at the University of Southern Queensland (USQ) during 2004/5. This represented a fundamentally new approach to the delivery of materials at USQ, based on a resource-rich CD-ROM containing the main aspects of the study materials supported with multimedia enhancements, online support and some printed materials. The different combination of qualitative and quantitative approaches used for these studies has given the researchers a clear indication of what students felt about this hybrid/transmodal new delivery mode. Analysis of the research data indicated a strong acceptance of the CD-based learning environment, though moderated by a desire to still receive some print-based materials. On the whole however, students reported a preference for a CD-based resource. But why? This and other interesting findings of these studies will be discussed.

Introduction

At the University of Southern Queensland (USQ), as with many other institutions in Australia, distance education course materials have traditionally been delivered via static print-based packages. However, advances in technology and the greater use of multimedia in education have provided an opportunity for course leaders and designers to enrich students' learning experiences by providing technology-based learning resources that comprise a range of multimedia and online components. A range of forces including, pedagogical, opportunistic, pragmatic, and psychological motivations, have encouraged many educators to adopt these educational technologies to enhance the delivery their courses. At the beginning of 2003, in a major shift in policy, The USQ decided that all courses of study, for both on and off campus students, would be developed in hybrid delivery modes (now known as Transmodal delivery) over the next 3 - 4 years. Central to this new delivery would be a resource-rich CD containing all essential study materials supported with significant multimedia enhancements and online support. This represented a fundamentally new approach to the delivery of course materials at USQ, one that would require significant research to underpin its development and evaluation.

This paper reports on a series of five research projects covering seven courses of study, investigating how students perceive this new approach to course content delivery during 2004/5. Further, this paper seeks to outline the need for this change at USQ; it looks the approaches taken in researching this change and briefly investigates the outcomes. As a consequence it postulates that course materials can be designed to cater for students with a range of different learning styles and backgrounds and seeks to demonstrate that higher levels of engagement are possible when a range of different media can employed. This hypothesis will be supported with a summary of key points taken from the research conducted into the courses mentioned above, drawing on student's comments and perceptions of these environments. In researching these seven courses, different combinations of qualitative and quantitative approaches were taken. These different approaches have given the researchers, and more importantly the University, a clear indication of what students felt about this new form of delivery. Finally this paper will identify what further research will need to be performed to gain a through understanding of the implications of USQs move to Transmodal delivery

Transmodal delivery at USQ (the potted version)

Taylor (2004) argues that traditional approaches to learning and teaching will not have the capacity to meet the escalating demands of higher education in the future. This is due to the significant societal and technological developments that have resulted in major changes taking place in the field of higher education (Jochems, van Merrienboer, & Koper, 2004). These changes have not been restricted to individual institutions, but have occurred on a more global level, with institutions increasingly competing in the international marketplace for their students. This has required fundamentally new approaches to be considered in the delivery of course materials across the board (Kellner, 2004). USQs answer has been the implementation of Transmodal delivery.

Transmodal delivery at USQ has its genesis in the principles of hybridised learning environments. The term 'hybrid' in the educational context embraces a range of approaches to learning and teaching that integrate a number of delivery media, mainly facilitated by the proliferation of information and communication technologies (Parsons & Ross, 2002). This approach has allowed considerable expansion of support mechanisms for both on-campus and off-campus students and has made them available *en masse* (Cookson, 2002).

