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BLENDED LEARNING IN HIGHER EDUCATION: DELIVERY METHODS SELECTION

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Research

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Abstract

Blending online delivery methods with traditional face-to-face instruction has emerged in an effort to accommodate an increasingly diverse student population whilst adding value to the learning environment. A large number of research studies have shown a positive effect of blended learning for teaching and learning. However, designing a successful blended learning course is still challenging for many academics in the higher education sector. A major design problem is selecting the most appropriate delivery methods to achieve the course outcomes. This study contributes to addressing this problem by: (i) identifying criteria that teachers should consider when selecting delivery methods for their blended learning courses; and (ii) rating the importance of each of these criteria. It employs a two-round online modified Delphi survey to achieve its aims.

Keywords: Blended Learning, Blended Instruction, Delivery Methods, Instructional Methods, Blended Couse Design.

1 Introduction

Blended learning courses can be defined as courses that: (i) thoughtfully integrate different delivery methods such as: lectures, in-class discussion, online discussion, self-paced activities; and (ii) contain both face-to-face and online portions (Alammary et al., 2014). It is becoming increasingly evident that blended learning can overcome various limitations related to face-to-face instruction and online learning. A review of around 1,100 empirical studies published between 1996 and 2008 concluded that blended learning can be more effective than either face-to-face instruction or online learning (Means et al., 2010). In a study involving students from 213 higher education institutions in the USA, a higher education technology group, EDUCAUSE, found that blended learning is now the norm for course delivery in higher education with students identifying blended courses as best supporting how they learn (Dahlstrom and Bichsel, 2014). The question, therefore, has shifted from "Whether to blend or not?" to "How to design a successful blend?"

Designing a successful blended learning course requires a thoughtful integration of different face-to-face and online delivery methods. However, selecting the most appropriate delivery methods to achieve blended course outcomes is challenging. Bersin (2003) noted that one of the most difficult decisions that academics make when designing their blended courses is choosing the most appropriate delivery method for the content at hand. The selection process is influenced by many criteria related to the nature of the course, student characteristics and the intentions of the teacher (Dziuban et al., 2005). In reviewing the literature, we did not find studies where these influential criteria have been explored or their impact on course design investigated.

To enhance the understanding of blended learning course design and contribute towards the existing literature in this area, the current study employs a two-round Delphi survey to identify the different

criteria that academics should consider when selecting delivery methods to achieve their learning outcomes. The research questions driving this study are as follows:

1. What criteria teachers should consider when selecting delivery methods to achieve each of their learning outcomes?
2. How important is each of these criteria to the selection process?

The remainder of the paper is organized as follows. Section 2 describes the background of the study. Section 3 explains the modified Delphi technique that has been used to conduct the study. Section 4 presents results obtained with the Delphi technique. Section 5 discusses the results obtained. Section 6 concludes the paper and outlines future work.

2 Background

A number of studies have shown that it is important to use a variety of delivery methods in blended courses to enhance students' learning experiences (Bath and Bourke, 2010, Oliver and Stallings, 2014, Saunders and Werner, 2002, Strickland et al., 2012). Saunders and Werner (2002, p.3) state that "only a blend of methods and approaches can produce the richness and achieve the desired learning outcomes". Blended learning provides academics with a variety of delivery methods to choose from. These methods can be classified into five categories based on the type of interaction that each of them supports (learner-instructor, learner-learner, learner-content and learner-interface):

1. *Face-to-face instructor-led*: students attend a class where a teacher presents material with little opportunity for interaction, hands-on learning or practice (Gerzon et al., 2006).
2. *Online instructor-led*: instruction delivered online with a teacher or facilitator who sets the pace and/or offers interaction, e.g., virtual classrooms, webcasts, scheduled internet instruction (Gerzon et al., 2006).
3. *Face-to-face collaborative work*: educational approaches that encourage students to work together in class, e.g., problem-based instruction, cooperative learning, writing groups, peer teaching, workshops, discussion groups (Tutty and Klein, 2008).
4. *Online collaborative work*: educational approaches that encourage students to work together online, e.g., online discussion groups, online learning communities (Tutty and Klein, 2008).
5. *Online self-paced*: educational approaches that allow students to study in their own time and at their own pace, from their own location, e.g., podcasts, online reading (Moore et al., 2011).

