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Blended and online learning: student perceptions and performance

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Purpose – The purpose of this paper is to improve educator knowledge of the antecedents and consequences of blended learning in higher education.

Design/methodology/approach – A longitudinal case study approach is adopted. Three case studies each involve tracking a student evaluations of teaching (SET) measure (willingness to recommend) and grade point average for three subjects from the same business discipline over six years. The cases involve comparison of: a business subject taught solely online; a business subject where experimentation in the blend of face-to-face teaching and learning is involved; and a business subject where face-to-face teaching is primarily used, and where in the most recent iteration online content supplements the learners' experiences.

Findings – The findings suggest that there are situations where integrated use of blended learning involving face-to-face teaching, digital media and digital communication with simple navigation between the content items leads to positive student perceptions. This is in contrast to negative student perceptions in the situation where learners must navigate in online learning, and where there is little or no face-to-face instruction. While not examined in detail, nor part of the research question, it is not surprising to find no relationship between learning mode and grade point averages is evidenced.

Research limitations/implications – The effects of prior computer literacy and language proficiency across the students used in this study, and potential demographic and experiential differences between on-campus and off-campus students are not controlled for. Additionally, only three business subjects are investigated and it is recognised that there is a need for a broader study. Finally, with response levels to the university-controlled SET that typically range between 20-43 per cent for these large subjects, there is possible non-response bias that it was not possible to counter over the six years involved.

Practical implications – The findings in this study suggest that while blended learning offers many benefits to higher education institutions and learners alike, care needs to be taken in the manner in which such approaches are implemented in light of possible negative learner perceptions where a less traditional approach is taken.

Originality/value – A major contribution of this study is the fact that experimentation has taken place in terms of the degree of face-to-face and online learning that have been blended in at least one subject (case study two), and the fact that the SET for this subject are compared, longitudinally, with two other subjects which lie on either side of this subject in terms of the extent of online and face-to-face teaching and learning employed – 100 per cent online in case study one and almost 100 per cent face-to-face in case study three.

Keyword(s):

Australia; Undergraduates; E-learning; Learning methods; Lifelong learning; Distance learning.

Introduction

In most ways, modern universities are no different to profit-seeking corporations. Even public sector universities which might be regarded as not-for-profit organisations must achieve operating surpluses if they are to continue to serve the purpose which society sees them as fulfilling, whether from teaching and research operations or from investments. In the case of teaching operations, technology is seen as a means of achieving cost-effectiveness – a matter which is re-examined in the educational context in the present paper.

The paper commences with a review of distance education development in the next (second) section. In the third section, the use of tools and technologies and the resulting student evaluations of teaching (SET) employing secondary data is described. In the following (fourth) section, discussion of the findings of Australian case studies involving three undergraduate degree study subjects is presented. The paper closes with commentary on the ramifications of the findings of the case studies and sets out a suggested future research agenda to more fully answer the research propositions examined.

Background

Educators have long used various tools and technologies to enhance their communication with audiences, and have long sought to engage them interactively. These tools may be grouped in terms of their importance as Bates (1995) suggested, and as has been done in Table I, culminating in the use of digital tools and technologies enabled by the computer – particularly the networked microcomputer.

The use of the microcomputer has been particularly evident in what is termed distance education and synchronous digital communication of the type set out in Table II, and which is referred to herein as knowledge media. A view of the distance education development timeline is shown in Figure 1.

The main point to be made from the timeline presented in Figure 2 is that universities and their approach to teaching and learning have been transformed by telecommunications, multimedia (TMT) and transmission control protocol/internet protocol (TCP/IP) convergence. It is reiterated that the TMT acronym refers to convergence in TCP/IP (e.g. the World Wide Web and associated tools such as Wikis, Blogs, YouTube, Second Life and social networking generally, multimedia (e.g. all manner of packaged DVD and online tools such as the Sony Playstation 3, Home 3D) and telecommunications (e.g. wide area networks (WAN) and 3G mobile telephones). The advent of TCP/IP tools has led to use of such online course management systems as Blackboard which now embraces a product originally released as WebCT Vista. Additionally, products like eLive (synchronous communications), iLecture (lecture recording and streaming) and screen recording software (e.g. Camtasia, Breeze and CaptureCam pro) have entered the toolbox of most university educators whether teaching on- or off-campus students.

SET and learning outcomes

Global market coverage by Australian education institutions and the ensuing enrolment of international students has assisted many universities to gain cost-effectiveness (Back *et al.*, 1996). This is particularly so with regard to postgraduate education concerning which

Cunningham *et al.* (1998, p. xvii) advised that the higher education sector needed to develop strategies to compete effectively in the "profitable lifelong learning market".

More than one university has taken this message to heart, and in this regard, a major Australian university which offers on-campus and off-campus courses has adopted this by requiring every graduate of the university to complete at least one "wholly online" subject. Whether enrolled in on- or off-campus mode, graduates of this university will have completed a subject where there is no face-to-face tuition, and all subject content is delivered via digital means – which may include packaged (e.g. DVD movie clips) and/or online content (e.g. streamed podcasts). Turning to this university's most popular undergraduate business degree, one of the ten core subjects all students take towards the degree, the Marketing I subject was offered exclusively via this digitally mastered mode from 2004 to 2009. This subject forms one of the case studies presented in the present paper. By the end of 2008, some 36 subjects were offered in this mode. Many more are offered simultaneously in on- and off-campus study modes such that students might attend face-to-face lectures and tutorials, and also have access to digital versions of this content. Two of these subjects Direct and Online Marketing and *Strategic marketing* form two further case studies that are discussed in the next section and employ blended learning, an approach that is thoughtfully discussed by Bluic *et al.* (2007), and their definition has been adopted in the present paper.

