

# Roadmap for enhancing efficiency and effectiveness of Blended E-learning in Higher Education: A UAE Case Study

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**Abstract** — Many educational institutions are shifting their pedagogies from the traditional physical classroom based teaching by introducing online teaching methods utilizing the technological opportunities in the educational field. Blended E-learning is one of the approaches that got the attention of the higher education institutions in which both teachers and students can have a new and stimulating educational experience. In institutions where eLearning is seen as part of core business, solutions for its support and use by students and teachers need to be robust and backed by appropriate strategy that ensures successful lesson delivery and assessments. This research paper has identified key factors that positively impact Blended E-learning. It also proposes a roadmap that can help institutions to consider a Blended E-learning approach to implement in their curriculum in a structured manner to ensure better results.

**Keywords:** *Blended E-learning, synchronous learning, asynchronous learning, Roadmap, Framework*

## I. INTRODUCTION

Professionals are no longer having liberty to take a break from their employers for a period of 2 to 3 years to complete higher education. They have to balance life between job, family responsibilities and pursuing higher educational qualification. In addition to that, most of the higher education students are trying to reconcile themselves with the different commitments that they have such as family and jobs obligations. While most services can be delivered electronically, education can also effectively be conducted by using technology and Internet mediums. Many academic institutions, whether in the United Arab Emirates or around the world, have shifted from the traditional physical classes to E-learning environment where students and teachers can differently consider the time and place factors.

Many higher educational institutions have been implementing synchronous and asynchronous blended E-learning methods to efficiently deliver education to its students through faculty members. However, not all of these institutions are implementing the blended E-learning approach in the way that can bring the maximum benefit to the stakeholders. The advantages of the blended E-learning if leveraged appropriately can lead to a radical and positive change in the education field.

There is a need for a roadmap which can guide colleges and universities in implementing blended E-learning to leverage the critical factors that impact it positively. The aim of this research paper is to propose a comprehensive roadmap for influencing the most crucial factors affecting the blended E-learning approach so as to help universities to effectively and efficiently implement their synchronous and asynchronous online classes.

The Objectives of the research paper are as follows:

- To identify the most important factors that are affecting blended E-learning approach.
- To create a roadmap with the best practices to enrich the factors that affect blended E-learning.
- To validate the roadmap by applying them on a current blended E-learning course.

## II. LITERATURE REVIEW

Regarding the definition of E-learning, it has to be different based on the field that it is used on (ex: Business, Education, Military, etc.). With its different terminologies; E-learning or virtual learning; the following authors have defined E-learning as:

- “Computer-based environment that are relatively open systems, allowing interaction encounters with other participants and providing access to a wide range of resources” (Wilson, 1996) as cited by (Piccoli, Ahmed, & Lves, 2001).
- “The process of learning mediated by a mobile device” (Kearney, Schuck, Burden, & Aubusson, 2012).
- “The integration of pedagogy, instructional technology, and the Internet into teaching and learning environment” (Carter, et al., 2014)
- “Internet mediated teaching, web-based education, online education, computer assisted learning, virtual classrooms, electronic learning, mobile learning, web-based learning, virtual learning; a cacophony of vernacular, the use of information technology in education is best designated by the term electronic learning (E-learning)” (Catoni et al. 2004) as cited by (Conradie, 2013).
- “Educational interactions occur in the environment, turning spaces into places” (Dillenbourg, Schneider, & Synteta, 2002).
- “The use of information and communication technology (ICT) to enhance and support learning and to affect the construction of knowledge” (Abdel Megeid, 2014).

While the definition of E-learning can vary from one author to another, the term (blended) is simply defined in dictionary as a mix or combination. In the blended E-learning, the mixture is achieved by combining the synchronous and asynchronous E-learning. The term synchronous as defined in the dictionary as occurring at the same time which mainly happens in the online environment as video conferencing and chats. Opposite to the synchronous E-learning, the asynchronous E-learning is facilitated by media such as e-mail and discussion boards (Hrastinski, 2008) which mainly does not require the participants to be online at the same time. There are many tools that support both above types of E-learning mechanisms. For example, the synchronous E-learning can be conducted using

different video conferencing technologies such as Zoom, Black Board Collaborate, Skype as well as the online chat tools while the asynchronous E-learning can be facilitated by Black Board Learn (discussion board, assignment submission, file exchange), Edmodo.com and through emails too.