With this variety of delivery methods comes a major design challenge, i.e., deciding the most appropriate delivery methods to achieve the learning outcomes. According to Alammary et al. (2014), designing a successful blended course requires a careful look at all the learning outcomes with blended learning in mind. For each outcome, the teacher needs to decide the most appropriate delivery option that can help students achieve that outcome. This appropriate delivery option is normally a compromise between what is good and what is possible. It requires the teacher to consider different influential criteria relating to the nature of the learning outcome, the students, the educational institution or even perhaps some other criteria. Alammary et al. added that by applying this process at the learning outcomes level, teachers can gain the maximum benefits of blended learning and can produce a better learning experience for their students.

A number of research studies have attempted to help and guide the selection of blended learning delivery methods. Two problems were apparent in these studies. First, their proposed selection procedures were ambiguous and not based on a rigorous research method. Second, they only considered a few influential criteria to guide the selection procedure. McSporran and King (2005) for example, developed a template that can be used to select a combination of different delivery methods based on two criteria: learners' needs and available resources. Only two criteria were considered in McSporran and King's selection procedure and no explanation was provided as to why only these two criteria were

considered. Another study is by Toro-Troconis (2013) who developed a design tool based on Bloom's Taxonomy and learning theories to guide the development of blended learning activities. However, the selection of the learning activities is based on the type of the intended learning outcome and does not take into consideration other important criteria related to the students, the teachers and the educational institution. Hirumi et al. (2011) also developed a selection procedure to allow teachers to analyse and formulate face-to-face, distance learning and blended learning components for their military training courses. Again, only a few influential criteria were considered to develop the selection procedure, i.e., learning outcome type (Bloom's Taxonomy), method cost and stability, and instructional strategy. No explanation was provided as why these criteria were considered important.

To sum up, it is apparent from reviewing the literature that selecting the right delivery methods is very important for the success of a blended course. However, the criteria that should be considered during the selection process are not clear.

3 Method

A two-round online modified Delphi survey was employed in this study to identify and rate the different criteria that academics should consider when selecting delivery methods for their blended courses. The Delphi method is a common technique for gathering data from experts through multiple rounds of questionnaires (Hsu and Sandford, 2007). It employs a series of data collections and analysis techniques to reach consensus on a particular topic (Skulmoski et al., 2007). The traditional Delphi method normally has four rounds of feedback and modified questionnaires (Custer et al., 1999, Hsu and Sandford, 2007). The modified Delphi can have as few as two rounds (Martino, 1993, Snyder-Halpern et al., 2000). The first round questions of a modified Delphi survey can be based on an extensive review of the literature (Hsu and Sandford, 2007). Before inviting the participants, a decision was made to limit the number of rounds to two for two main reasons. Firstly, it was considered that a two-round survey would encourage more participants to participate in the study and would minimise their workload (Hearnshaw et al., 2001). The second reason is that the Round 1 survey was based upon an extensive and careful review of available literature. Participants in the survey were presented with an initial list of influential criteria. According to Snyder-Halpern et al. (2000) and Martino (1993), the number of Delphi rounds can be reduced to as few as two if participants are provided with an initial list of preselected items.

3.1 Creating an initial list of influential criteria

To create an initial list of influential criteria, we searched a number of databases that contain publications on e-learning and blended learning such as: *ACM digital library, ProQuest, Computer database, ScienceDirect, IEEE Xplore* and *Google Scholar*. The search terms used included, but not limited to: *'hybrid course' + 'design', 'blended course' + 'design', 'blended learning' + 'approach', 'hybrid course' + 'approach', 'blended learning' + 'integration' and 'blended leering'+ 'blending'.* The word '*hybrid'* was used because both '*hybrid courses*' and '*blended courses*' are used interchangeably. Also, the words '*design*', '*approach*', '*integration*' and '*blending*' were all used to retrieve papers that might have discussed the topic of designing blended courses. The aim was to retrieve papers that may use different expressions to describe similar concepts. As the focus of this study was blended learning in higher education, only studies conducted in the context of higher education were reviewed.

