THE APPLICATION OF MULTIPLE-CRITERIA DECISION ANALYSIS (MCDA) TO ADDRESS BLENDED LEARNING DESIGN CHALLENGES

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Abstract

Blended learning has proved to be more effective than either online learning or face-to-face instruction. For many researchers in higher education, it is almost certain that blended learning will be the new traditional model for course delivery. Despite this, designing blended learning courses is still a major challenge for many academics. Educational institutions' lack of access to blended learning technical and pedagogical support, the large numbers of blended learning components that need to be considered when constructing a blended learning experience and the lack of a universally recognized formula or defined standards to guide the design process are examples of major challenges facing academics who want to implement a successful blended learning experience. To facilitate the design process, this paper discusses the different design challenges that face academics when designing their blended learning courses. It then discusses the applicability of using a multiple-criteria decision analysis (MCDA) approach to address these challenges and facilitate the design.

Keywords: Blended learning, Hybrid course, MCDA, Design blended course, Blended learning in higher education.

1. Introduction

Over the last decade, the rapid growth in technological innovations has led to an increased level of integration of computer-mediated instructional technology into the traditional learning experience (Graham, 2006). The introduction of new instructional technology is challenging traditional methods of learning and teaching and also changing the way students and instructors are interacting in the learning environment (Dziuban, Moskal, & Hartman, 2005). It has been argued that integrating instructional technology into traditional face-to-face teaching can overcome various limitations related to a face-to-face learning experience (Garrison & Kanuka, 2004). As a consequence, the term blended learning has emerged to describe situations where face-to-face instruction is combined with online learning. An increasing number of studies are providing evidence that blended learning can overcome many limitations related to both face-to-face instruction and online learning. A meta-analysis of more than 1,100 empirical studies published between 1996 and 2008 concluded that blended learning proves to be more effective than either online learning or face-to-face instruction (Means, Toyama, Murphy, Bakia, & Jones, 2009).

Despite these proven advantages, designing blended learning courses is still a major challenge for many teachers in the academic field. The large number of possible blended

learning components that need to be considered when constructing a blended learning experience (Clark, 2003), the lack of a universal recognized formula or defined standards to guide the process of mixing up the different components of the blend (Dziuban et al., 2005; Gedik, Kiraz, & Ozden, 2013) and teachers negative perceptions of blended learning are all examples of possible design challenges.

In response to the various design challenges, this paper is proposing the use of multi-criteria decision analysis (MCDA) to address these challenges and facilitate the design process. MCDA can be used to produce recommendations on how to develop a successful blended experience. MCDA is an approach that is used to find the optimal option from a set of available options in the presence of several, sometimes conflicting, criteria (Işıklar & Büyüközkan, 2007).

This study is organized as follows. Section 2 explains the different challenges facing academics when designing their blended courses. Section 3 discusses the previous work that has been done to address these challenges. Section 4 introduces MCDA and describes its principal features. Section 5 presents the research method that has been used to investigate the applicability of using MCDA to facilitate blended learning course design. The results are presented in section 6, while section 7 discusses the findings of the study in view of the related work. Section 8 explains how MCDA can be applied. Section 9 describes how the proposed MCDA approach can address the discussed design challenges. Finally, section 10 concludes the paper and outlines future work.

2. Challenges of Designing Blended Learning Courses

Many teachers in higher education institutions, even those who might consider themselves experts in face-to-face instruction, return to being novice teachers as they face different kinds of challenges when they decide to design a blended learning course. The following is a detailed description of seven identified challenges.

2.1. The Large Number of Possible Blended Learning Components

A large variety of instructional learning components need to be considered when constructing a blended learning experience (e.g., classroom instruction, laboratory, virtual classroom, problem-based instruction, discussion groups and webcasts). Blended learning is most effective when it uses a combination of different components (Carman, 2002; Oliver & Stallings, 2014). Uskov (2003) listed more than 20 different components that can be integrated into blended learning courses. Elsenheimer (2006) also suggested a catalog of around 50 components.

