The Perspective of Engineering Students about Blended Learning: Experience and Challenges

Amjad Gawanmeh*, Roudha Alhammadi*, Mohammad Daradkeh*, Shadi Atalla*, Wathiq Mansoor*
*College of Engineering and IT, University of Dubai, Dubai, UAE.
{agawanmeh,s0000002808, mdaradkehc, satalla, wmansoor}@ud.ac.ae

***Abstract*—Rather than receiving education face-to-face on-campus, blended learning, which combines both online education and face-to-face, emerged as an alternative solution. If implemented properly though, this mode of education can have its positive impact on the teaching and learning processes. Blended learning has become very popular post COVID pandemic, since many institutes wanted to continue using online education partially, where part of the course is delivered using conventional methods, and part using online tools. This paper is intended to study students' perceptive on blended learning involving engineering students at a private university in Dubai where this study was implemented, the researchers utilized a questionnaire focusing on students' feedback and perspective about blended learning. Based on the study's findings, most respondents were in favor of blended learning education, particularly in relation to its impact on student performance and convenience.**

***Index Terms*—Blended Learning, Remote education, Students' perspective, Online education**

I. Introduction

The emergence of the COVID-19 pandemic posed challenges for students and educators alike. One major consequence was the closure of educational institutions worldwide, leading to a transition from traditional in-person learning to online education. This transition brought about various problems, with mental health concerns among students being a particularly significant issue [1], [2].

As stated, this transition from normal education to online delivery has raised many concerns, some of which are related technological facilities, educators IT training, quality of students' IT skills, and mental health of students [2]–[4].

Blended learning has emerged as a concept that combines both online and face-to-face learning experiences. This mode of learning has become very common in education recently. The combination of both learning modes, help shifting the focus of education from being teacher-centered to being student-centered. In addition, it also has provides several tools to increase interaction between students and teachers, which is supposed to enhance and improve the learning experience. It is also expected that this mode has numerous benefits such as flexibility, accessibility, and learn in a collaborative environment.

Inspired by the need to address challenges related to the implementation of blended learning, this paper is seeking to highlight students' perceptions towards blended learning. As such, this study is intended to analyses engineering students' perception about blended learning. Based on the study's findings, it could be possible to have a clear idea about how blended learning impacts students' performance, and willingness to adopt this mode of education.

II. Related Work

To start with, what is meant by blended education? Obviously, it is a mode of education that combines b both face to face and online. Numerous scholars have acknowledged that online education has been present in higher education institutions for some time [5]. It covers various educational settings where both asynchronous and synchronous communication methods are utilized to support student learning, regardless of their physical location [6] [7]. In the context of online education, instructors and students engage in teaching and learning activities from separate locations [8], [9].

Authors in [10] addressed the advantages of Online education model, highlighting flexible as well as cheaper learning [11]. Additionally, online education enables learners to enhance their learning progress by allowing them to schedule their courses at their convenience [12]. Furthermore, it promotes an environment-friendly by eliminating the need for paper consumption among students, instructors, and administrators.

Although technological advancements have enabled us to experience a more convenient educational life than past generations, they have not necessarily ensured any better learning environment and conditions for today's generation of learners. Concerned particularly with blended learning, observing and analyzing the perspective of students is necessary. Authors in [13] stated that despite the convenience brought by technological advancements to education, these technologies do guarantee improved learning process for students. Hence, the impact of combining online and face-to-face education on the achievement as well as well-being of learners has been a concern among several authors, who note that it has not yielded positive effects [14]–[16].

Carey [17] states that the main challenge which educational institutions encounter with blended learning is utilizing technological facilities as required. Due to lack of IT training or facilities. Another challenge to encounter within the contexts of blended learning is assessments. Other authors, including Baleni [18] and Fontaine [19], addressed the issue of online assessment reliability and compared summative and formative

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methods highlighting several issues such as monitoring and invigilation.

Mental issues related to language barriers were addressed by Hysaj and Suleymanova [20]. They examined oral and written samples of several students in language classes, and found out that students might not always be provided with authentic communication situations for them to enhance their communicative competence and promote their language skills.