3.2 Developing and piloting the survey

Witkin and Altschuld (1995) pointed out that using electronic technology can facilitate the Delphi process by allowing researchers to: (i) easily develop and distribute their questionnaires (ii) maintain participants' anonymity; and (iii) more rapidly collect and analyse the responses. Therefore, three online survey management systems were considered for the development of the two surveys: Google Forms, SurveyMonkey and LimeSurvey. LimeSurvey was selected mainly because it is free and allows its

users to: (i) apply rich text formatting e.g., bold, italics, underlined and coloured text; (ii) create a wide range of question types; (iii) track respondents; (iv) identify an expiry date for their surveys; (vi) view the results in different formats; and (vii) export results in various formats such as PDF, excel and SPSS.

Prior to beginning the Round 1 survey, a pilot study was conducted. The aim of the pilot survey was to improve the validity of the survey, assess its difficulty and get rough estimates of the time and cost involved with the Delphi technique (Rubin and Babbie, 2012, van Teijlingen and Hundley, 2002). Validity was examined in terms of face validity and content validity. According to Burton and Mazerolle (2011, p.29), the purpose of face validity is to evaluate the survey instruments for "ease of use, clarity, and readability", while content validity is used for "establishing an instrument's credibility, accuracy, relevance, and breadth of knowledge regarding the domain".

Three experts in educational technology were asked to participate in the pilot study. The pilot survey was distributed in an online format. Under each item in the pilot survey, experts were provided with a textbox to comment on the clarity and relevance of that item. The experts were also asked to indicate whether the item should be omitted or revised. If the expert recommended revision, they were encouraged to suggest a revision. Experts' suggestions were analysed and a number of changes to the survey were made.

3.3 Expert panel recruitment

A critical step in any Delphi study is to identify and select experts who have a high level of knowledge in the area under study, and can be representative of their profession (Martino, 1993). A group of Australian and New Zealand experts who have in-depth knowledge and sound experience in both face-to-face and online teaching methods were invited to participate in this study. The selection of experts from these two countries only was mainly for the purpose of forming a homogenous group of experts. Unlike heterogeneous panels that require recruiting large number of experts, a small homogenous panel can yield high quality results (Ziglio, 1996).

In selecting this panel of experts, a purposive approach was adopted. Twenty six experts from different New Zealand and Australian universities formed an initial list. These experts were members of professional groups such as the Australasian Computing Education Conference (ACE) committee and the Monash Better Learning and Teaching team. They all had years of experience in course design and online delivery methods. After that, the researchers searched a number of New Zealand and Australian universities websites to find more participants. Three criteria were used to identify experts:

1. Experience in course design: participants were required to have been involved in designing one course at least.
2. Experience with online delivery methods such as course website, online discussion, blogs or webcasts.
3. Publication record in the field of educational technology in top-tier publication venues.

Additionally, the researchers aimed to include experts from as many different disciplines as possible to examine the impact of the experts' discipline on criteria selection and rating. The search resulted in the identification of 22 more potential participants and a total of 48 experts were in the final list of potential participants.

3.4 Conducting and analysing Round 1 survey

Participants were sent an e-mail containing a link to the Round 1 survey. The survey contained an overview explaining the purpose of the study and the potential criteria that had been identified in the literature. Participants were requested to rate the importance of each criterion by using a Likert scale of 1 to 5, where 1 is very unimportant and 5 is very important. They were also requested to add any additional criteria that may not have been included in the list. Round 1 data analysis involved both

qualitative and quantitative methods. The central tendency (mean) and level of dispersion (standard deviation) were used to present information concerning the criteria rates. The mean was used to represent the group opinion, while standard deviation (SD) was used to indicate the spread of responses from the expert panel (Keeney et al., 2011). A consensus was determined to be reached when SD <= 1 (von der Gracht, 2012).

A content analysis approach similar to that of Burnard (1991) was used to analyse the open-ended questions. All comments from the returned Round 1 survey were copied into a word processing document. Each statement was examined to decide if it was a comment or a new criterion that the participant wanted to be included in the list. The anonymised raw data and the final list of criteria were shared with another two academics who have experience in the educational technology field to ensure that the analysis was performed correctly (Keeney et al., 2011).