2.2. Selecting the Right Delivery Method is Challenging

Designers of blended learning courses should try to maximize the benefit of traditional and online delivery methods by using each method for what it does best (Mortera-Gutiérrez, 2006; Oliver & Stallings, 2014). Therefore, choosing the right method is critical. With a large number of available delivery methods for a blended learning arrangement, the selection process becomes harder.

2.3. No Universally Recognized Formula or Defined Standards to Guide the Design Process

Dziuban et al. (2005) stated that there are no defined standards to guide decisions as to how much or what part of courses should go online and what part should be taught in the traditional classroom. They added that such decisions are influenced by many factors, mainly the nature of the course content, student characteristics and the intentions of the instructor. Vaughan (2007) also found that there is no recognized formula for the reduction of class time or the use of technologies within a blended learning course.

2.4. Blended learning courses are required to accommodate the needs of an increasingly diverse student population

According to Graham (2006), nowadays more people with outside commitments such as family and work seek additional education. Many students on the other hand are not living on or near campus (Hood, 2013) and they find it difficult to go regularly to their schools and to find available parking space (Vaughan, 2007).

2.5. Blended Learning is Perceived as Complex and Highly Technical

Parr (1999) found that teachers' perceptions of educational technology is likely to be a vital factor in the successful integration of educational technology in their courses. Lynch, Altschuler, and McClure (2002) indicated that many faculty members think that technology raises different kinds of problems, most obviously the fact that it takes time and effort to figure out how to use it. Lee and Lee (2008) found that teachers who have negative attitudes towards technology tend to have negative perceptions of blended learning, and that seems to affect their enthusiasm to benefit from blended learning.

2.6. Most Teachers do not have Enough Experimental Experience and Theoretical Preparation to Design Effective Blended Courses

Redmond and Lock (2011) stated that while many teachers in higher education institutions may consider themselves experts in face-to-face instruction, they return to being novice teachers in a fully online or blended learning environment. Tiirmaa-Oras, Pilt, Villems, and Ruul (2007) stated that teachers from a traditional face-to-face teaching background usually find it very challenging to integrate blended learning components. The main challenge according to Huang and Zhou (2005), is that many teachers in higher education lack knowledge and experience that can help them to construct effective instructional activities based on blended learning.

2.7. Many Educational Institutions Lack Access to Technical and Pedagogical Support

Faculty members need to have access to technical and pedagogical support that can help and motivate them to develop their blended learning courses (Ocak, 2011; Oliver & Stallings, 2014). Tiirmaa-Oras et al. (2007) stated that teachers, especially those with no or limited experience in designing for blended learning, need access to information, guidance, practical examples and blending methods that can motivate them to get started and construct their blended courses with the smallest consumption of time and other resources.

3. Previous Work

There are few studies that have been conducted to address the different design challenges that have been discussed in the previous section. The main concern with all these studies is that they are limited to one or two challenges. Tiirmaa-Oras et al. (2007) work for example, aims to gather success stories, research results and tools to be used as theoretical base for the design of blended learning courses. McSporran and King (2005) also developed a template that can be used to select a combination of different delivery methods based on two criteria: learners' needs and the available resources. Only two criteria have been considered in McSporran and King's selection process and no explanation has been provided as why only these two criteria have been considered. Similar work to McSporran and King (2005) is the work of 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, Bradford, and Rutherford (2011) also developed a selection process to allow teachers to analyse and formulate face-to-face, distance learning and blended learning components for their military training courses. This work is only applicable to military training courses.

4. Multi-Criteria Decision Analysis (MCDA)

Blended learning design decisions, such as deciding the most appropriate delivery method to achieve a learning outcome, are usually complex, uncertain, and dynamic. They are hard to be considered through the examination of a single criterion, or point of view. A realistic approach to solve such decision problems requires compromise between what is good and what is possible, considering all the influential criteria (Baltussen & Niessen, 2006).