Janmaimool and Nunsunanon [21] conducted a study to address the effectiveness of face to face and online learning learning and factors that can improve online education. The findings indicate that online classes are comparatively less effective compared to traditional face-to-face courses. Furthermore, through multiple regression analysis, it was discovered that the effectiveness of online learning is significantly influenced by factors such as learners' ability to engage with classmates during class, their ability to interact with instructors outside of class, the quality of online platforms utilized, as well as disruptions or distractions present in learners' surroundings.

In conclusion, technology have enabled blended learning to be common and practical, therefore creating new environment for learning and teaching. However, this mode of education also created several challenges, among these, the challenges related to the use of both modes of education together. This study will analyses the prospective of Engineering students about blended learning.

III. The Research Objectives/Questions

This study aims to examine the perceptive of students in Engineering college at university of Dubai, UAE about blended learning. Furthermore, it addresses the impact of blended learning on students who conducted both on-campus and online education for some courses and discusses the challenges encountered. The study focuses on students' perspectives to find solid answers for several key research questions/objectives as listed below:

1) What is the students perception of blended learning in terms of: engagement, motivation, teamwork, flexibility, and convenience?
2) What is the students perception of blended learning about academic performance and assessment?
3) How do students perceive the quality of teaching and course design in blended learning?
4) What do students think about blending learning becoming the norm?

IV. Materials and Research Methodology

In this section, we describe the research methodology including research design, tools, and administration details of the study that is adopted from our revious study in [2]. The study adopted both quantitative and qualitative instruments to analyze the students prospective about blended learning. The study is limited to engineering students at University of Dubai. The research used the systematic survey that was designed using the quantitative research approach. The questionnaire was given to students in different sections and levels across the college. Table I shows the list of questions that were given to students. The scale used to measure the descriptive survey is the Liker scale method.

Research Design: This survey was designed based on the perspective of students while studying online, and then their perspective after they were back on campus. A detailed questionnaire was designed and adopted in the study as a tool to study the students perceptive about blended learning.

Data Collection Method: The study was given to students online, using the google forms, and then, students were given a period of time to respond to the questionnaire. Data was collected online anonymously. The research received the approval of the university. In addition, the participants in the study were briefed about the purpose of the survey at the beginning and related consent. Responses were collected over a period of two weeks in each phase.

Population and Sample: The study targeted engineering students at university of Dubai from all levels. Students were targeted in different classes at different levels, to ensure that collected data from selected candidates is representative as a sample for the quantitative study using disproportional sampling. All the sample respondents provided full cooperation in responding to all parts of the questionnaire. Descriptive statistics were used for quantitative data analysis. Finally, the questionnaire and data collection method were passed in the ethical committee of the college.

Reliability of the Instrument: Pearson Product Moment Correlation, a common statistical analysis measure for linearity between data, was used for this purpose by providing the instrument into two groups that were not part of the study obtaining a ratio between 0.75 and 0.95, which showed that the instruments were highly reliable.

Administration of Instrument: The instrument was administered through online moodle education LMS system. Follow-up communications with students to ensure that they respond within the given time. This method was in compliance with university policy and regulations.

Method of Data Analysis: Data collected was analyzed and processed using the statistical instruments MS Excel. The questionnaire was designed to be answered using descriptive statistics with an extra hypothesis that was evaluated using the adopted method. Given the type of questions, and nature of the responses embedded in the survey, we believe that advanced statistical methods were not necessary to draw conclusions based on the collected data. Hence, MS Excel was sufficient to do the analysis.

V. Findings and recommendations

First, in order to validate results, we did analysis using Chi square method as shown in table I . We found that related questions have similar Chi score. For instance, 0.0007 and 0.0003 for Questions 1, 2, 3, 4, 8, 9, 10, 11 and 15. This indicates that answers were consistent. As table I demonstrates, only around 15% of the subjects preferred not have blended learning. The same percentage did not feel engaged or motivated in blended learning classes, did not receive timely feedback, and were