3.5 Conducting and analysing Round 2 survey

The same group of experts who participated in the Round 1 survey were sent an e-mail containing a link to the Round 2 survey. Participants were presented with a revised list containing criteria that they had rated in Round 1. They were asked to reconsider their responses while taking into consideration the group mean response which was shown as underlined red text after each criterion. The participants were encouraged to consider adjusting their responses toward the group mean responses. They were also informed that if they wish to rate a criterion more than one point away from the mean, they needed to provide justification. The central tendency (mean) and level of dispersion (standard deviation) were used to present information concerning the criteria rates.

4 Results

4.1 Initial lists of criteria

Three criteria that might affect the selection of the most appropriate delivery methods to achieve course outcomes were found in the literature. These criteria were divided into two main categories: (i) course related criteria; and (ii) learning outcome related criteria, see Table 1.

Course related criteria
1. Number of students enrolled in the course.
Learning outcome related criteria
1. Knowledge type: factual, conceptual, procedural or metacognitive. 2. Level of learning: Remembering, understanding, applying, analysing, evaluating or creating.

Table 1. Criteria that might affect selecting the most appropriate delivery methods.

For course related criteria, the number of students enrolled in the course was found to be a potential criterion that may be worthy of consideration. According to Gray and Tobin (2010), online components can reach a larger number of students and overcome the limitations of time and space. Kaur and Ahmed (2006) also pointed out that as the number of students increases, the introduction of more self-paced components becomes necessary.

Harriman (2004) and Hofmann (2012), recommended that instead of looking at an entire course, teachers need to look at each single learning outcome to determine the best delivery option for that outcome. Learning outcomes, according to Bloom's Revised Taxonomy (Krathwohl, 2002), are expressed in terms of (i) some subject matter content, i.e., knowledge type; and (ii) a description of what is to be done with or to that content, i.e., level of learning. The Revised Taxonomy is a modified version of Bloom's Taxonomy of Educational Objectives. Bloom's Taxonomy is the most popular Tax-

onomy for the educational practice which was developed by Bloom in 1956 (Marte et al., 2008, Saulnier, 2003).

In the revised taxonomy, knowledge is categorized into four types: factual, conceptual, procedural and metacognitive knowledge (Krathwohl, 2002). Toro-Troconis (2013) suggested that factual and procedural knowledge can be delivered using self-paced delivery methods, while conceptual and metacognitive knowledge require collaborative activities. The four knowledge types are shown and described in Table 2.

Knowledge type	Definition
Factual Knowledge	The basic elements that students must know to be acquainted with a discipline or solve problems in it.
Conceptual Knowledge	The interrelationships among the basic elements within a larger structure that enable them to function together.
Procedural Knowledge	How to do something; methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.
Metacognitive Knowledge	Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.

Table 2. Knowledge types (Adapted from Krathwohl (2002)).

Level of learning, on the other hand, includes (from low to high level): remembering, understanding, applying, analysing, evaluating and creating (Krathwohl, 2002). Hofmann (2012) pointed out that learning outcomes that require memorizing might lend themselves to self-paced delivery approaches, while high-level learning outcomes may be best taught using instructor-led delivery approaches. The six levels of learning are shown and described in Table 3.

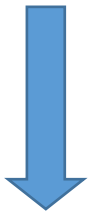
Knowledge type	Definition
Low Level learning  High Level learning	**Remembering**: to recall knowledge from the long-term memory
	Understanding: to construct meaning from instructional messages, including oral, graphical and written communication
	Applying: to carry out or use a procedure through executing or implementing
	Analysing: to break a concept into parts and to determine how these parts are related to each other or to the overall structure
	Evaluating: to make judgement based on some criteria or standards
	Creating: to put set of elements together to form a coherent or functional whole

Table 3. Levels of learning (Adapted from Krathwohl (2002)).

4.2 Round 1 results

Out of the 48 experts who were invited, 19 agreed to participate and completed the Round 1 survey. No specific set of characteristics differentiated those experts who participated from those who did not. It seems that the multiple rounds made some academics reluctant to participate. However, the 19 experts who agreed to participate, represent a wide range of academic disciplines. The majority of them taught undergraduates and postgraduate courses, had more than five years of experience in course design and had four years or more of experience with online delivery methods, see Table 4. They all had a number of publications in the field of educational technology. The list of experts is not exhaustive as it included academics from New Zealand and Australian universities only and perhaps, other academics could have been added to the list. Despite this, experts who participated provided adequate representation of various academic disciplines and a wide range of views (Turoff, 1975).