However, as many tools may be available; it is important to use them in the right manner to derive maximum benefits. Thus it is important to understand the factors that impact the use of these tools in an online blended learning environment. Many research papers have highlighted factors that are affecting blended E-learning. Each of these papers has a different perspective and explanation for each factor. A list of indicators were identified in this research to be the base of the final roadmap. Table 1 (below) displays some of the most important indicators:-

Citation	Indicators
(Grogan, 2015)	1. Social Presence
	2. Cognitive Presence
	3. Course design
(Kearney, Schuck, Burden, & Aubusson, 2012)	4. Usability of the learning mediums
	5. Communication in context
	6. Organizational context
	7. Generic mobile
	8. Learning environment issues
	9. Learning context
	10. Learning objectives
(Hrastinski, 2008)	11. Time factor for students to fulfill tasks and arrange educational commitments
	12. Learning outcomes
	13. Content of the course
	14. Learner's motivation
(Chang, Yeh Wang, & Dong Chen, 2009)	15. E-learning system satisfaction
	16. E-learning system acceptance
	17. Motivation of learners
(Homan & Macpherson, 2005)	18. Access and motivation
	19. Socialization
	20. Exchanging information,
	21. Knowledge
(Chigeza & Halbert, 2014)	22. Personal reflection
	23. Teachers knowledge, policies and experiences in E-learning
(Karaksha, Grant, Nirthanan, Nirthanan, Davey, & Dukie, 2014).	24. Usage of technology

**Table 1: Blended E-learning indicators from literature**

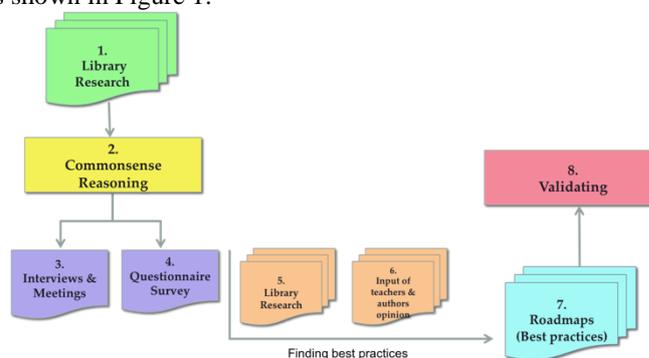
The next step was to factorize the list of indicators by using the commonsense reasoning method i.e. by combining similar indicators into group factors. This would enable to create a roadmap on basis of the grouped factors rather than on each indicator. But as it is the same indicators that have been rounded into grouped factors, the importance of the indicators is still considered in the roadmap. The process was to combine the indicators into common categories called factors as displayed in Table 2 (below):-

Factors	Indicators (non-ranked)
<b>1. Characteristics of the student</b>	a) Technical skills
	b) Motivation to learn
	c) Communication skills
<b>2. Role of the student</b>	a) Cognitive presence
	b) Involvement
<b>3. Characteristics of the teacher</b>	a) Motivation to teach
	b) Experience in E-learning
	c) Teaching style
<b>4. Role of the teacher</b>	a) Level of explanation
<b>5. Social aspects</b>	a) Level of socialization
	b) Ethics
<b>6. Course design</b>	a) Course content
	b) Course materials
	c) Rules of the class
	d) Technology used
	e) Time considerations
	f) Level of synchronization
	g) Level of asynchronization

**Table 2: List of factors affecting the performance of blended E-learning**

### III. PRIMARY DATA ANALYSIS

The indicators and the grouped factors were entirely based on outcomes of the literature review. It was important to find the significance of these factors and indicators in the perspectives of UAE based Academicians and students. Hence it was needed to conduct a Primary investigation. Both qualitative and quantitative methods were used to collect the required data as shown in Figure 1.