This approach was deemed necessary as USQ study materials are delivered in many different contexts; on campus in Toowoomba and Wide Bay; for students studying at preparation level through to postgraduate; to international agents and partners; to independent and corporate groups of students. More importantly Transmodal delivery was designed to complement the University's new directions for teaching and learning and its 'Leading Transnational University' vision (Smith & Sankey, 2005). Associated with this is the increased reliance on the internet for information retrieval, though currently restricted by the inconsistency of broadband technologies across the range of diverse student bodies (Bruch, 2003). These issues clearly made a CD based resource the most viable option for the provision of resource rich course materials for foreseeable future. For this to be the case, learning environments would need to be designed that were both consistent in their approach to navigation while at the same time be able to provide students with access to significant quantities of electronic resources.
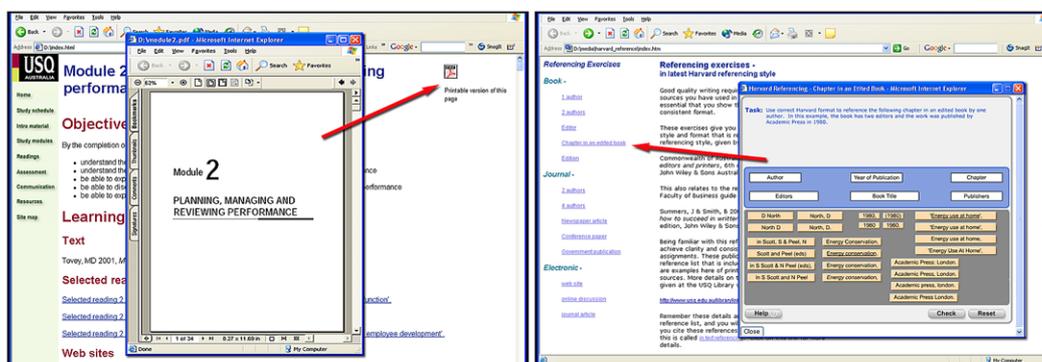
Figures 1 (left) and 2 (right), two screen captures of the Transmodal environment showing the printable version of the materials and a multimedia enhancement.

There was also the perceived need to provide easy access to traditional print-based resource, if preferred. The CD based approach could be used to provide students with their traditional print based resources, in the form of PDF files (see figure 1), significant multimedia enhancements (see figure 2), support software, USQ information publications, and hyperlinks to additional resources both on the CD and on the wider internet. The CD based environment is then further supported by the Universities WebCT based learning management system, USQ*Connect*. Printed resources were also made available for purchase from the USQ Bookshop if student prefer this option, however as it will be seen, given the choice the majority of students would prefer to print their own.

Integral to the design of Transmodal CD based environments is the premise that students learn in different ways, that each individual has a preferred learning modality (Sarasin, 1999). Further,

when this is taken into account and materials are designed to cater for multiple sensory channels, information processing can become more effective (Kearnsley, 2000). As the CD based materials for these courses were formatted in such a way as to permit them to be viewed as HTML pages, this allowed for a range of navigation features to be incorporated into these environments. These navigation features not only gave the course leaders additional options as to what they could provide their students (in the forms of links to additional resources both on the CD and on the internet), but it gave the student a greater level of control over how they accessed the range of learning resources available to them. With the additional hyperlinked options students are presented with a choice (or level of control) as to whether they access an alternate representation of the material or not. This level of control has been seen by Ainsworth & Van Labeke (2002) to significantly improve the learning opportunities for students. Therefore, if a student prefers to listen to, or view a particular concept, as opposed to read it (or do both), they may. This aspect of the environments was seen, by the students in the courses researched, to be very helpful. It was also seen to save student time and made the process of learning (for many) more enjoyable, which in turn made the materials (for some) easier to learn. Previous research conducted by Anderson (2001) would support this claim. From her research Anderson believes that this approach causes students to actively think about the structure of the information being presented.

The courses and different approaches taken in research

A range of qualitative and quantitative methodologies were employed to gather feedback from approximately 400 students across seven Transmodal courses from two faculties (table 1). The research to date has been conducted both from an instructional design and content expert perspective, and thus quite a variety of questions have been asked. These approaches have yielded a very rich and diverse pool of data from which to gauge the perceptions of the students using these materials.