	No of participants
Discipline (Some experts belong to more than one discipline)	
Information Technology	8
Business	5
Education	4
Economics	2
Social Sciences	2
Medicine	1
Human Sciences	1
Library	1
Exercise Science	1
Management	1
Engineering	1
Experience in course design	
1- 5 years	1
6 - 10 years	7
11 - 20 years	8
20+ years	3
Experience with online delivery	
1- 3 years	2
4 - 6 years	4
7 - 10 years	5
10+ years	8
Course level	
Undergraduate	6
Postgraduate	3
Both	10

Table 4. Experts involved in the Delphi study.

All the three criteria, which experts were asked to rate, scored mean importance ratings between 3 and 4. *Knowledge type* scored the highest mean (3.58), followed by *number of students* which scored 3.47, and finally *Level of learning* scored 3.32. However, experts did not reach consensus on any of these three ratings (SDs > 1). The data in Table 6 presents the panel mean score and the SD for each criterion.

The majority of panel members responded to the open-ended questions that requested them to suggest additional criteria. By applying the content analysis approach, eight new criteria were extracted from their answers: two course related criteria, three learning outcome related criteria, two student related criteria and one institutional related criteria. Two new categories were identified: student related criteria and institutional related criteria. Table 5 displays the identified criteria and their associated categories.

4.3 Round 2 results

As it can be seen in Table 6, criteria in this round were divided into four main categories: (i) course related criteria (ii) learning outcome related criteria (iii) student related criteria; and (iv) institutional related criteria.

All the three course related criteria, which respondents were asked to rate, on a five-point ordinal scale, scored a mean importance rating between 3 and 4. The experts reached a clear consensus on two

criteria while the third one was near consensus. The rating of *Number of students*, which is the only one that has been rated in Round 1, moved closer to consensus, as its SD changed from 1.39 to 1.09.

Course related criteria
1. Availability of appropriate staff: Is there appropriate staff available for teaching on campus? 2. Resourcing available per student: Is there enough resources, such as space and technology, available for students on campus?
Learning outcome related criteria
1. Student expertise with respect to the learning outcome: Detailed explanation and extensive repetition increases learning efficiency for novice students but decreases efficiency for expert students 2. Level of competency: Students may have different level of information technology competency based on their year of study (e.g. year 1, 2, 3 etc.) 3. Availability of technology to enable online delivery of the learning outcome
Student related criteria
1. Students' preparedness for study: Are students adequately prepared for study? 2. Students' preferred learning style (Online or face-to-face)
Institutional related criteria
1. Level of support for a particular technology

Table 5. Additional criteria that have been suggested by the panel members.

	Round 1 Mean	Round 2 Mean	Round 1 SD	Round 2 SD
Course related criteria				
1. Number of students	3.47	3.13	1.39	1.09
2. Availability of appropriate staff		3.67		0.94
3. Resourcing available per student		3.53		0.81
Learning outcome related criteria				
1. Knowledge type	3.58	3.2	1.39	1.05
2. Level of learning	3.32	3.07	1.52	1
3. Student expertise with respect to the learning outcome		3.2		1.22
4. Level of competency		2.93		1.24
5. Availability of technology to enable online delivery of the learning outcome		3.67		1.07
Student related criteria				
1. Students' preparedness for study		3.2		1.28
2. Students' preferred learning style (Online or face-to-face)		3.33		0.94
Institutional related criteria				
1. Level of support for a particular technology		3.87		0.88

Table 6. Panel mean scores and standard deviations of criteria.

Of the five learning outcome related criteria, one (20%) scored a mean importance rating less than 3, while the remainder (80%) scored between 3 and 4. The experts reached a clear consensus on one criterion and another two were near consensus. The rating of *Knowledge type* and *Level of learning*, which have been rated in Round 1, moved closer to consensus. *Level of learning* scored a significant change from a low consensus (SD = 1.52) to a high consensus (SD = 1).

The two student related criteria, scored a mean importance rating between 3 and 4. The experts reached a high level of consensus on one criterion and a low level on the second. The only institutional related criterion, i.e. *Level of support for a particular technology*, scored a mean importance rating of 3.87 and a high level consensus.