Multi-Criteria Decision Analysis (MCDA), also referred to as Multiple-Criteria Decision Making (MCDM), is a widely used decision support approach that can improve the quality of decision by making the decision process systematic, transparent and justifiable (Işıklar & Büyüközkan, 2007; Kiker, Bridges, Varghese, Seager, & Linkov, 2005). It provides a set of concepts, methods and techniques that permit a systematic quantification approach to support decision making in problems involving multiple, sometimes conflicting, criteria (Clemens, 1996). The systematic approach allows the decision maker to take all influential criteria of the problem into consideration. Based on these criteria, they can assess different competing alternatives (options) with the intention of achieving a certain goal.

MCDA was introduced as a promising and important tool for decision support in the 1970s. Since then the number of contributions to its theories, methods and techniques has continued to grow at a steady rate (Chang, Chang, & Chen, 2009). The applications of MCDA include many areas such as products design (Liu, 2011), buildings design (Mela, Tiainen, & Heinisuo, 2012), material selection (Mosavi, Milani, Hoffmann, & Komeili, 2012), energy planning (Pohekar & Ramachandran, 2004) and risk management (Hallerbach & Spronk, 2002). In higher education, MCDA has been applied in different areas such as resource allocation, performance measurement, budgeting and scheduling (Ho, Dey, & Higson, 2006). A search of the literature, however, failed to reveal any reports of MCDA being applied to help the design of academic courses. We therefore propose that its applicability to this context needs further investigation.

5. Method

To examine if MCDA can be used to address blended learning design challenges and to facilitate the design process, three interviews with experts in both decision support systems and course design were conducted.

5.1. Participant Recruitment

The findings of any research study depends critically upon the selection of participants. According to Rowley (2012), two important considerations need to be taken into account when choosing interviewees. Firstly, they need to have the knowledge to offer useful insights and feedback on the research topic. Secondly, they need to be willing to participate and be able to be visited at locations that suit their convenience. Taking these considerations in mind, a group of experts who have in-depth knowledge and sound experience in both decision support systems and course design were invited to participate in this study. A purposive approach was adopted to select this group of experts. Four criteria were used to identify these experts:

A. Experience in course design: participants need to have been involved in designing at least one course.
B. Experience with decision support systems.
C. Publication record: do they have publications in the field of decision support systems in top-tier publication venues?
D. Access to potential interviewees: can they be visited at locations that suit them?

Another major concern when recruiting participants is deciding how many interviews is enough. Flick (2007) pointed out that when comparing participants' views or experiences, the number of interviews should be defined based on a number of internal and external factors. From the inside of the study, researchers firstly need to look at the dimensions that can be the basis of the intended comparison such as profession, gender and age. Then, they need to identify how many cases for each dimension should be included. Flick suggested that it would be better

to have two interviews for every case. The outside determinants according to Flick are: the time given to complete the study and research experience with qualitative research. A number of studies also show that when eliciting knowledge from experts, three interviews can be sufficient (Bu-Qammaz, Dikmen, & Birgonul, 2009; Perrenet, van Diepen, & Zwaneveld, 2011).

For this study, the only internal considerations are the experts' knowledge and experience in decision support systems and course design. It was determined that all participants will need to have in-depth knowledge and experience in these two fields. Other considerations such as age, gender or place of residence are irrelevant. Regarding external considerations, the researchers have excellent experience with qualitative research but they only had around two months to complete their study. Based on that time constraint, a decision was made to conduct three to five interviews. A total of 5 experts were contacted by email and invited to participate in the study. Three of them (60%) agreed to participate and were interviewed. These three interviews provided adequate range of views and were considered sufficient.