Course (n)	Methodology	Mode	Methods	Analysis
MKT1001 n = 86	Quantitative & qualitative	On- & off-campus	Electronic survey - closed and open-ended questions	SPSS Manual
MKT2004 n = 31	Quantitative & qualitative	On- & off-campus	Electronic survey - closed and open-ended questions	SPSS Manual
ECO2000 n = 70	Quantitative & qualitative	On- & off-campus	Focus groups, Two electronic and paper surveys - closed and open-ended questions	SPSS NVivo
MGT2004 n = 100	Quantitative & qualitative	On- & off-campus	Focus groups, Two electronic and paper surveys - closed and open-ended questions	SPSS NVivo
PRL5000 n = 13	Qualitative	Off-campus only	Emailed survey containing four open ended questions	Manual
CMS3011 n = 37	Quantitative & qualitative	On-campus only	Focus groups, electronic discussion forums and short survey	SPSS Manual
CMS1000 n = 69	Quantitative & qualitative	Off-campus only	Electronic survey - closed and open-ended questions	SPSS Manual

Table 1. The courses, methodologies, mode, methods and tools used to collect and analyse data.

Students enrolled in Introduction to Marketing, MKT1001 and Marketing Channels, MKT2004 were asked how many times they had used the course CD and accessed the course homepage. Three items measured perceptions of the course CD using a five-point Likert scale including, enjoyment, ease of use and navigation, and perceived impact of the CD on their performance in the course. The students were also asked to indicate how valuable the various elements that were housed on the CD and the course homepage were, with respect to achieving desired learning outcomes. Students were also provided with an opportunity to make open-ended comments on the course CD and the course homepage, as well as to provide suggestions for other elements that could be included in the course resources. The response for the electronic surveys was 86 students (32%) for the core course, Introduction to Marketing (MKT1001) and 31 students (60%) for the second level course, Marketing Channels (MKT2004).

Surveys and focus groups were conducted for students enrolled in Macroeconomics for Business and Government, ECO2000 (S1 2004) and People Development, MGT2004 (S2 2004). Both courses were second year business courses, but from different disciplines. In week 3 students completed a 10 item survey based on a five point Likert type scale, with one opportunity for an open-ended response. This survey asked students for their initial perceptions of the CD based materials. A learning styles inventory was also administered in this week. In week 14, a 31 item survey was administered again based on a five point Likert type scale and included 5 open ended questions. This second survey asked students to reflect on their use of the CD based environments and offer suggestions for future developments of the courses. Focus groups were also held for both on- and off-campus students in both weeks 3 and 14. A substantial quantity of data was collected covering a range of topics related to both the CD based materials and the support offered through USQ*Connect*. The final data set consisted of 170 responses from 288 students.

Students enrolled in Corporate Communication, PRL5000 offered in S1 2005 answered a series of four open ended question relating to the CD based delivery of this course and the additional multimedia utilised. This survey was sent to students via email and responses were also returned by email and later collated. This is a master's level course delivered as part of the Master of International Communication in the Faculty of Arts. 13 responses were received from 22 students.

The first Transmodal offer of CMS3011 was in S1 2004, This course is a third year course in the faculty of Arts dealing with the social and political aspects of communication technologies,. Both this cohort and the cohort of S1 2005 were surveyed on their use of the CD, discussion forums and their face to face expectations. The survey contained 32 questions combining both qualitative and quantitative items and was completed by on-campus students only. Students were asked to complete a printed questionnaire during class time. Questions 1-27 used a five point Likert scale. Questions 28-32 required specific numbers or time frequencies to be selected. Students were also given opportunity to make open ended comment at the end of the questionnaire. In 2004 26 students were surveyed and in 2005 11 students (there was a large drop in numbers studying on-campus and an increase in off-campus students in 2005).

In Semester 1 of 2005, 69 external students enrolled in Communication and Scholarship CMS1000 (from a total external enrolment of 144) participated in an online survey evaluating perceptions of the CD based delivery and their use of the multimedia elements. CMS1000 is a first year level course, offered through the faculty of Arts, and is a mandatory course in communications forming part of the core for many programs across the University. A 20 question online survey was administered consisting of 15 items based on a 5 point Likert type scale and 5 open ended questions. This resulted in a rich combination of qualitative and quantitative responses.