**Figure 1: Research Methods for data collection**

The interviews and the questionnaire survey were conducted to identify experts' opinions and explanation on the identified factors. 45 participants have participated in the questionnaire while four experts have been interviewed. The results of the questionnaire showed a minimum of 75% agreement while the interviewees contributed with their experiences to explain the

factors and provide examples and suggestions. In addition to that, the results of the questionnaire led to rank the factors within their categories as displayed in Table 3.

Factors	Indicators (with Ranking)
<b>Characteristics of the student</b>	1. Motivation to learn 2. Technical skills 3. Communication skills
<b>Role of the student</b>	1. Cognitive presence 2. Involvement
<b>Characteristics of the teacher</b>	1. Teaching style 2. Motivation to teach 3. Experience in E-learning
<b>Role of the teacher</b>	1. Level of explanation
<b>Social Aspects</b>	1. Level of socialization and ethics
<b>Course Design</b>	1. Course materials and technology used 2. Rules of the class and time considerations 3. Course content 4. Level of synchronization and level of asynchronization

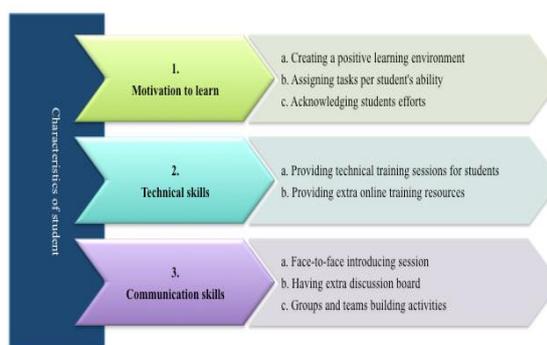
**Table 3: Ranking of indicators affecting the performance of blended E-learning**

Ranking of indicators within each of the factors is essential while implementing the roadmaps. Academic institutions and instructors will need to set the priorities of the factors based on the circumstances of their courses as well as by looking at the ranking.

#### IV. ROADMAP FOR BLENDED E-LEARNING

A roadmap a plan or strategy intended to achieve a particular goal. One of the research objectives was to propose roadmap for effective implementation of blended eLearning initiatives. The proposed roadmap consists of individual roadmaps of best practices that can enrich the effectiveness of each of above the six factors for efficient and effective implementation of blended E-learning in Higher Education. The roadmaps can help the higher education institutions and their stakeholders to have a better experience in blended E-learning and get the maximum benefits that are brought by the approach such as flexibility, saving time, etc. The source for creating the roadmaps is a mix of literature, interview data analysis and researcher's perspectives.

The first roadmap is to enrich the characteristics of student. There are several indicators that influence the student to adopt the E-learning context. Students with stronger characteristics can have better performance in the blended E-learning. Figure 2 shows the best practices to enrich the characteristics of motivation, technical skills and communication skills:



**Figure 2: Roadmap to enrich the characteristics of students**

#### 1. Motivation to learn:

As mentioned before, student motivation is an essential key to succeed in the blended E-learning. There are several methods that teachers can utilize to enrich students' motivation such as:

- Having a positive and energetic learning environment. Susan Wallace in Nottingham Trent University, Nottingham, UK, mentioned that having a cheerful teacher who brings the positive energy into the environment of the session can motivate students. Such cheerful teachers adjust their teaching planning and strategies to accommodate students (Wallace, 2014). Teachers must ensure that their teaching style and overall attitudes' are suitable for the different learning styles that students have (Psycharis, Botsari, & Chatzar, 2014).
- Assigning tasks as per student ability. Students are more motivated if they are able to fulfill the tasks; which enables them to accept the course and feel that they are able to succeed and enjoy it. Teachers need to make sure that the course tasks are not too easy and at the same time they are not too challenging either.
- Acknowledging students efforts. Teachers can motivate students and encourage them to learn by rewarding them with marks for their activeness in class. The reward is not only marks but it can be the pride and enhancing student's image (Wallace, 2014) which can be done through appraising comments and feedback.