TABLE I: Summary of the responses to all questions

Seq	Question	SA	A	NADA	D	SD	Chi
1	I prefer blended learning classes over fully on campus ones	17	6	5	2	3	0.0007
2	I feel motivated to engage in coursework in blended learning	16	7	5	1	4	0.0007
3	I am able to navigate and use the technology used for blended learning courses	19	8	1	1	4	0.0001
4	I receive timely feedback on assessments in blended learning	17	8	3	2	3	0.0003
5	I find it easy to collaborate with my classmates in blended learning	13	9	5	2	3	0.0011
6	It is a challenge to stay focused during online lectures as opposed to on campus	3	4	12	6	8	0.1266
7	I feel connected to my instructor in a blended learning environment	12	10	5	3	3	0.0025
8	Blended learning help to balance the workload of your blended learning courses with other responsibilities	22	4	2	1	3	0.0001
9	The materials and resources provided for your blended learning courses are effective	18	8	3	1	3	0.0001
10	I have access to adequate support and resources when you encounter difficulties in blended learning	11	13	4	1	3	0.0002
11	I am able to catch up with deadlines in a blended learning	17	8	3	2	3	0.0003
12	Blended learning classes enhanced my teamwork	14	8	5	3	3	0.0025
13	There are many distractions during online components in blended learning environment	4	3	9	9	8	0.0412
14	I feel annoyed by some activities blended learning such as using the camera and microphone	4	6	5	9	9	0.1306
15	I would like blended learning to become the norm in university education	17	8	2	1	4	0.0003

TABLE II: Percentages of agreement/ disagreement

Question	Agree	Disagree	NADA
1	69.7 %	15.2 %	15.2 %
2	69.7 %	15.2 %	15.2 %
3	81.8 %	15.2 %	3.0 %
4	75.8 %	15.2 %	9.1 %
5	68.8 %	15.6 %	15.6 %
6	21.2 %	42.4 %	36.4 %
7	66.7 %	18.2 %	15.2 %
8	81.3 %	12.5 %	6.3 %
9	78.8 %	12.1 %	9.1 %
10	75.0 %	12.5 %	12.5 %
11	75.8 %	15.2 %	9.1 %
12	66.7 %	18.2 %	15.2 %
13	21.2 %	51.5 %	27.3 %
14	30.3 %	54.5 %	15.2 %
15	78.1 %	15.6 %	6.3 %

unable to use technology in class. On other hand, more than 70% were on the agreement side for all of these. In addition, there was agreement among respondents about convenience and distractions, where a little over 50% disagreed that there were distraction during online activities, and about feeling annoyed by some online activities, as illustrated in questions 13, 14. On the other hand, 21% agreed to the first, and 30% to the second, this shows that this subject varies for students, which can be justified due to the ability of students to adapt to this type of education.

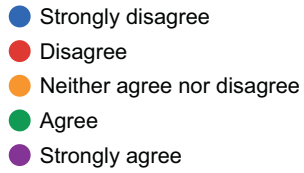
The majority fo respondents agreed that blended learning help balance workload, with 81%, which proofs that this is one fo the biggest advantages of this mode of education. On the other hand, only 21% found it challenging to stay focused, with around 40% where unsure about this. In fact, this shows that conclusion cannot be For collaboration with teammates and team work, around 16% did not agree, and 67% agreed, as shown in response to questions 5, 7 and 12. Finally, 78% of respondents would like blending learning to become the norm, with more than 50% strongly agree, which is in agreement with positive attitude towards this type of education. Table II illustrates agreement/disagreement percentages for all questions.

Figure 1 shows the breakdown percentages for answers for selection questions, namely, questions 1 and 6 (b), and 8 and 15 (c). It shows that the majority prefers blended learning mode, as indicated by question 1. Also, there was no agreement about staying focused during online classes. We believe that this subject requires more analysis and study in order to identify factors that help students focused. In addition Figure 1 (c) shows that balancing workload is one of the most important factors for students about blended learning as illustrated by question 8. Finally, there is majority agreement about blended learning becoming the norm in the future. Finally, Figure 2 shows the distribution of all responses,

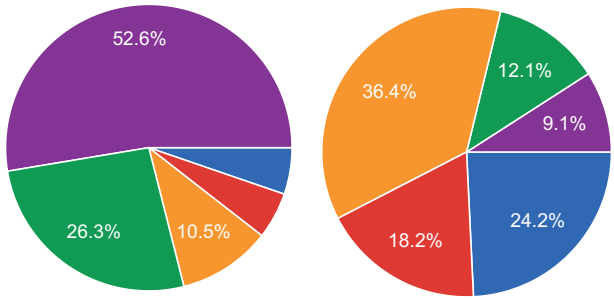
VI. Discussion and Recommendations

As shown by the study's findings, students are highly motivated for blended learning, despite having some challenges, in particular, the shift to online educatioin, and back on campus during the pandemic has created several issues in education, in particular, impacted students' mental health negatively [5]. However, blended education is on the direction to be the future of teaching and learning. This requires that mental health, technology quality, and proper IT training, in addition to other related issues be emphasized.