5.2. Measures and Procedures

To ensure consistency, standardized open-ended interviews were conducted with the interviewees. An interview guide was developed to make sure that participants would be asked identical questions; however, the questions were worded so that responses would be open-ended. According to Turner III (2010), standardized open-ended interviews can allow the participants to contribute as much detailed information as they want and, at the same time, allow the researcher to ask further questions as a means of follow-up. The content of the interview guide was validated with two experts who have extensive experience in qualitative research and course design. These experts were asked to comment on the clarity of the wording of questions, pointing out any ambiguities. Suggestions were analysed and a number of changes to the guide were made.

Invitation emails were sent to potential participants with an explanation of the purpose of the research study, what would be expected of them and whether they wished to participate. Participants, who agreed to take part in the study, were sent another email with the interview guide and were asked to schedule a time and place for the interview. Each interview lasted about 20 to 30 minutes and was conducted at a place and time convenient for the participants. All interviews were audio-recorded.

5.3. Data Analysis

Data analysis followed the procedures described by Rowley (2012). Firstly and as soon as the three interviews were conducted, the researcher listened to the interview recordings and transcribed them verbatim into text form. While listening, notes on the important points in each interview were made. Secondly, the transcribed text was rearranged so that all the text relating to the answers to a specific question were in one place. Thirdly, the researcher conducted a structured reading during which he annotated the text for key themes and important observations. After that, pre-figured themes, based on the interview questions, were crystallized and finalized. Transcribed text was coded using the predetermined themes. Text related to the same theme from different interviews or in different parts of the same interview were coded together, so they could be examined and compared. Finally, the researcher started to interpret the data, and in order to reduce bias, two experts who have extensive experience in qualitative research were invited to check the classification and coding.

6. Results

Three experts who have had more than five years of experience in course design and decision support systems participated in the study. They all have large number of publications in the field of decision support in top-tier publication venues. The three interviewees provided a range of views on the topic as well as in-depth understanding of those views. Two main themes were formed based on the interview questions: (i) the applicability of MCDA to address the challenge

and facilitate the design of blended learning courses; and (ii) the most applicable MCDA method that can be used to develop a blended learning design toolkit.

The applicability of MCDA to address the challenge and facilitate the design of blended learning courses

The three experts agreed that designing blended learning courses is a multi-criteria decision problem as it is influenced by many different criteria. One expert said: *"you [have] got lots of different sub-decisions and each of these has different relevant criteria that you do use to make a decision"*. Another expert explained: *"there are a range of factors that should be considered when thinking about a particular course"*. He added that *"In principle I think it is a multi-criteria problem"*.

Two of these experts, also, described it as "complex problem". One of them said: *"It is a really complex problem"*. The other one *said: "I think it is a multi-criteria problem, a complex one"*.

Regarding the applicability of using MCDA to address this multi-criteria design challenge, two experts agreed that it is applicable. One of them described it as *"a useful tool in any kind of decision making"*. She also added *"It is a perfect tool and I am happy for you to use it"*. The second expert and, after describing variety of factors that he thought academics might need to consider when designing their blended courses, said: *"There is no reason I think why not go to a multi-criteria decision model, it will be quite robust"* .

The third expert, however, was not sure if a MCDA approach is applicable. He agreed that it might offer insight but to solve, he said: *"I don't know"*. He explained his answer by saying: *"My personal view is that I am quite sceptical about using utility theory approaches. I reckon they are simplistic approaches to quite complex problem".* Then, he added: *"They can perhaps offer insight into a decision problem that you may not have before"*.

The most applicable MCDA method that can be used to develop a blended learning design toolkit

To build an MCDA model, researchers need a method to elicit knowledge from experts. They will need to identify possible influential criteria first, and then identify the impact of each of these criteria on the model. The Delphi method is a possible technique for gathering this type of data. Researchers also need to use an MCDA method to analyse experts input and produce recommendations. Two examples of popular MCDA methods are AHP (Analytic Hierarchy Process) and TOPSIS (Technique for Order Preference by Similarity to Ideal Situation).