Digitally delivered subjects, whether wholly online or blended, are important for undergraduate students if for no other reason than they prepare them for lifelong learning in an energy-starved world where digital modes of delivery may be de rigueur. Moreover, they may give a competitive advantage to the universities that are seen to be adept in distance education using digital tools and technologies when those with first degrees seek to pursue further studies. Nevertheless, there are limitations in the use of knowledge media and issues abound concerning how the learning process is affected by the use of knowledge media and how this is reflected in SET (Clayson, 2009; Palmer and Holt, 2009; Rovai *et al.*, 2006). Clayson's meta-analysis found that in the case of business subjects like those investigated in the present study, there was no statistically significant association between learning and SET, and in studies conducted in other disciplines, there were mixed results such that the "overall pattern [however] was not significant [$\chi^2 = 3.28$, df $= 2$, $p = 0.184$]" (Clayson, 2009, p. 23). In effect, objective measures of SET are unrelated to learning.

Turning to SET as a measure of satisfaction, studies in the services context have indicated that customer satisfaction depends on the type of product, and the service attributes that customers experience (Gustafsson and Johnson, 2004). Palmer and Holt (2009) suggest that student satisfaction in the wholly online teaching environment is driven by how confident learners feel about their ability to communicate and interact in the online teaching space. The learners also need to know what is required to succeed and how well they are performing against these criteria. In the case of blended learning, Smart and Cappel (2006) found that overall satisfaction in blended learning environments is higher in the case of elective subjects relative to compulsory subjects. Furthermore, satisfaction with the online component was negatively correlated to the time commitment and effort required to complete online subjects, with older students indicating higher overall satisfaction. A growing body of literature shows that where students have prior technological literacy, they tend to indicate higher satisfaction with online instruction (Henry and Stone, 1994; Simmers and Anandarajan, 2001).

Studies of the influence of service quality on customer perceptions of satisfaction, and retention in the commercial environment, have shown the importance of this measure over

time (e.g. Cronin and Taylor, 1994; Jones and Sasser Jr., 1995; Reichheld and Sasser Jr., 1990; Zeithaml *et al.*, 1996). While this is not meant to enter any debate over whether students are customers, satisfaction is also important in the education context (Clayson, 2009; Palmer and Holt, 2009; Smart and Cappel, 2006). However, one difference is that students form a captive market. Reichheld and Sasser established that once customers are no longer captive to companies, they expect total satisfaction as do customers in competitive markets. In the education environment, Palmer and Holt established that satisfaction arises from meeting students' expectations on important attributes such as prompt feedback on assignments, and setting out clear expectations as to which criteria will best lead to good marks. Gustafsson and Johnson (2004) point out that it is important to perform high on attributes regarded as of high importance and where performance is low.

The issues concerning online instruction were alluded to by Laurillard (1994, p. 19) in that

[…] [p]rint can do little more than convey the teacher's description, one aspect of discussion. It may request that the learner express their own description but cannot require it the way that a face–to–face dialogue can. It can express the teacher's reaction to a possible learner description, but cannot react to an actual expression of the learner's understanding the way a face–to–face dialogue can.

Laurillard (1994) also made the point that a vital part of the learning process concerns the interaction between the learner and the world, and that in the formal learning environment this world is teacher-constructed. The learners' interactions may be with others (groups or syndicates), with an interactive workshop topic or some other abstraction of the real world. However, the point must be made that digitally delivered subjects using knowledge media of the type alluded to in Table II allow limited adaptation and reflection of the type indicated in Figure 2.

It either takes a face-to-face encounter or the use of such synchronous tools as eLive to permit true interaction. The latter is one of many internet technologies that permits real-time collaboration between people in different locations, and permits the highest level two-way interaction. However, there are limitations on the number of those interacting, particularly due to bandwidth and participant management considerations. Arguably, a combination of technologies is required to gain reasonable support for the learning process in instances where there is to be any reduction in the level of face-to-face interaction.

Laurillard (1994, p.19) also described the learning process in terms of four elements (see Figure 2):

1. *Discussion*. Between teacher and learner at the level of descriptions.
2. *Interaction*. Between learner and some aspect of the world defined by the teacher.
3. *Adaptation*. Of world by teacher and action by learner.
4. *Reflection*. On learner's performance by teacher and learner.

In developing the subjects discussed in the case studies presented in the next section, this learning process was used, and led to development of the following proposition:

P1. When undergraduate students learn in a wholly online environment, as opposed to a blended learning environment, they perceive there to be limited adaptation and reflection, which is indicated in their evaluations of teaching practices.

Another aspect of making knowledge media available as a substitute, in all or in part, for face-to-face interaction is that on-campus students may disregard the importance of discourse, and since attendance is not compulsory, they neither attend classes nor find time to engage with knowledge media content. Arguably, Anwyl *et al.* (1987) would add that introducing compulsory attendance at classes to build knowledge would not be a satisfactory solution to this dilemma.

Laurillard (1994) also pointed out that with the arrival of larger on-campus classes it is only to be expected that support for learners was, and arguably, remains, on the decline. This is particularly so in an educational environment where educators place a high priority on building a research profile (Polonsky, 2008). On the teaching side, the arrival of a perceived saviour, in the form of a cluster of technologies already termed knowledge media, saw the rise of devotees of what might be variously described as "learner-oriented", "constructivist" or "exploratory" learning theories (Laurillard, 1994, p. 25). Harper and Hedberg (1997) provided a review of a number of knowledge media initiatives (by self-professed constructivists) in terms of the framework proposed by Duffy and Cunningham (1996). Laurillard (1994) stressed the point that while it is common to convert existing "content" into multimedia/hypermedia teaching materials, this practice should be resisted, arguing that what may have worked well in a narrative by an educator, may not be as effective in a new media format. She also suggested that the study guide used to navigate a course of study might not serve a useful purpose in a new medium. That is, another form of navigational device may be warranted. Students using knowledge media expect control over their direction using mechanisms such as hypermedia links, among other differences from face-to-face classes. This does not mean that "discovery learning" is effective either, even though a computer-mediated approach using the internet might support this approach better than other media. This led to development of a third proposition:

P2. When undergraduate students learn in either a wholly online environment or a blended learning environment, they prefer a live "Navigator" over a study guide as a means of navigating subject content.