#### 2. Technical skills:

Students need to know how to use the blended eLearning technology incorporated in the course to be able to communicate effectively and be involved in the course. The technical skills of students can be enriched by:

- Providing technical training sessions for students. Unless sufficient support and training is given, acceptance will remain at a superficial level (Ng'ambi, Bozalek, & Gachago, 2013). Even those who already have technical skills, such sessions will be important for them to refresh their knowledge; they should be allowed to integrate what they know to strengthen individual concepts and gain better problem solving skills (Chuang, Jou, Lin, & Cheng-Ti, 2015).
- Extra online training resources. It is also important to offer some online resources so students can have an access to web links to other educational websites and virtual

laboratories across the globe, mainly to enhance students training (Aichounia, Benchicoub, & Neh, 2013). Resources such as Frequently Asked Questions (FAQs), how to troubleshoot technical issues in the used technology, how to install upgrades and updates, etc. have to be made available for students so they can refer to them when needed.

### 3. Communication skills:

Students need to interact, discuss and communicate with each other. Communication makes students feel that they are in a normal classroom and not isolated or only dealing with a piece of device. Student's communication skills can be enriched by:

- a. *Having face-to-face introduction session.* Referring to the experiences of interviewee 4, it is recommended to have such introduction session at the beginning of the course to give students an opportunity to know each other.
- b. *Having extra discussion boards.* Extra discussion boards can be used to discuss issues other than those in the course work; student-student interaction has a great impact in the success of E-learning as it has a direct impact in the motivation of the students (Essam & Al-Ammary, 2013). Students can post interesting topics that they read or watch or even discuss about their studying skills. Such discussions improve students' communication and build their relationships.
- c. *Groups and team building activities.* Students from the same class come from different cultures, backgrounds and traditions. Having students getting to know each other is so important to create an effective learning environment; this includes the use of teaching strategies and educational content that can help students develop integrative knowledge about self and others (Daniel, 2011). The group activities increase the communication between students and strengthen their interaction, which can positively affect the course environment.

Besides the characteristics that should facilitate the adoption of blended E-learning, there are some roles that student must perform to get the actual benefits of the blended E-learning. Figure 3 shows some practices that can reinforce these roles, which are the cognitive presence and involvement:

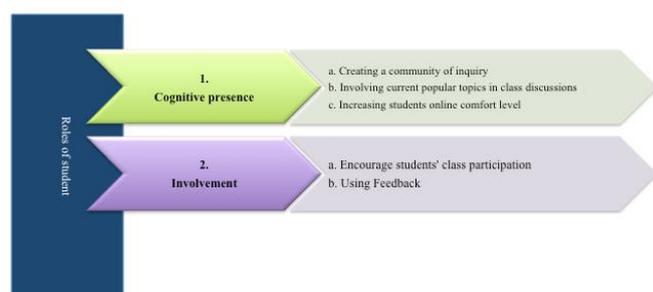


Figure 3: Roadmap to enrich the role of student

#### 1. Cognitive presence:

Teachers have a challenging responsibility to encourage the cognitive presence of the student as it is usually linked with the topic that the teacher is lecturing. Below are ways that

teachers can follow to enrich the cognitive presence of their students:

- a. *Creating a community of inquiry.* Teachers need to convert the session into a community of inquiry in which members question one another, demand reasons for beliefs, and point out consequences of each other's ideas—thus creating a self-judging community when adequate levels of cognitive presence as an evidence (Garrison, Anderson, & Arch, 2009). Moreover, when students see their teachers taking an active role in focusing online discussions, they also report higher cognitive presence (Sheaa & Bidjeranob, 2009).
- b. *Involving current popular topics in class discussions.* Students are more willing to discuss what they see in social media and what issues exist in the society as well as sharing their different respective perspectives.
- c. *Increasing students' online comfort level.* Lower level of comfort with online discussion is strongly correlated with lower levels of cognitive presence (Sheaa & Bidjeranob, 2009). Teachers need to create a comfortable online environment for students in which they can participate and get fair attention. Increase in comfort level with online technologies impact the success of an online learning experience, while technical problems, a perceived lack of sense of community, time constraints, and the difficulty in understanding the objectives of the online courses are the main challenges. (Song, Singleton, & Hi, 2004). These challenges can be overcome by increasing the comfort level of the students in using online technologies.