5 Discussion

This study identified and rated the importance of criteria that academics should consider when selecting delivery methods for their blended learning courses. These criteria were divided into four main categories: (i) course related criteria (ii) learning outcome related criteria (iii) student related criteria; and (iv) institutional related criteria.

Experts perceived *Availability of appropriate staff* as the most important *course* related criterion that need consideration. It also scored the second highest importance mean rating among all the other criteria that were identified in this study. An expert described it as a dominating factor that need consideration: "*a dominating factor here is the availability of appropriate tutorial staff or markers*". Bailey et al. (2012) and Nagel and Kotzé (2010) noted that while traditional learning might require hiring more tutors to support teaching activities, using certain technologies e.g., discussion forums, online peer review and online quizzes, can allow small staff to enhance student engagement and easily moderate large class interaction.

The least important *course* related criterion was *Number of students*. It was also a case of a debate between the experts. This debate was reflected in experts' comments. While some felt that the *Number of students* is irrelevant, others felt that it is very important. One expert commented, illustrating its insignificance in selecting delivery methods: "*The number of students does not seem to be relevant to me as we divide students into tutorial groups and then it does not matter how many are enrolled*". Another said: "*If the blended pedagogy is well designed, monitored and evaluated, the number of student would be less important*". On the other hand, some experts felt that it is very important to consider the number of students when choosing delivery methods. One stated: "*I challenge anyone who rated this low to teach a class of 10,000 students using the same delivery methods as a class of 10! While I could teach the class of 10 in the same way I would the class of 10k, it wouldn't be a wise use of resources. For a massive class I would invest time in the development of the course, whereas for a small group I would invest time in the teaching. This sort of concern for scalability supports particular methods more than others*".

Experts also regarded *Availability of technology to enable online delivery of the learning outcome* as the most important *learning outcome* related criterion that needs consideration. It also scored, along with *Availability of appropriate staff*, the second highest importance mean rating among all the other criteria that were identified in this study. An obvious explanation of this is that with limited technology available, teachers will have less delivery options to achieve their learning outcomes. As an expert noted: "*if I had a highly technical outcome, and did not have the technology, I may be pushed to deliver in some other way. If the technology permitted real time online demonstrations, I would be more likely to try online delivery*". This concurs with the finding of Boitshwarelo (2009) and Alammary et al. (2015) that availability of technology has a major impact on determining the appropriate delivery option. The least important *learning outcome* related criterion was *Level of competency e.g., year 1, 2, 3 etc.* This criterion scored the lowest mean ratings of all the other criteria that were identified in this study and was the only criterion with an importance rating less than 3. An explanation can be found in a comment from one of the experts who commented: "*You can teach at any level on-line*".

Experts' comments reflected different views regarding the impact of learning outcome type on the selection of delivery methods. While some maintained that certain types of learning outcomes might lend themselves best to certain delivery formats, other argued that there were no practical differences in learning between face-to-face and online delivery methods. One expert commented: "*it is important for the lecturer to know what knowledge type and level of learning they want from their students. Online or F2F resources can then be designed"* while another remarked: "*You can teach just about anything online*". Another similar comment: "*Learning outcomes of all types and levels can be delivered with an on-line course*". There are, however, in the literature a large number of studies suggesting that certain learning activities e.g., problem-based instruction, cooperative learning, writing groups, peer teaching can better help students to develop high order thinking skills, i.e., analysing, evaluating and creating (Benek-Rivera and Mathews, 2004, Guri-Rosenblit and Gros, 2011, Huang, 2002, Sarason and Banbury, 2004). One expert made a similar remark: "*online self-paced would be used to identify 'gross' or foundation knowledge, with face-to-face used to implement knowledge/skills and foster collaboration/discussion between student and educator*".

Overall, it was interesting to note that the two criteria related to learning outcome type, i.e., *Knowledge type* and *Level of learning* did not score as high as expected. The former had the sixth highest importance rating while the latter scored the tenth. This was unexpected because these two criteria were considered by several previous studies (Harriman, 2004, Hirumi et al., 2011, Hofmann, 2012, Toro-Troconis, 2013) to be the gold standards for guiding the selection of blended learning delivery methods.