Case studies

In this section of the paper, three case studies are discussed. The case study approach sets out the development of three separate undergraduate marketing subjects, each employing blended learning to varying degrees. The case studies are also used to discuss evidence concerning the propositions presented in the immediately preceding section. The first case study involves a subject where learners are totally dependent on knowledge media, a wholly online subject – Marketing I. The second case study involves the subject direct and online marketing. As will be shown, this subject has been used to vary the dependency on knowledge media relative to face-to-face teaching, and more recently with a form of blended learning, with results that differ from both the first and third case studies. The third case study, strategic marketing, while also employing knowledge media, also makes the most use of face-to-face teaching in a blended learning approach. In closing the discussion in the present section, an examination of grade points is discussed.

SET data in the present study were centrally collected, online, by the university administration. The core items are as follows: this unit was well taught; the course materials in this unit were of high quality; the workload in this unit was manageable; requirements for completing the assessment tasks in this unit were clear; the teaching staff gave me helpful

feedback; the library resources met my needs for this unit; I would recommend this unit to other students; the online teaching and resources in this unit enhanced my learning experience. Rather than use the full questionnaire employed across all subjects in the university, we used a single indicator – "Would you recommend this subject to other students?" As discussed earlier, one reason for doing so was due to the findings by antecedent studies regarding the tenuous relationship between SET and learning outcomes. Another was because of the use of such an item in satisfaction studies (Keiningham *et al.*, 2007). Despite the many who might hold contrary views, it might be argued that it is only necessary to ask one question rather than a battery of similar questions in this regard (Rossiter, 2002, 2005).

Case study one – a wholly online subject

Marketing I is one of the three largest subjects offered by the university in this study. The subject was made one of ten core subjects comprising the Bachelor of Commerce 24-subject degree course in 2001. Given this fact, the subject is mainly taken in the first semester of the second year of a full-time student's degree, and is accordingly labelled as a second level subject.

In 2003, university management made the decision that every graduate of the university would complete at least one wholly online subject. Marketing I was the first core subject in the business degree offered without face-to-face interaction and therefore was wholly dependent on knowledge media. The subject was first offered in "wholly online" mode in semester two, 2004.

In effect all students became off-campus students in their study mode for this particular subject. The perceptual difficulties students experienced soon became evident in SET. This was particularly evident in the case of on-campus students whose SET of 3.7 (on a 5-point scale) was much lower in 2005 than the 4.1 recorded for off-campus students. As Figure 3 indicates, students have not been as favourable in their evaluation of this total reliance on knowledge media.

Figure 3 presents a comparison of the weighted average SET of all business and commercial law subjects with the evaluation of the Marketing I subject using a single indicator–"Would you recommend this subject to other students?". The results show that since the subject was first offered in this mode, SET has mostly declined over the seven year period highlighted. This, despite the fact that the SET for all subjects on this particular single indicator rose during the period examined. This SET indicator was used in part because some of the other scale items used do not relate as readily to the online learning environment, e.g. "This subject was well taught". As indicated earlier, studies of the influence of service quality on customer retention have shown the importance of this measure over time (e.g. Cronin and Taylor, 1994; Jones and Sasser Jr., 1995; Reichheld and Sasser Jr., 1990; Zeithaml *et al.*, 1996). This is not meant to enter any debate over whether students are customers.

In line with Laurillard's (1994) recommendations concerning the use of knowledge media in order to meet the teaching objectives for this subject employing knowledge media but no face-to-face tuition, the following was implemented in this subject:

1. *Discussion*. In breaking down the ultimate goal into more manageable goals, separate online discussion areas on Blackboard included a Social Club and separate discussion areas for assessment items, topic by topic discussion and more. There was provision

of expert commentary on the goals of the subject and on a topic by topic basis. There was provision of the means for learners to articulate their own commentary in aforementioned online discussion areas and via emails to a list server.

2. *Interaction*. Student interaction has been relatively high, having been stimulated on a topic by topic basis. As an example of success, this resulted in a 214 per cent increase on year ago to some 16.06 posts (messages) per student on Blackboard in 2006. Audio visual recordings of exam "How To's" were streamed from Blackboard and audio visual recordings of lectures were distributed on CD-ROM.

3. *Adaptation*. In most instances, expert analysis in the form of audio-visual "How To's" on such topics as pricing were made available only after students had completed or attempted to complete the exercise. To replace the previously used printed study guide, a HTML study guide was developed with hyperlinks to relevant academic journals and to publisher-provided and university instructor-developed digital multimedia content, including the publisher-provided wholly online version of the marketing textbook. Progressive assessment included completion of 20 randomly drawn multiple-choice test banks for each of the topics involved and which together accounted for 30 per cent of marks Certification involved a hard copy, essay-style final examination completed in examination centres managed by the university.

4. *Reflection*. Student reflections were incorporated as part of the formal assessment regime and accounted for 20 per cent of marks.

The findings in Figure 3 indicate support for P1, albeit that there was a slight upturn in SET for this subject in second semester 2008 which it is not possible to explain without qualitative investigation. That is, many students perceived that total dependency on knowledge media coupled with online discussion and interaction via a computer-mediated medium did not fully meet their educational needs. Off-campus students tend to be older and more self-directed, and this may explain their tendency to hold a positive perception of this mode of learning and to appreciate structure (Dynan *et al.*, 2008). The implications concerning *P2* are discussed later in this section of the paper, and the reader is now directed to case study two.

Case study two – direct and online marketing

The subject Direct and Online Marketing was introduced in semester two of 2002 and has been offered in semester two of each year since then. The data presented in Figure 4 for this subject cover the period 2003-2008.

Once again, Laurillard's (1994) recommendations were employed in the use of knowledge media in order to meet the teaching objectives for the subject and are employed in describing the use of both face-to-face teaching and knowledge media in various blended learning permutations over the period 2003-2008:

1. *Discussion*. For 2003-2005, face-to-face lectures were accompanied by computer laboratory tutorials. For the entire period, Blackboard was used so that there were separate online discussion areas for a Social Club and separate discussion areas for assessment items, topic by topic discussion and more. There was provision of expert commentary on the goals of the subject and on a topic by topic basis. Additionally, there was provision of the means for learners to articulate their own commentary in aforementioned online discussion areas and via emails to a list server.