#### 2. Involvement:

Students need to feel that they are part of the course, so that they can actively participate, discuss, ask and answer questions. To achieve that, teachers need to:

- a. *Encourage students' class participation.* Students need to participate in curricular and noncurricular activities to add value to the course with their opinions and ideas. Assigning marks is also essential to trigger their participation. It is important not only to identify the extra-curricular activities in which the student participates but also to assess the time and energy that the student devotes to each activity (Astin, 1999). Teachers also need to wisely take advantage of the groups' activities, which can be consciously used to enhance student involvement in the learning process (Astin, 1999).
- b. *Using feedback.* Students need feedback and confirmation that their voices have been heard. Also students themselves must be encouraged to give feedback about the course and to express their concerns (Fletcher, 2014).

Similar to the student characteristics and roles, teachers have to acquire several characteristics and roles in the blended E-learning approach. Students and teachers are supposed to have similar experiences with the technology, yet there are some differences related to their respective roles. Figure 4 displays the best practices to enrich the characteristics of the teacher, such as: teaching style, motivation to teach and experience in E-learning:



Figure 4: Roadmap to enrich the characteristics of the teacher

### 1. Teaching style:

Style refers to the preferences in the use of abilities (Sternberg & Zhang, 2001), thus the use of these abilities will make every teaching session an exceptional experience for both teachers and students. Teachers can enrich their teaching styles by the following:

- a. Professional development (PD). PD sessions can cover different aspects not only the teaching skills. Activities including workshops, research groups, individualized feedback or reading pedagogical research (Oleson & Hora, 2014) can enrich teaching skills and other important aspects such as course design, assessment design, class management skills, emotional intelligence and technical skills. Such professional development helps teachers getting different teaching styles and being able to deal with different learning styles of students as well.
- b. Willingness to adjust teaching styles. It is important to achieve students' satisfaction regarding how they are being taught. Teachers need to ask their students about their opinions, comments and suggestions; thus they adjust their teaching styles especially if the majority of students are demanding a reliable change. Students' feedback regarding teaching styles can be gained verbally or through reflections. Students can be asked to write reflections to evaluate the teachers, which can give them an overview about students' learning preferences. Teachers as well can write reflections about their classes to compare and evaluate their performances regularly. Reflection papers are great tools to improve one's abilities as he/she can evaluate the positive experience and try to improve more as well as evaluating the negative experiences and try to fix the mistakes (Raggatt, Hanson, & Edwards, 2010).

In addition to the characteristics of the teacher, Figure 5 shows a roadmap to enrich the general role of the teacher in the blended E-learning approach:

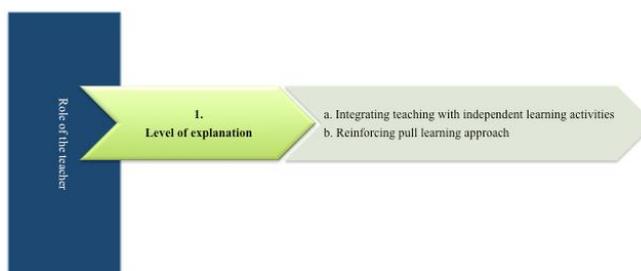


Figure 5: Roadmap to enrich the role of the teacher

### 1. Level of explanation:

Level of explanation in a blended E-learning approach will definitely be less than it is in a physical class. However, students still need to get sufficient amount of information from their teacher to move on with the course. The following can enrich the level of explanation in the blended E-learning context:

- a. Integrating teaching with independent learning activities. Teachers are supposed to allow independent learning opportunities rather than giving a continuous lecture (in synchronous sessions) or uploading tremendous amount of materials over discussion boards (in asynchronous sessions). Students need to explore the topics of the course and work independently on finding answers for the activities and tasks that are given by teachers; 'surface' rather than 'deep' learning may be encouraged by this type of resource (Cotton & Gresty, 2007).
- b. Reinforcing pull learning. Teachers need to balance between what they give to students and what they are supposed to receive from students; pull-based learning and push-based learning models (Leung, 2003). Verbal discussions and discussion boards encourage students to reveal their knowledge and share their ideas.