Figures 3 (left) and 4 (right). Looking from different perspectives reveal new aspects of planet 'Transmodal delivery' at USQ'

In looking at different courses designs from a range of disciplines and across two faculties could be seen to be akin to investigate a new planet found in our solar system, planet 'Transmodal delivery'. Looking from different perspectives (see figures 3 and 4) will reveal different aspects of

this new planet. Slowly but surly a clearer picture has begun to emerge of what students have felt about the Universities move to Transmodal delivery.

A brief overview of the findings

MKT1001 and MKT2004

Online evaluations were conducted on, MKT1001 and MKT2004, in semester 2, 2004. First, respondents were asked to report on the number of times they had used the course CD and the course homepage. The findings indicate high levels of usage of MKT1001, with 75% of the respondents in the core course, and 83% of the students in MKT2004 using the course CD at least seven times in the semester. Approximately 83% of the respondents in both courses used the course homepage at least seven times in the semester. Second, respondents were asked to indicate their level of agreement with three statements regarding the course CD. For both courses, 83% of the respondents agreed that the course CD was easy to use and navigate. For MKT1001, 68% of the respondents agreed that they enjoyed using the course CD, and 77% in the MKT2004 course agreed with the same statement. For MKT1001, 64% of the respondents agreed that the course CD assisted their performance in the course, while 73% in the MKT2004 course agreed with this statement.

Respondents were asked to indicate the perceived value of the elements housed on the course CD, in terms of assisting their performance and enhancing their learning experience. In particular, the recorded lectures, interactive diagrams, and links to key terms were considered to be the most valuable elements by respondents in both courses. However, all elements housed on the course CDs were rated as valuable in terms of assisting performance and enhancing the learning experience. Finally, respondents were asked to rate the perceived value of various aspects of the course homepage, in terms of enhancing their learning experience. For both courses, the assignment discussion topics, announcements, and updated lecture slides were rated as the most valued. However, the remaining components including module discussion topics, links to resources, links to websites, and course and staff information were also valued.

ECO2000 and MGT2004

It was seen from the feedback provided by students that the implementation of the ECO2000 and MGT2004 CD based learning environments could be considered successful. The majority of students considered the CD based environment helpful to their studies, and that they had suited their approach to learning. This was particularly true in relation to the use of multiple representations and multimedia enhancements used in the two courses. Students described these elements as, enhancing their learning experience and making the materials more dynamic and complete, while others commented that, the multiple representations had made the materials easier to learn, particularly for those students studying off-campus and for international students. This was mainly due to there being sufficient alternate representations to suit a range of preferred learning modalities. A majority (though a smaller majority) of on-campus students also agreed that the CD had suited their approach to learning and expressed a desire to receive their materials in this way. There was a clear perception that this gave them access to additional information, information they may not have gained from attending the lectures and tutorials.

However, it was also seen (particularly in the week three feedback) that the majority of students still wanted access to a printed version of the materials, given a choice. The main reasons for that being, the convenience experienced previously by being supplied a print-based version in other courses and the ease of use and/or portability the printed version allowed. Nevertheless, as student became more familiar with the CD based resources, and the extra options that were made available to them, such as, purchasing the printed version form the USQ Bookshop or printing what they required for themselves, there was a clear understanding of the benefit of the CD. It may be suggested that this was true due to the quantity of additional resources available on the CD.

As a result, but not solely attributable to the features the Transmodal environment, a higher percentage of students (10% more) overall attained passing grades in the 2004 offers of ECO2000

and MGT2004 than had previously done, either in 2003 or over the preceding four years. The only difference between these and the previous offers of both courses was the incorporation of the CD based environment, augmented with a number of multiple representations and multimedia enhancements. The course contents itself had not changed in this time, simply the way it was represented. However, the importance of this result should not be overstated at this time as this trend would need to be continued before a claim of significance could be made. Nevertheless, this was a pleasing outcome for all concerned.