2. *Interaction*. Pre-recorded lectures on CD-ROM were used from 2003 to 2007. In 2007, teaching was outsourced due to the unavailability of the lead educator, who

returned to take the subject in 2008. Audio visual recordings of exam "How To's" were streamed from Blackboard but not linked from Navigator. Rather, they were hyperlinked in posts (messages) in a topic discussion area. This was designed to increase interaction.

3. *Adaptation*. In most instances, expert analysis in the form of audio-visual "How Tos" on such topics as pricing were streamed from Blackboard only after students had completed or attempted to complete the exercise. A detailed study guide was made available on CD-ROM during the 2003-2007 period with adaptation as newer releases of the textbook became available. In 2008, this was replaced by a single HTML document "Navigator" which set out the links to all content including many hyperlinks to online academic journal articles in one document. No CD-ROM was used, rather Navigator was available on Blackboard. Face-to-face lectures which had not been used in 2006 and 2007 were re-introduced. Specially recorded podcasts presented 20-30 min versions of the lectures and referred to lecture slide number and textbook and journal readings. Rather than hold weekly face-to-face tutorials, four workshops were held during semester to introduce the subject; introduce the assignment; have an industry speaker talk on the assignment topic; and conduct a final examination review. Moreover, blended learning employed face-to-face lectures and shorter, tailored, streaming podcasts of the lectures were hyperlinked from topic discussions so as to stimulate online discussion. Certification took the form of an essay-style three-hour examination held in examination centres around the world.

4. *Reflection*. Student reflections were incorporated as part of the formal assessment and accounted for one-fifth of the 30 per cent of marks carried by the assignment. It is to be noted that the assignment was completed on an individual basis during the 2003-2007 period, but became a team effort involving three students per team in 2008. Each team had their own discussion area wherein they could build their assignment and reflect on each others' contributions.

It is suggested that the lower SET shown in Figure 4 for the 2005-2007 teaching period is mostly owing to the almost exclusive reliance on knowledge media and digital communication with no face-to-face interaction. Furthermore, it is suggested that the turnaround in 2008 is owing to the introduction of blended learning which involved a re-introduction of face-to-face lectures with four accompanying workshops, the streaming of podcasts of tailored and shorter lectures, and the introduction of team-based progressive assessment. Student comments highlight the use of face-to-face delivery. It is the authors' contention there is further support for P1 based on this case study.

Case study three – strategic marketing

Strategic marketing was offered in the second semester as a capstone subject in the undergraduate marketing curriculum. The subject entailed blended learning involving face-to-face and online content delivery and discussion modes for on-campus and off-campus cohorts across multiple campuses. As with the first and second cases, this blended mode offering catered to both domestic and international students. Strategic marketing used similar teaching resources described in the previous case studies, such as the CD-ROM, knowledge media content using a Blackboard interface and online discussion groups. In addition to face-to-face lectures to a large cohort, smaller face-to-face tutorials were used to discuss the subject content more intensely. Figure 5 presents the performance of the strategic marketing subject over the period 2003-2008.

Laurillard (1994) suggested that knowledge media can deliver teaching objectives by using constructivist ideas, and these have again been used to discuss the blended learning approach taken in 2008.

1. *Discussion*. Using the knowledge media perspective, the strategic marketing subject used a "live Navigator" to complement the face-to-face teaching interaction. Week-by-week topic discussion areas on Blackboard offered the same content that was delivered during the face-to-face discussions. Discussions during on-campus tutorials were recreated using mp3 sound recordings that were available online to students. By using knowledge media content and the interactive capabilities of a Navigator, the instructor was able to keep students motivated to return to the discussion on a weekly basis. The Navigator approach enabled the subject material to be accessed in one digital location and made it easier to synthesise and review content for all students. Face-to-face lectures and online discussion were designed to be a seamless experience for students irrespective of campus, cohort, domestic or international.
2. *Interaction*. Between 2003 and 2007, the subject mainly employed face-to-face interaction with limited content and discussion on Blackboard. This could not be described as blended learning. In 2008, the strategic marketing subject operationalised interaction using vodcasts (streaming audio-video). The objective was to offer students the opportunity to revisit concepts that were covered during the face-to-face lectures. These revisited some of the more challenging conceptual study material that required more in-depth analysis. Students who missed a face-to-face lecture could catch-up by watching the vodcast accessed from hyperlinks in a "Navigator" employed to help them find their way through the content. After each face-to-face session, a follow up 20 min vodcast was released, dedicated to demonstrating how to apply concepts covered in the reading list. Each vodcast ended with a quick review of the relevant concepts covered in the chapter, journals reading and practical application exercises.
3. *Adaptation*. Laurillard (1994) suggested that good knowledge media practice should make expert analysis available only after the student had an opportunity to offer own input. The "Navigator" became a useful tool to release the vodcast at the appropriate time to aid student learning after their face-to-face inputs. With most distance education subjects, students receive printed material, CD-ROMs and teaching resources in advance of the subject commencing. A different "live" approach was taken in this subject in that Navigator links to available subject content was offered.
4. *Reflection*. The final step in the Laurillard (1994) constructivist process is to manage reflection. Learners need to reflect on the information and content covered during the learning process, and in this subject from the use of case studies. The strategic marketing subject dealt with this by requiring students to submit a "trainer's note" as a way of thinking about what they are communicating to management. This tool prompted students to reflect on their own interpretation of the reading materials by teaching others what they were learning from their own analyses.

It is suggested that the upward trend line in Figure 5 for SET in 2008 is due mostly to blended learning and the interactive methods employed.

Live "Navigator" vs study guide

Earlier, the authors alluded to a point made by Laurillard (1994) that the study guide used to navigate a course of study might be as useful where subjects involve knowledge media. In

seeking an answer to her question as to whether another form of navigational device might be beneficial, the three subjects comprising the case studies each use a live "Navigator" as opposed to a study guide. Study guides had hitherto taken the form of a large printed document, and more latterly distributed on CD-ROM, on a topic by topic basis. The study guide typically ran to some six to ten pages for each of 12 topics. The study guide also included navigation to suggested textbooks and academic journal reading and often included tutorial-style exercises. In most instances, students saw the study guide as alternative reading to the prescribed textbook, despite any instructions to the contrary by educators.