The social aspects are important factors that affect success or failure of the blended E-learning. In fact, they are more effective in blended E-learning based education where traditions and culture are impacting the behavior of students and teachers. Figure 6 depicts some suggestions to enrich the aspects of ethics and socialization level:

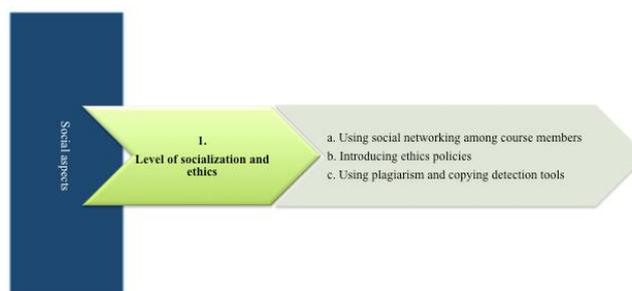


Figure 6: Roadmap to enrich the social aspects

### 1. Level of socialization and ethics:

Students in the same class come from different cultures, backgrounds and traditions and this can be used to create an interesting and enjoyable learning environment:

- a. Using Social Networking. Teachers must allow the socialization opportunities in which students get to know each other, build friendships and find those who have similar interests. This can be done more effectively when students are using social networking applications and websites such as WhatsApp, Instagram, Twitter, Facebook and other social networking mediums that are very effective nowadays. Socialization will allow students to share interests, concerns, feelings and share problems that they seek help to find solutions for. Whenever students are having strong social relationship, they can encourage each other and be more motivated to move on with the blended E-learning course in a positive manner.
- b. Introducing course's ethics and violation polices. Academic honesty, copyrights, referencing, etc. all of these aspects must be introduced and explained to students and the consequences of violation should be explained to them as well. In fact, violating polices must be set and communicated to students at the beginning of the course so they know all their responsibilities towards what they use and contribute to the course.
- c. Using plagiarism and copy detection tools. Such tools are important to enhance the ethical considerations especially in terms of copyrights. Examples of plagiarism tools such SafeAssign and Turnitin shows the percentage of copied text in a submitted paper. In addition to that, recognition of students' facial expressions can be used to understand their level of attention (Chen, 2012), which requires a high level of skills and experience, therefore, professional development is highly needed.

The design of the blended E-learning course is an essential factor that has been mentioned several times in the literature. Figure 7 shows steps that can help in designing a successful blended E-learning course:

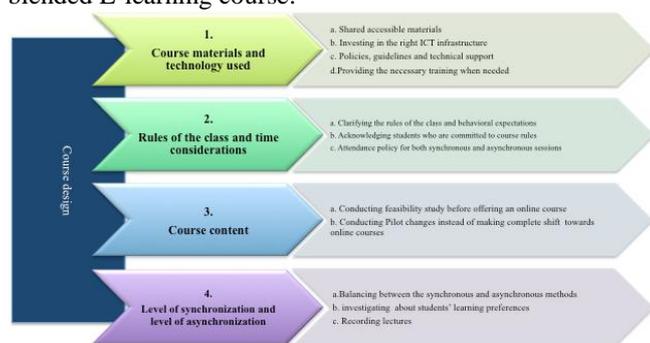


Figure 7: Roadmap to enrich the course design

### 1. Course materials and technology used:

As teachers need to work on their own development, other facilities must be available to apply the teaching and learning processes. High Quality Course material must be available to ensure continuous teaching and learning processes without interruption. These aspects can be enriched by:

- a. Shared Accessible Materials. There are several options for sharing materials and making them accessible to faculty and students. Tools such as Black Board Learn, Edmodo, SharePoint and the regular shared drives within the institute can be used for this purpose. This can save teachers' time, introduce them to different teaching styles, share experiences and provide variety of teaching

materials, thus making it easier for teachers to design their courses based on the senior colleagues' best practices. Ensuring an easy and user-friendly navigation for the course is also essential.