PRL5000

In all four questions there was a minimum of 66% (up to 77%) of students who agreed that there were distinct advantages in providing the course materials in a CD based format. These advantages included; *'the use of colour'* and interaction, *'a more modern feel'*, it was seen to be more environmentally friendly and that this approach had made the materials *'nicer to learn'*. The majority of students also found the materials were easy to navigate, and that this feature had made it easier for them to find related learning elements by being able to link strait to them. The additional multimedia in the form of animated diagrams audio overviews and Breeze presentations were seen, by the majority of students (66%), as being fundamental in them learning of the materials. These elements had served to *'enhance the learning experience'*, *'enrich the sometimes lonely study through distance education'* and *'made the learning more interactive and easier to learn'*. Importantly, students felt that this style of learning materials had catered for their preferred way of learning.

The main criticism of the materials (23%), as seen in the other courses, was the move away from the printed materials. These students identified that they would prefer to be supplied with the hard copy of the materials, as against the CD, even though the CD made it possible for them to print what was required. Not withstanding this, the introduction of the CD based environment as the main delivery platform for the course materials was seen as being successful, and an approach many students would like to see repeated in other courses.

CMS3011

Some early trends can be tentatively seen in the way on-campus students are responding to the CD based course materials. The main areas of agreement across the two years included students' desire to have their readings in book form, rather than on the CD and their preference for face to face lectures and tutorials (not surprising since all these students had chosen to study on-campus). There was not strong support for learning entirely online; however there was a slight trend in 2005 towards greater acceptance of a mix of online and face to face methods of learning. It may be seen that the 2005 students were much more comfortable with accessing both the CD and the course homepage on USQ*Connect* than the 2004 students. It is too early to term this a "trend"; however, if this growth in acceptance continues in future offers it augers well for the continuing use of the combination of CD, course home page and book of selected readings, with some face to face lectures and tutorials. Interestingly, in spite of the2005 group having all lectures on the CD, they also attended face to face lectures more conscientiously than the 2004 group. In relation to communication, email was identified by both groups of students as being the easiest and preferred way to communicate with the lecturer. This was also the lecturer's preferred method of communicating with the students (apart from in class communication), which may have had a minor effect of this result.

CMS1000

A brief summary of this data shows that, 79% of students liked the CD format and found it easy to navigate, one students commented: *'Now that I have moved on to another subject, without a CD, I'm realising just how useful the CD was and how difficult I am finding it to learn solely from text. Thank you for the CD!!!'* The ease of access to printed materials has been a perceived concern, however in this case the preference by students to have access to print was evenly split (50/50) with only 9 students identifying they wanting to receive only print. The majority of students (86%) were happy to receive the CD and either print what they required or purchase the print from the

bookshop. They required access to print for three main reasons; for portability, so they could highlight important points and to save them having to use the computer all the time. The interactive elements used on the CD (such as breeze presentations and multimedia based tools) where very highly valued. 80% of students identified these as helping them to learn the content. Only 10% of students didn't find them helpful. This sentiment is summed up in the following two comments: *"Sometimes reading is not enough to get it into your head and it needs to be spoken, the CD completes that need effectively".* And, *"Yes. Presenting material in a variety of formats and ways facilitates and stimulated my learning".* One particular area of concern was that 10 student's experienced technical problems with the CD that they could not fix themselves, however eventually most of these problems were resolved satisfactorily. The use of the USQ*Connect* environment was as an essential part of the course design with 80% of students finding the integration of the discussion forums helpful.