In case one – Marketing I – a Navigator was made available as a Word file with hyperlinks on Blackboard (Blackboard) in addition to the study guide from semester one 2007. However, as Figure 3 illustrates, the single indicator SET continued its decline. In case two – direct and online marketing, a HTML version of a live Navigator was introduced in semester two 2008 as a replacement for the CD-ROM content which included specially pre-recorded audio-visual lectures and a study guide. It is the authors' contention that the re-introduction of face-to-face lectures together with use of an evolving (and date-stamped) navigational document directly led to the more positive student perceptions of the subject shown in Figure 4. In case three – strategic marketing, face-to-face lectures were continued, as were face-to-face tutorials, in semester two 2008. However, the use of a live Navigator was introduced. In this case, there was a greater increase in positive perceptions as reflected in SET presented in Figure 5. Thus, there is some support for *P2* in the two blended learning cases that students using knowledge media gained control over their direction using mechanisms such as hypermedia links, and were surer that they needed to complete the suggested reading, rather than simply rely on a study guide.

Case study discussion summary

The results indicate the strongest support for P1 from the third case study experience. All three subjects experienced a rebound in SET during 2008, but it was most pronounced in strategic marketing (case study three). In short, the subjects employing blended learning showed greater student satisfaction based on the single indicator of satisfaction employed. That is, the greater the face-to-face contact in blended learning, the better the perceived satisfaction. We suggest that this is due to the perception of high work loads associated with wholly online study relative to the mainly face-to-face approach taken in strategic marketing as Smart and Cappel (2006) suggested would be the case. While it must be acknowledged that the single indicator of satisfaction used in the present study does not provide an understanding of the quality of teaching nor whether SET improved because students were clearer about the learning objectives and criteria that lead to good student marks, Clayson's (2009) meta-analysis suggests that this is the reason why more objective measures of learning outcomes should be used. This single measure can only be regarded as a surrogate for the other aspects of student learning mentioned.

Although no specific propositions have been framed concerning grade point averages, a comment is warranted. Despite SET moving between two low and high points from 2003 to 2008 for all subjects under scrutiny in this study, grades have remained quite static and have averaged 59 points with a narrow standard deviation. It is instrumental to note Clayson's (2009) reminder that in the case of business/marketing subjects the grade/evaluation association is not the same as the learning/SET relationship.

The live "Navigator" is preferred over the static book style of study guide, indicating that *P2* is supported. Students simply prefer to see paper-based reading materials in a study guide come alive when it is presented in a useful hypermedia format. That is, when such a tool aids efficiency and speed in the learning environment, it is appreciated more so than online tools which take more student time to grapple with, as Smart and Cappel (2006) suggested. Face-to-face students expressed positive comments about being able to access reruns of the lecture and tutorial discussions in streaming video format, confirming the earlier in-class experience, for the same reason.

Student performance

Table III presents the grade point average for the subjects in the three case studies and the mean for business and commercial law undergraduate students for the 2003-2008 period on a semester-by-semester basis.

Although not part of the research question, it is not surprising that there is not a corresponding relationship with grade point averages evident as meta-analysis has shown (Clayson, 2009). In reality, many factors such as leniency, reciprocity and rigour account for grades.

Limitations

The findings in the present paper suggest that there are merits in using a blended learning environment over a wholly online environment when teaching undergraduate marketing subjects. In each case, the dependent variable was a single-indicator SET score concerning willingness to recommend the particular subject to other students.

There remain issues which might be regarded as limitations in this study. First, it was not possible to test the propositions in a more rigorous experimental design. Second, prior technical proficiency has not been controlled for. Nor have the effects of language proficiency across the students used in this study been controlled for, as Radia and Stapleton (2008) suggested they should. Fourth, potential differences between on-campus and off-campus students have not been controlled for. Arguably, off-campus students are more mature and bring their work and life experience to the classroom, while on-campus students are younger, less experienced and do not have the same level of self-discipline when studying (Smart and Cappel, 2006). Fifth, only three business subjects have been investigated and as other researchers have commented, there is a need for a much broader approach as suggested by Bluic *et al.* (2007). Finally, with response levels to the university-controlled SET ranging between 20 and 43 per cent of quite high enrolment levels for these subjects, there is non-response bias that it was not possible to counter over the six years involved.

Future research directions

There is the need to extend the present study. Educational researchers might consider tracking individual students over an extended period. Most research focuses on once-off cross-sectional data when describing online teaching experiences. It is clear that there is a need to ascertain student perceptions of the various elements used in blended learning in the cases presented, and more broadly. This will entail both qualitative and quantitative research. An experimental design study using subjects studying for other degrees would be instrumental in

providing greater insight into the benefits of blended learning where various elements are varied. Such a design should control for the variables identified in this study.

International students will continue to study at universities across the globe, and it will be necessary to tailor the learning experience for these students, with blended learning playing a greater part in this process. Given labour costs, energy shortages and the time pressure that now causes both undergraduate and postgraduate students to spend less time in class, there will be a greater need for universities to employ blended learning with less face-to-face teaching and further research is needed.
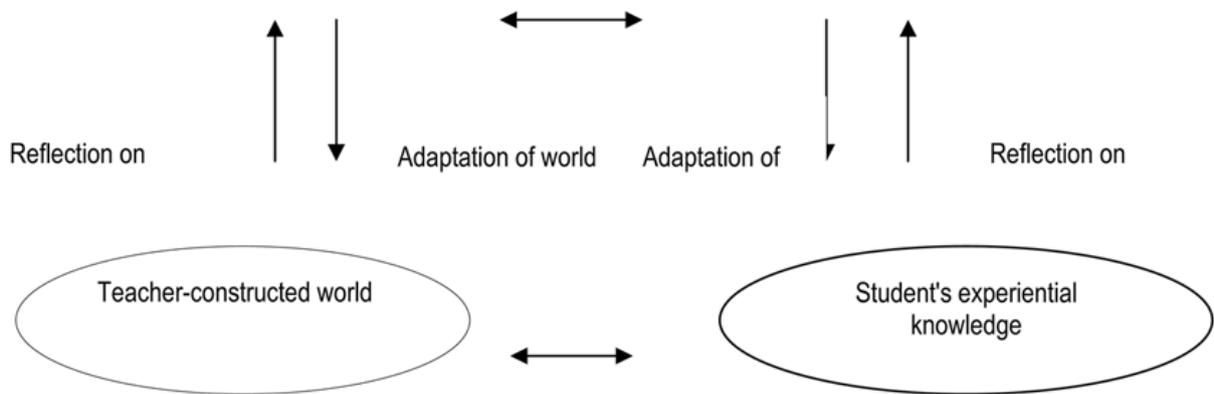
Conclusions