- b. Investing in the right ICT infrastructure. Higher education institutions should invest in the right ICT infrastructure that allows students and teachers to easily access the ICT hardware, using friendly software and provide fixed technical support (Al-adwan & Smedley, 2012).
- c. Policies, guidelines and technical support for faculty members and students. Fewer universities have written policies, guidelines or technical support for faculty members or students (Stewart, Stott, & Nuttall, 2011). Institutions must have clear policies and guidelines for using technology as well as the violation polices. Teachers and students need to know whom they have to approach once they have issues or need upgrades in the used technology.
- d. Providing the necessary training when needed. Training is essential for faculty members and students especially when the technology is newly launched. The training can be conducted physically at the institute before the actual start of the course or online by using synchronous methods such as Zoom or by uploading materials and demo videos on the course online page.

### 2. Rules of the class and time considerations:

Rules of the class are mainly affected by the level of awareness that students have. As mentioned, students in E-learning courses need to be more independent, this independence can require students to change their ways of thinking, behavior and habits (Al-adwan & Smedley, 2012). In addition to that, teachers should consider in mind that students do select E-learning because of their other commitments in family and work; therefore time considerations are not only for attendance but also for submission dates. Therefore, following ways are suggested to enrich the aspects of the rules and time considerations:

- a. Clarifying rules of the class and behavioral expectations. Earlier research suggests that clarifying the classroom rules and behavioral expectations, monitoring students' adherence to them and using behavior-specific praise are simple and effective practices to reduce disruptive behavior (Närhiab, Kiiskib, Peitsob, & Hannu, 2015). Despite the difficulty of controlling an online class, it is important for teachers and students to keep in mind that behavior is an essential element in both physical and online classes. It is also important to mention the behavioral commitment in the discussion boards where students need to post respectful comments and not using any disruptive language.
- b. Acknowledging students who are committed to course rules. Acknowledgment can be done by verbal communication, posted comments or by assigning marks. Such acknowledgment will encourage students to keep their commitments and others to follow the rules.
- c. Attendance policy for both synchronous and asynchronous sessions. Attendance policy for the synchronous sessions

and submission dates for the asynchronous sessions must be considered carefully. Those who miss the synchronous sessions must inform the teacher in advance and mention the reason of his/her absence. Such policy does not interfere with the flexibility concepts, but it is essential to increase the awareness of respecting the class rules and seriously committing to them. Furthermore, (Stewart, Stott, & Nuttall, 2011) demonstrated that students with lower levels of attendance were associated with higher levels of online reading, providing some support for the hypothesis that students may be able to successfully compensate by viewing online lecture resources when unable to attend class. Based on that, students may get more committed to the asynchronous sessions more than the synchronous ones. However, flexibility must not lead to students' carelessness and it has to be considered as one of the priorities in the rules of the class. Submission dates can be considered as an attendance policy for the asynchronous sessions in which students need to submit their assignments on time. To achieve the flexibility concept in the online education, teacher can decide on flexible submission dates to help those who get sudden family or work commitments that interfere with the original submission time.

### 3. Course content:

While online education can provide tremendous benefits; for students, teachers and the institution itself; not all of subjects can be converted into online ones. There are some areas that are more reliable when conducted in physical classrooms. One of the most important steps before deciding having an online course is:

- a. Conducting feasibility study before offering an online course. Researchers have warned that not all online courses provide high-quality learning experiences (Stewart, Stott, & Nuttall, 2011), which clarifies that institutions have to be cautious when choosing to offer blended E-learning courses. Subjects such as engineering and medicine require high hands-on activities which E-learning may not be able to sufficiently provide. E-learning has the potential to make important contributions to medical education, but there has been limited study of a blended approach in which the digital resources are introduced alongside traditional teaching methods (Khogali, Davies, Donnan, & GR, 2011). Teachers can shift to blended Learning instead of blended E-learning so students can attend the physical classes for training and practicing but all of the lecturing materials, written assignments, etc. are available online as well as the discussion boards, blogs, emails, etc. for questions and discussions.
- b. Conducting Pilot Projects instead of total shifting towards online courses. Teachers can try converting one of the course aspects into online such as exams then trying another aspects till he/she makes sure that all course aspects are applicable to online contexts. Such step can makes it easier for students to accept the online context and get used with it as well as exploring all difficulties that can be solved rather than having a total sudden shift towards the online context in which different barriers may appear.