This course will continue to undergo further upgrades in relation to the types of resources made available to the students. A series of formative quizzes will be added to the CD and more images and icons will be integrated into the environment. The lecturer for this course (Eleanor Kiernan) was extremely pleased with the responses made by the students and has seen a distinct advantage in proving course materials in this way. It was seen that it is extremely important to make the expectations for using the CD based environment as clear as possible to students both from the perspective of the lecturer and the university. Explicit instruction need to be given to students as to how to access the printed version from the bookshop or the most effective strategy for printing these out for themselves. One possible strategy to alert students to the option of buying the printed version is to place an explicit statement on the course specifications that students can access prior to enrolling in a course.

What lessons were and were not learned about Transmodal delivery

Due to the limitations of space in this paper providing a full description of all the research findings was considered impractical; however, this paper would like to highlight some key lessons learned from across the different research projects. These include:

- Due to time and resources required to develop a quality CD, it is recommended that conversion from print to CD be a staged process over two offerings of the course. Some of the multimedia elements should be developed in the first offering and housed on the course homepage while still offering the course in printed version, and then once all multimedia elements have been developed the course can be delivered via CD for the second offering.
- It is essential that CD courses represent added value for students and staff should not be allowed to simply dump print-based courses on a CD.
- The elements that represent most value for students appear to be those which have visual and/or audio components. In particular, students value recorded lectures (Breeze – PowerPoint plus audio), audio explanations, and interactive diagrams (with text-based and audio explanations).
- Hyperlinked examples and activities are also valued; however, it is essential to try to check that links are current.
- It is important that when additional multimedia based elements are used thier presence should be made explicit to students by the use of markers or easily recognisable icons. Where appropriate, give clear instruction as to how to utilise these elements for maximum benefit. It should be clearly indicated if these elements are an alternative representation or if they are to be viewed or heard as stand alone information.
- More visuals should also be integrated into this style of presentation. This will allows students to concentrate on something other than just the voice and will also serve to visually reinforce the concepts.
- Formative quizzes were identified in many courses as being extremely useful to the students; these should be incorporated on the CD and contextualised into the materials.
- The use of printable resources is important, particularly for mature age students and those with a read/write learning preference. If audio components are incorporated a transcript of the text should also be made available. This will allow students to highlight and make notes

where required. This has also been shown to help international students not only understand the materials better, but also aid their understanding of the English language by aurally reinforcing what is written.

So far those involved in these different research projects have gained quite a good understanding of how the students have felt about the change to Transmodal delivery. Research to date has focused on the design of the environments, the perceptions of students at different year levels and in different disciplines, and it has used a range of methodologies to elicit these perceptions (figure 5). Interestingly, an informal community of practice has begun to emerge among the staff involved in developing this new form of delivery. This has not been driven by institutional mandates, rather from a shared experience of pitfalls and successes. It has also been seen that the staff involved have recognised that what is being developed has a significant potential to improve the quality of the learning and teaching approaches adopted at USQ. However, stemming from this informal community of practice, it has become clear that there may be a further perspective to Transmodal delivery that needs to be understood; that is, to gain an appreciation of related staff issues. It appears that there may be barriers to the uptake or adoption of this new approach that need to be investigated to complete our understanding of this new planet 'Transmodal delivery' (figure 6).

Figures 5(left) and 6 (right). Looking at Transmodal delivery from all these different perspectives may complete our understanding of planet 'Transmodal delivery'

The last frontier: Understanding the academics

It is clearly one thing to look at Transmodal delivery from the perspective of the student; however, when a fundamental institutional change like this occurs it may be seen that decisions are sometimes based on expedience, rather than on the desires of the academic community as a whole. While it is assumed that many of the factors that impact on the propensity and willingness of academic staff to adopt and integrate educational technology may well be similar, there may be other factors that explain why staff may or may not choose to adopt Transmodal delivery. The high cost of technology and the vast investment in infrastructure that many universities have made means that the adoption of educational technology by academic staff is prudent. However, this adoption may not necessarily result in sustained and meaningful use of this technology (Weston 2005). Therefore, staff must first recognise the opportunity this presents to be sufficiently motivated to use it. Moreover, Butler and Blashki (2003) lament that the extent to which of the use of contemporary technology for distance education has been 'limited to simple replication of existing distance education processes' (p. 636), for example the simple dumping of print-based material onto a CD or online.