When the experts were asked if Delphi method is an appropriate method for knowledge acquisition or if they recommend other methods, two of them said *"why not"*. One explained her answer by saying: *"why not Delphi, Delphi method if you have many experts and you want a consensus, Delphi method is good"*. She also pointed out two main issues that need to be considered when using Delphi: participants dropping out and reaching consensus. She said: *"The problem with Delphi Method is that people drop out or you never come to consensus"*. The third expert pointed out that Delphi method can only be used for building but not to validate the developed model. He described external validly as a concern when using Delphi method. He said: *"So the problem is external validity so sure you can create this model based on talking to people but you do not know whether that model is going to work or not until you actually try it out"*. He suggested using another method for validation or, alternatively, using a design science approach. He described the benefit of using design science by saying: *"The way that design science handles it: you create an artefact which is a model whether it turns into a DSS [decision support system] or not but it is an iterative process of reflection, working out what the design is and evaluation. So it is a circlular kind of process"*.

Regarding the most applicable method to analyse experts input and produce recommendations, one expert pointed out that it will depend on the number of criteria that will be identified. She said: *"selecting the method depends on the number of criteria that you find"*.

Another expert explained that the different MCDA methods will often produce the same results. He said: *"I like using multiple methods, but the results often come [out] the same"*.

7. Discussion

Designing blended learning courses, as it has been found in this study and other previous studies (Alammary, Carbone, & Sheard, 2015; Gedik et al., 2013; Moskal, Dziuban, & Hartman, 2013), is a complex problem that is influenced by many criteria. Some are related to the students, the teacher, the educational institution or the nature of the course. Therefore, and when designing their blended courses, teachers need to compromise between what is good and what is possible, considering all the influential criteria. In reality, however, when working with such a complex problem, they normally attempt to use heuristic or intuitive approach to simplify the problem until it seems more manageable (Baltussen & Niessen, 2006). In the process, possible blended learning components may not be considered, important criteria may be ignored and opposing points of view may be discarded. In short, there are many reasons to expect that, on their own, teachers, even those who might consider themselves experts in instructional design, will experience difficulty making informed, thoughtful choices of the most appropriate components for their blend. This highlights the need to use a more systematic way to solve such a multi-criteria design problem.

MCDA is a decision support approach that evolves as a response to the perceived inability of people to effectively and systematically analyse large amounts of dissimilar information. It can deal with the difficulties that people have been shown to have in handling large amounts of complex information in order to make an informed decision (Dodgson, Spackman, Pearman, & Phillips, 2009). It seems likely, based on this study's findings, that an MCDA approach can be a good fit to facilitate the design of blended learning courses. In the literature, there are a number of reasons that can support this finding.

Firstly, MCDA facilitates a systematic and explicit consideration of all multiple criteria that may impact decisions. In MCDA, a decision problem (e.g., choosing the most appropriate delivery method to achieve a learning outcome) is analysed to identify all the influential criteria. Then, the decision-making panel weight each criterion, thereby making their values and objectives explicit. After that, the panel score the performance of each alternative (option) with respect to each criterion, a step that prompts explicit consideration of the advantages and disadvantages of each alternative and promotes discussion within the decision-making panel (Goetghebeur et al., 2012).

Secondly, MCDA allows a group of different experts to be involved in the decision process and encourages them to think more deeply about what they value, why they value it, and in what context they value it. Each one of them can suggest different criteria and express different points of view, which then need to be resolved within a framework of understanding and mutual compromise (Pohekar & Ramachandran, 2004). According to Kiker et al. (2005), one of the advantages of applying an MCDA approach is the ability to call attention to similarities or areas of conflict between experts with different views, which can result in a more informed decision.

Thirdly and according to Kiker et al. (2005), group decision approaches, such as MCDA, have many advantages over individual approaches; in particular, there is a higher possibility of benefiting from the presence of systematic thinkers, more criteria and alternatives may be put forward for consideration, and group members often tend to rely on more deliberative, knowledgeable members. As a blended learning design process would typically require the consideration of a large number of delivery methods, which teachers may have never experienced before, a group decision process is beneficial and often necessary.