The paper discussed three approaches to teaching large classes over a six-year period. The wholly online option (case study one) was compared with the more traditional face-to-face method highlighted in case study three and which culminated in 2008 with a dramatic increase in the use of blended learning. case study two involved the use of blended learning following on from reliance on face-to-face, and then a wholly online approach. This enabled the testing of the each delivery method against SET as a performance measure. Student perceptions indicated that they favoured a blended learning approach that while it involved face-to-face teaching, it also incorporated knowledge media and used a live Navigator.
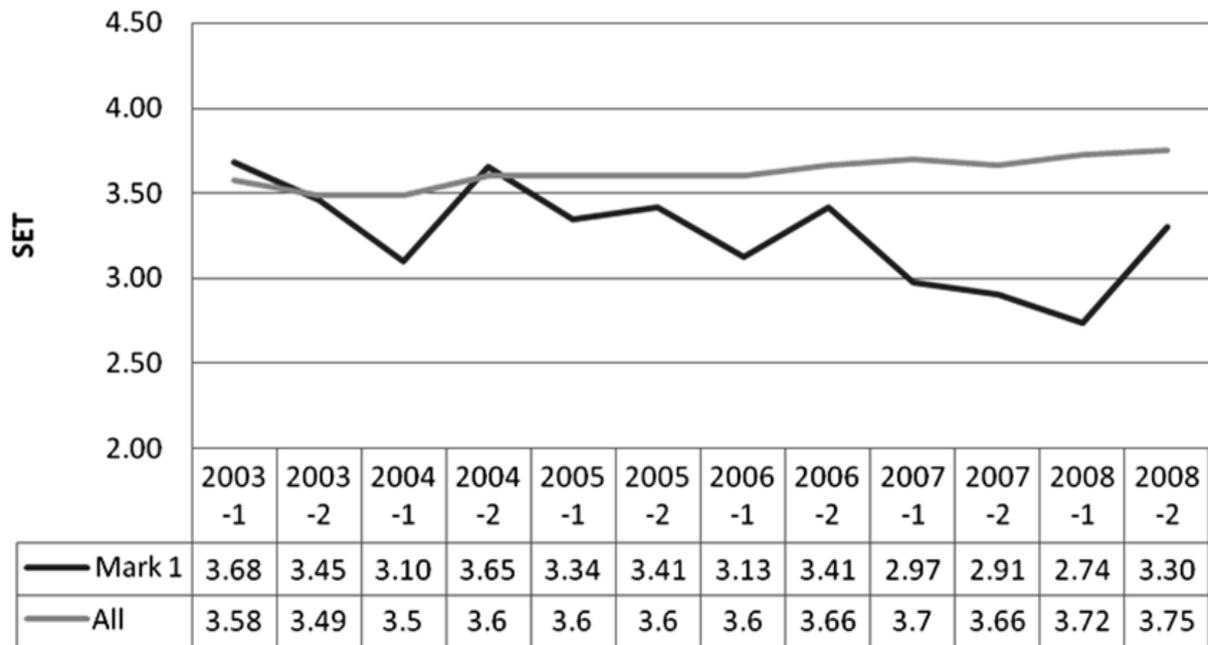
There is support for the proposition that a live Navigator is preferred to the traditional study guide in the two cases where the study guide was replaced entirely. The study discussed in the present paper identifies the need to investigate further and overcome any possible shortcomings in terms of differences across language barriers, student maturity and variation in subject content. There remains an opportunity for higher education institutions to develop richer models of teaching delivery modes that better accommodate student cultural diversity.
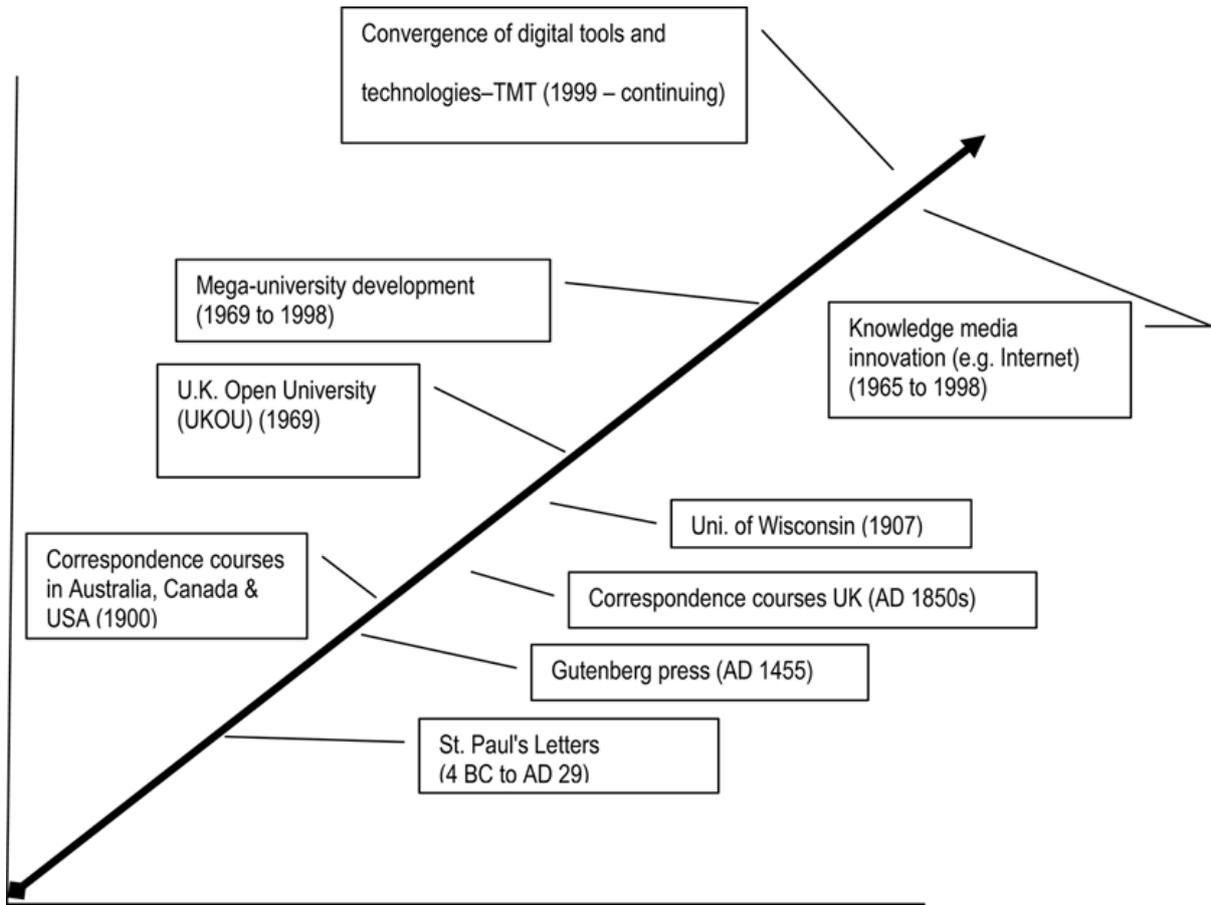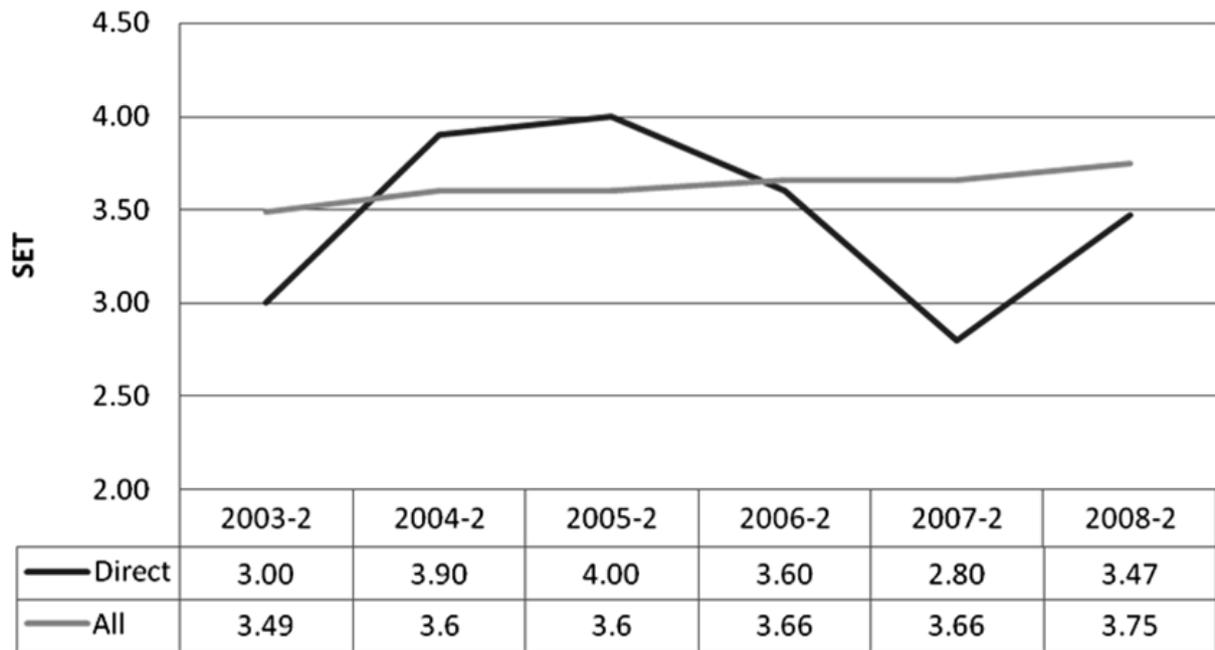
Figure 1 *Distance education timeline*