Despite the many pedagogical benefits associated with the adoption of educational technology, as seen in the above mentioned studies, Jacobsen and Friesen (2002) found that, 'both philosophical and pedagogical barriers to innovation exist when teachers shift from information-transmission to designing technology-enabled, constructivist learning environments' (p.4). In particular, the need to adapt one's teaching style and redesign course content has presented a major barrier for some educators (Jones & Kelley 2003). Entrenched instructional practices, lack of clarity about the

benefits of technology, lack of willingness to take risks, and the need for more rigorous course planning has deterred some faculty from changing familiar instructional practices (Weston 2005). Indeed, the successful integration of educational technology requires an adjustment of pedagogy to allow for active participation, authentic tasks, collaborative learning, and individualised feedback (Knowlton 2002), an activity that does not come without significant cost implications.

For educators to modify teaching styles (some of which are very well entrenched) and develop new skills to effectively integrate technology into courses, developing an understanding of the relationship between learning, interactivity, and technology is seen as essential (Rockwell et al. 1999). Hence, in adopting and integrating educational technology, there is a real need for specific training in these areas (Hazari 2004). Some academic staff have also expressed pedagogical concerns, in relation to the impact educational technology will have on student learning, and others have expressed a lack of confidence in the benefits for students (Ebersole & Vorndam 2003; McAlpine & Gandell 2003). Thus, Munoz (1993) stressed the importance of being ethical in the use of educational technology and warns that educators should 'resist the seductive force of technology to replace rather than enhance' (p.49). Further, it is seen that perceptions of the applicability and value of educational technology varies across subject domains (Betts 1998). For example, some subjects lend themselves more to visualisations, such as the Arts, while other subjects may make greater use of information on the Internet, such as business-related subjects.

A further issue that needs to be addressed is that some staff tend to react (even over react) to students' concerns when shifting from face-to-face instruction to online courses or from printed materials to electronically-delivered materials (McPhail & Birch 2004). Student resistance may arise due to a variety of factors including loss of face to face interaction, the cost associated with printing materials, lack of access to hardware and software, or a lack of computing skills (McPhail & Birch 2004). The bottom line for many academics however is the fear of a negative impact on student evaluations, if the technology does not work or is not accepted by students. These are real concerns; concerns that need to be understood when moving to a new form of course delivery. Concerns that if not adequately addressed may well lead to a decline in the job satisfaction of academic staff, which in turn may lead to a decrease in motivation, and that may ultimately lead to a decline in their effort expended on learning and teaching.

Conclusion

The findings from the variety of research projects investigating the Transmodal delivery of courses indicates that students had positive attitudes toward and value the CD based courses and the various multimedia components housed on the CDs. It was seen in the feedback given by students that higher levels of student engagement were possible when utilising imbedded multimedia elements and that these were seen to cater for a range of different learning styles. In particular, students agreed that they enjoyed using the course CD, found it easy to use and navigate, and also agreed that the course CD had assisted their performance in the course. This was primarily achieved by providing a more complete representation of the information being presented, thereby increasing the opportunity of students to engage with their learning materials. Importantly this was achieved whilst also maintaining a balanced environment for more traditional learners, at the same time as integration of a range of multimodal learning and teaching strategies was implemented for those who learn in non-traditional ways. These findings may encourage more educators to consider the adoption of educational technology for the purpose of designing and delivering distance education courses, due to the potential pedagogical benefits that may be achieved in terms of student satisfaction with the course resources, enhancing the students' learning experience and perceptions of improved performance. However, in doing so there are important issues relating to how academic staff may react to the implementation of these new technologies also need to be investigated before the full benefits to the learning community can be fully realised.

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