Moreover, Tversky and Kahneman (1974) pointed out that without the help of formulas or decision support tools, people tend to focus on a small number of criteria and base their judging on insufficient information. Kiker et al. (2005) also added that with the absence of a systematic method, decision makers are most unlikely to identify and consider all possible criteria, and may not make effective use of all necessary and available information when choosing between the feasible alternatives. The large number of criteria that influence a blended learning design

process seems to make it inefficient and ineffective for teachers to rely on their own limited experience to design their blends.

Lastly, MCDA can enhance trust in the decision recommendations and support the learning process. According to Salo and Hämäläinen (2010), MCDA explicit process can help users to understand the interdependencies between the model outputs (decision recommendations) and the model inputs (criteria weights, alternatives preferences). Users can also explore interactively how changes in an input parameter will be reflected in the produced recommendations.

To identify possible influential criteria and the impact of each of these criteria on the MCDA model, this study suggests the use of the Delphi method. The Delphi method is a common technique for gathering data from experts through multiple rounds of questionnaires (Hsu, Lee, & Kreng, 2010). It employs a series of data collections and analysis techniques to reach consensus on a particular topic (Skulmoski, Hartman, & Krahn, 2007). However, it seems that a Delphi method can only be used for building the model. To validate the model, another approach would need to be considered.

Regarding the most applicable MCDA method to process Delphi method data and produce blended learning design recommendations, some findings suggest waiting until identifying all influential criteria and then select a method based on the number of criteria. Other findings suggest that these different MCDA methods will often produce the same results.

8. How to Apply MCDA

To use MCDA to assist academics in designing their blended learning courses, the following steps should be carried out:

A. The design problems that need to be addressed need to be identified; e.g. deciding the most appropriate delivery method to achieve each course outcome. The problem definitions need to be concise and unambiguous.
B. A literature review can be used to create an initial list of criteria and the prospective alternatives for each decision problem.
C. Use two Delphi method surveys to elicit knowledge from experts. Each survey should consist of two rounds. An expert panel should be formed for each Delphi trial. A group of at least five willing experts could be adequate (Armstrong, 2001; Rowe & Wright, 2001). Experts will need to have in-depth knowledge and sound experience in both face-to-face and online teaching methods.

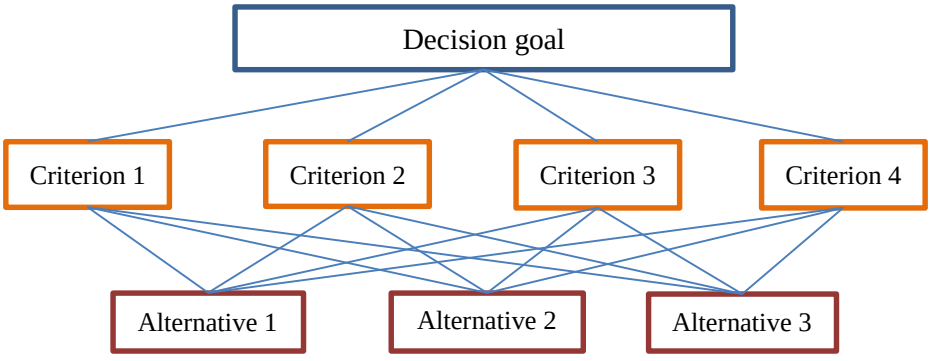

Fig. 1. a hierarchy of a decision problem.

D. Delphi study 1 – Round 1 will involve identification of criteria that influence each decision problem. The experts will be presented with an overview explaining each decision problem and a list containing description of feasible alternatives and possible evaluation criteria. They will be requested to select and justify criteria that they would consider important in evaluating the presented alternatives. They will be also requested for additional criteria that may have been excluded from the list.