Figure 2 *Essential aspects of the teaching-learning process*

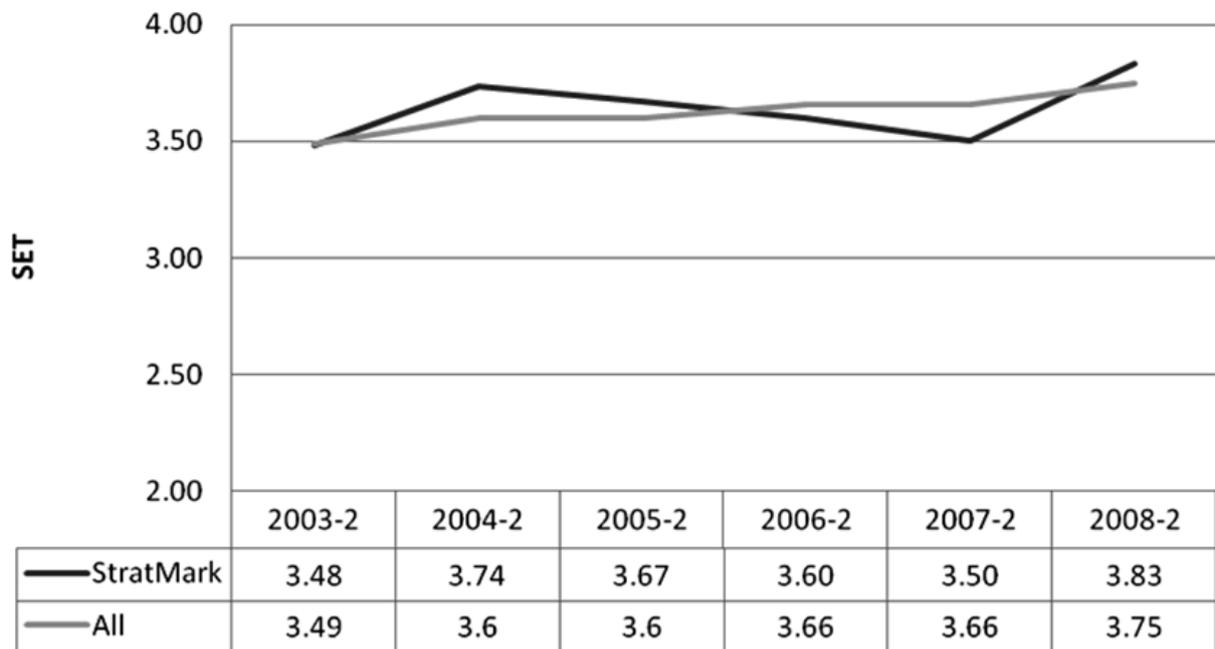|	2003 -1	2003 -2	2004 -1	2004 -2	2005 -1	2005 -2	2006 -1	2006 -2	2007 -1	2007 -2	2008 -1	2008 -2
Mark 1	3.68	3.45	3.10	3.65	3.34	3.41	3.13	3.41	2.97	2.91	2.74	3.30
All	3.58	3.49	3.5	3.6	3.6	3.6	3.6	3.66	3.7	3.66	3.72	3.75

Notes: Summer School SET scores tend to be somewhat higher, but have been excluded to better illustrate the trend line. In calculating the weighted (WTD) Average for 2004-2002, the proportional mix for 2004-2001 was used. Similarly, in calculating the WTD Average for 2006-2001, the proportional mix for 2001-2001 has been used. All indicates the mean for all business and commercial law subjects. All SET for 2004-2002 is an estimate. Response levels for the subject ranged from 25% to 37% for the subject, where enrolments ranged between 450 and 869 students in wholly online mode

Figure 3 Marketing I (Mark1) single indicator SET, 2003-2008

	2003-2	2004-2	2005-2	2006-2	2007-2	2008-2
Direct	3.00	3.90	4.00	3.60	2.80	3.47
All	3.49	3.6	3.6	3.66	3.66	3.75

Notes: Response levels for the subject ranged from 20 per cent to 43 per cent for the subject, where enrolments ranged between 57 and 137 students

Figure 4 Direct and Online Marketing single indicator SET, 2003-2008

	2003-2	2004-2	2005-2	2006-2	2007-2	2008-2
StratMark	3.48	3.74	3.67	3.60	3.50	3.83
All	3.49	3.6	3.6	3.66	3.66	3.75

Notes: Response levels for the subject ranged from 20 per cent to 37 per cent for the subject, where enrolments ranged between 325 and 412 students

Figure 5 Strategic marketing single indicator SET, 2003-2008

Face-to-face contact	Teachers have been operating for 3,000 years
Text (including still graphics)	Textbooks have been used for at least 2,000 or some 500 years if one believes that books did not exist much earlier than the Gutenberg Press. The postal service has existed for 150 years
Audio	Radio has been in operation for over 100 years
Television	Films have been made for 100 years, while television has been in use for over 70 years
Computing	While the transistor came into existence in 1945, microcomputers have been in operation less than 20 years, and hypermedia over the internet since 1993

Source: After Bates (1995, p. 31)

Table I Main educational tools

Education programme types	Tools and technologies	Communication
Early correspondence courses	Print and post	Two-way, asynchronous
Campus-based, external examinations	Print and post	Two-way, asynchronous
Distance education (prior to 1980 including open learning)	Printed notes	One-way, few-to-many
	Posted assignments	Two-way, one-to-one
	Radio broadcasting	One-way, one-to-many
	Audio conferencing	Two-way, synchronous
	FTA-TV broadcasting	One-way, one-to-many
	Textbook (print based)	One-way, few-to-many
Distance education (1980-1998)	Audio cassettes	One-way, one-to-many
	Video cassettes	One-way, one-to-many
	Telephone teaching	Two-way, synchronous
	Computer-based learning (CBT, CML)	One-way, one-to-many
	Cable-TV	One-way, one-to-many
	Satellite-TV	One-way, one-to-many
	Teletext	One-way, one-to-many
	Video discs	One-way, one-to-many
	Video conferencing	Two–way, synchronous
	Computer-mediated learning via packaged and online tools: CD-ROM/CD-I E-mail Conferencing-threaded e-mail and chat Conferencing internet Hypermedia (text, sound and images) Remote interactive databases Virtual reality	Two–way, synchronous
Distance and on-campus education (1999 and continuing)	As per earlier but now including: electronic course management environments such as Blackboard Social networking tools such as Blogs, Wikis and including developed virtual reality tools such as SecondLife eLive, iLecture and Screen capture tools	Two-way, synchronous Two-way, synchronous

Source: After Bates (1995, pp. 28-32)

Table II Knowledge media tools and technologies

	2003-1	2003-2	2004-1	2004-2	2005-1	2005-2	2006-1	2006-2	2007-1	2007-2	2008-1	2008-2
Marketing 1	58.88	54.35	60.01	59.41	60.22	60.88	60.34	58.43	56.19	48.56	58.36	55.40
Direct and Online		54.00		55.97		57.63		57.36		55.54		56.82
Strategic Marketing		61.17		57.34		63.38		59.41		56.53		56.80
Mean all subjects	60.70	60.14	61.10	61.14	62.30	61.60	60.70	60.37	61.50	60.30	60.80	60.40

Table III Grade point averages 2003-2008 for selected subjects

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