For the *student related* criteria, experts gave similar importance ratings to the two criteria in this category, i.e., *Students' preferred learning style (Online or face-to-face)* and *Students' preparedness for study.* Overall, they respectively scored the fifth and sixth highest importance mean rating among all the other 11 criteria that were identified in the study. This indicates that the students' learning preferences and preparedness have a medium level of importance when selecting the most appropriate delivery methods and perhaps other types of criteria might need to be considered first. One expert noted: "*Students readiness to adopt is a lesser factor in this consideration - students are at University to learn and learning how to engage in a blended environment is part of the learning process*".

Not surprisingly, the only *institutional* related criterion, i.e., *Level of support for a particular technology*, scored the highest importance mean rating among all the other criteria that have been identified to influence the selection of delivery methods. An expert explained: "*level of support for technology is one of the biggest factors to deciding whether or not to adopt. I have been in situations where support was lacking which made it very difficult to run a course successfully*". This stresses the crucial role that the institution plays in helping academics to build successful blended learning courses.

Generally speaking, based on criteria ratings and experts' comments, it seems that in order to help academics gain the maximum benefits of blended learning, three conditions are necessary:

1. A high level of technical support
2. The availability of all or at least most of the technology needed for online delivery
3. The availability of enough resources, such as space and appropriate staff

However, the absence of some of these conditions should not prevent teachers from engaging in blended learning. Alammary et al. (2014) recommended that in the absence of a high level of technical support, a "low-impact blend" can be implemented. A low-impact blend can be obtained by adding few online activities to a traditional course. While this type of blending does not allow the maximum benefits of blended learning to be obtained, it does bring some benefits to the learning experience.

In this Delphi study, expert's discipline was found to have no effect on the experts rating of criteria. For example, the three experts who rated *Availability of technology to enable online delivery of the learning outcome* criterion very high were from three different disciplines: Information technology, Education and Business. Another example is that the five experts from the Information Technology

discipline rated *Level of learning* criterion differently. While two of them rated it low, three rated it high.

Furthermore, the course level that experts teach, i.e., undergraduate, postgraduate or both, also does not seem to have an effect on the experts' rating of criteria. For example, the four experts who rated *Students' preparedness for study* criterion as low teach at different levels: one undergraduate, one postgraduate and two at both levels. Another example is the six experts who rated the *Number of students* criterion high, teach at different levels: one undergraduate, one postgraduate and four at both levels.

Finally, the Delphi technique was found to be a good fit to identify the different criteria that need consideration when selecting delivery methods for a blended course. It helped in building consensus among a panel of experts drawn from different academic disciplines who were geographically spread across Australia and New Zealand and would not have been able to participate in a face-to-face consensus method. It allowed the panel members to express their opinions and judgments privately without feeling intimidated by other participants (Hsu and Sandford, 2007). The statistical analysis techniques that have been used to analyse their feedback helped ensure that opinions generated by each one of them are well represented in the final results (Dalkey et al., 1969).

However, one limitation was realized with Delphi method. Despite the fact that the experts were provided with free text boxes to justify their opinions, some did not use them to explain their opinions and reveal the underlying rationale behind their ratings.

6 Conclusion

This study showed that selecting delivery methods for a blended course is a multifaceted problem that is influenced by many criteria. These criteria are related to the course, the students, the teacher, or the nature of the learning outcomes. Summing up the results, it can be concluded that when selecting delivery methods to achieve a blended course learning outcome, academics should first consider available technology and, most importantly, the level of support for this technology. They should be aware that lack of adequate support can make it difficult to use an online component. Then, they should consider the other resources required for course delivery e.g., appropriate staff and space. With limited resources, the use of less resource intensive instruction approaches, i.e., self-paced activities, is inevitable. After that, academics should consider their students' preferences and individual differences. It is important to design activities that can meet the need of a diverse student population. Finally, academics should consider the type of knowledge and level of learning they want from their students. As some experts explained, self-paced activities might be an appropriate option for students to gain a first exposure to new material however, helping students to develop high order thinking skills might require active engagement with course material through collaborative activities.

Clearly, further research is needed to: (i) assess the impact of the delivery methods selection criteria, that have been identified in this study; and (ii) test the impact of these criteria on the outcomes of blended courses. The results of this research can also be used to inform the development of a blended learning design toolkit. The toolkit should foster thinking about how to best design for blended learning.

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