### 4. Level of synchronization and level of asynchronization:

Blended E-learning combines the synchronous and asynchronous methods. However, there are some courses that have a higher level of one method, which may affect the course success in a positive or negative way. This aspect can be considered as following:

- a. Balancing between the synchronous and asynchronous methods. While students and teachers have different learning and teaching styles, it will be difficult to satisfy everybody when having a fully synchronous session or fully asynchronous one. Teachers need to balance between the both methods in order to recognize all levels of students. Balancing between both methods can reveal the abilities of students especially in the discussions, as some may prefer the verbal discussions while others may prefer to enter their comments in a discussion board.
- b. Investigating about students' learning preferences. In some cases, there might be a class in which all students do agree on having a full synchronous or full asynchronous course. In this case, students should be asked so the course is delivered based on their preferences. As cited by (Opdecam, Everaert, & Ke, 2014), investigating students' learning preferences regarding their academic environment can help instructors to select the appropriate teaching strategy and to structure the academic environment to better serve students' learning needs.
- c. Recording lectures. Teachers need to record their lectures and upload them to a shared drive so students can refer to them whenever needed. The only concern will be on those who do not approve their voices to be recorded as well as the students who do not prefer recording the session with their presence in classroom. However, the teacher can record the session once all students agree.

## V. VALIDATION OF THE ROADMAPS

The last step of this research paper was to validate the findings by analyzing the Information Technology Investment Financial Analysis online course. The course was conducted at the Master level at a Higher Education Institute in the UAE and had 17 students enrolled on it. All of the students were committed to work or families responsibilities, which led them to choose online education for its flexibility. The course was conducted through synchronous and asynchronous methods using Zoom and Edmodo technologies. The teacher of the course and three of the students were interviewed to ask about the implementation of the six categories of the factors that were discussed in this research via the proposed roadmaps. The main purpose of this case study was to validate the roadmaps by looking at how the factors were being implemented and how the roadmaps with their best practices could be implemented to improve that course.

The outcome of the case study proved the effectiveness of the identified factors especially in terms of student's characteristics and teacher's role. Some of the suggested best practices have been implemented successfully such as using the team building activities to improve the communication skills. However, there were some obvious weaknesses on implementing the factor of course design, and mainly in the indicator of the course content. The teacher was depending on his own materials and he did not provide any guideline for how to use the course technologies. Thus the suggested changes could be: using shared materials to get wider experience and

ideas regarding the course's topics. Also the guidelines should be uploaded for students so they can refer to them whenever they need. Guidelines can be documents with screenshots, video tutorials, etc.

## VI. CONCLUSION

This research paper has focused on blended E-learning, which refers to the synchronous methods such as videoconferencing technologies as well as the asynchronous methods such as discussion boards. The research aimed to find the most effective factors that are affecting the performance of blended E-learning and to create roadmaps to enrich these factors. Having that shift in the field of education is not an easy project, yet, it can lead to a positive paradigm shift to the way that we are conducting the teaching and learning processes. This research has inputs from the members of the Higher Education Institute in the UAE. However, the factors or the challenges that affect the performance of blended E-learning may differ from an institution to another based on the capabilities of each institution to handle the project of blended E-learning. The resources are not only the infrastructure and financial ones but also the human resources, which are students and teachers. In general, despite the differences between institutions, it is impossible to implement blended E-learning without considering factors such as the factors that were discussed in the research paper (characteristics and roles of the students, characteristics and roles of the teacher, social aspects and course design).

In summary, this research paper identified important indicators that affect the quality of a blended eLearning course delivery. These factors were grouped into factors and roadmaps were proposed to enrich the factors (and their grouped indicators). Valuable sources such as literature reviews, primary data analysis of interviews and analytical interpretations were used to create the roadmaps. The roadmaps were validated with data from a Graduate course at an UAE Institute and findings proved the importance of the factors for effectiveness of the course taught using a Blended eLearning pedagogy. The proposed roadmaps may be used as a guiding framework by those Institutions that are planning to implement courses in a blended manner. The limitations of the research is that it has local perspectives of the UAE based academic environment, UAE students and faculty and these may slightly differ in a different country. However as the roadmaps have been based on a rigorous literature review encompassing data from various countries, the road maps may have a wider application rather than only the UAE or GCC.

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