E. Delphi study 1 – Round 2 will involve approving the Round 1results. The experts will be asked to review their and other participants' Round 1 results.
F. The final hierarchy for each decision problem will be constructed: an overall goal on the top, a group of alternatives for reaching the goal at the bottom, and a group of criteria that relate the alternatives to the goal in the middle (see fig. 1).
G. Delphi study 2 – Round 1 will involve the same group of experts receiving a series of questions asking them to gauge: (i) the relative importance (through pairwise comparison) of criteria with respect to their decision problem goal, and (ii) the relative preference of alternatives with respect to each criterion.
H. Determine criteria weights via a method called Fuzzy Analytic Hierarchy Process (FAHP). FAHP is one of the most popular techniques for organizing and analyzing complex decisions (Hsu et al., 2010; Kahraman, Cebeci, & Ruan, 2004). After determining all criteria weights, the consistency ratios of all FAHP comparisons should be calculated.
I. In order to reach a consensus, steps (G) and (H) should be repeated one more time. In this step, a report describing the analysis results should be prepared and sent to the expert group for their review. The report should contain all the elements' rankings. It should underscore each element's ranking by indicating each alternative performance with respect to the criteria and each criterion relative importance with respect to the goal. Any major discrepancies between members' weights should be highlighted, and members should be given the opportunity to revise and justify their judgments', especially where notable discrepancy exists. This step is marked as Delphi study 2 – Rounds 2.
J. The final results including the criteria and their weights, the alternatives and their relative preference with respect to each criterion, will be fed into Microsoft Excel.
K. Use Fuzzy Technique for Order Preference by Similarity to Ideal Situation (Fuzzy TOPSIS) to calculate the performance values of each alternative with respect to each criterion and then do a final ranking of all alternatives to select the most appropriate one. Fuzzy TOPSIS has an easy and simple procedure. It can be easily applied and programmed (Kim, Park, & Yoon, 1997). Its calculation can be performed manually or by using a software; e.g. TOPSIS Software for Excel.

It is important to note that Delphi method can be replaced with a focus group if the experts are not geographically spread and are able to participate in a face-to-face discussion.

9. How the Proposed Approach can Address the Design Challenges

Using MCDA can help address the seven design challenges that have been discussed in section 2. Firstly, it allows a systematic way to identify and analyse the different criteria that need to be considered when choosing the most appropriate delivery methods to achieve the learning outcomes. The produced MCDA model can work as a standard guide to facilitate a successful blended learning course design. Moreover, the decision process will involve a group of experts who have years of experience in blended learning. As result, more student related criteria will be put forward for consideration and that can help producing a blended course that can accommodate the needs of a diverse student population. Furthermore, MCDA can be used to develop a decision support tool that contains rich information about the different criteria that need consideration when designing a blended course and their impact on the design process. When this information is displayed in a structured and easy to understand way, it can help enhance academics knowledge about blended learning design and most importantly motivate reluctant and inexperienced teachers to get started and adopt a blended approach.

10. Future Work and Conclusion

This study discussed different challenges academics in higher education face when designing their blended learning courses and then examined the applicability of using MCDA to address these challenges and facilitate the design process. It seems that an MCDA approach can be a good fit to assist the design of blended learning courses.

This study will be continued as follows:

A. Two Delphi studies will be conducted with groups of experts to elicit knowledge required to build the MCDA model and to analyse the impact of each of these criteria on the model.
B. The MCDA model will be used to build a design support toolkit. The toolkit will be implemented as a web application to make it possible for academics from anywhere to use it at any time without having to deploy it on their machines.
C. The Toolkit will be evaluated. The evaluation can be in the form of a survey distributed to experts in blended learning. Experts will be required to comment on the efficacy, utility and feasibility of BlendIt in assisting academics in designing their blended courses. The toolkit can also be used to develop an actual course. Students and teachers will be interviewed, after the course has been completed, for their feedback on the blended learning experience.

The outcome of this project is intended to contribute to the field of educational technology and to be a useful adjunct to support academics who want to adopt new teaching approaches.

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