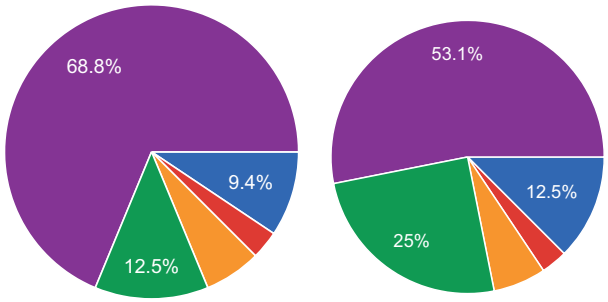
Overall, we can conclude formt his study that blended learning provides flexibility for studnets, where they can access course materials online at their own pace, while still receiving



(a) Legend



(b) Questions 1 and 6



(c) Questions 8 and 15

Fig. 1: Answers for selected relevant questions

personalized support from teachers. In addition, this mode of education can be customized to meet the needs of individual learners, where. learners can choose to work through material at their own pace, or receive more personalized support from instructors. Students can also access learning materials from anywhere, which can help to bridge the gap between students who are geographically dispersed or have different learning abilities. On the other hand, Blended learning can provide opportunities for increased student engagement and participation, as students can make use of available tools to enhance the learning experience.

There are several challenges in blended learning, first it requires reliable technology, which can be a challenge for some students. In fact, around 18% of students said that they were not able to use technology for blended learning, which is a number that needs to be investigated further. Other issues that were not handled in this study including instructors training to effectively use blended learning tools and strategies. This can be time-consuming and costly, especially for schools with limited resources. Also, student support to ensure all students have equal access to the course materials and learning experiences. Assessment and evaluation can be difficult in blended learning, more studies are reuiqred in this direction.

To minimize obstacles in blended teaching, Martin [22] emphasizes ensuring students' mental wellbeing, devising stimulating educational activities, and maintaining healthy relationships between students and instructors. Employing appropriate pedagogical approaches, designing engaging instructional content, and involving students actively in the teaching-learning process are expected to decrease barriers to effective instruction online.

One of the limitations of the study, as we believe, is the short period of time between being back on campus and the conduction of the study. Students may need more time to adapt to blended learning, in particular, after the pandemic. Another important factor is the sample of study , where number of students who participated, which is around 33. This is due to the fact that we are a small university with a small number of students. Finally, we believe that the questionnaire was simplified in order to make it more convenient for students to respond. Despite all of these limitations, we still believe that the study was necessary and informative, in particular in this environment, where these types of studies are very limited, if not absent at all. In order to address these limitations, we intend to conduct more analysis, and design more advanced questionnaires, and also conduct it on a wider scale, including students from different disciplines and different universities in the area. Finally, we list below recommendations as outcome fo this study:

- provide collaborative learning environment.
- Use various teaching strategies and employ technology.
- Encourage collaboration and team work using discussion forums, group projects, and virtual office hours.
- Provide continuous and live feedback to help students stay motivated and engaged.
- Incorporate practical examples and experiences to help students connect their learning to practical examples.
- Provide personalize learning experience with different choices of learning activities and assessments.
- Assess and evaluate student learning outcomes.

VII. Conclusion and Future Work

To conclude, the current era necessitates utilizing technological advancements whilst teaching so that students will be able to cope with the ever-changing requirements of today's digital world. Blended learning has become very popular recently, therefore, assessment of this mode of education from students perceptive is necessary to understand its effectiveness and improve it. This paper is a study dealing with the effectiveness of blended learning from students perspective. The study, however, is limited to one private university in Dubai, one college within the same university, and a sample of around 33 students whom have experienced blended learning during the past academic year. The study identified several conveniences for students in this learning mode, as well as several challenges. Finally, recommendations ere listed in order to improve

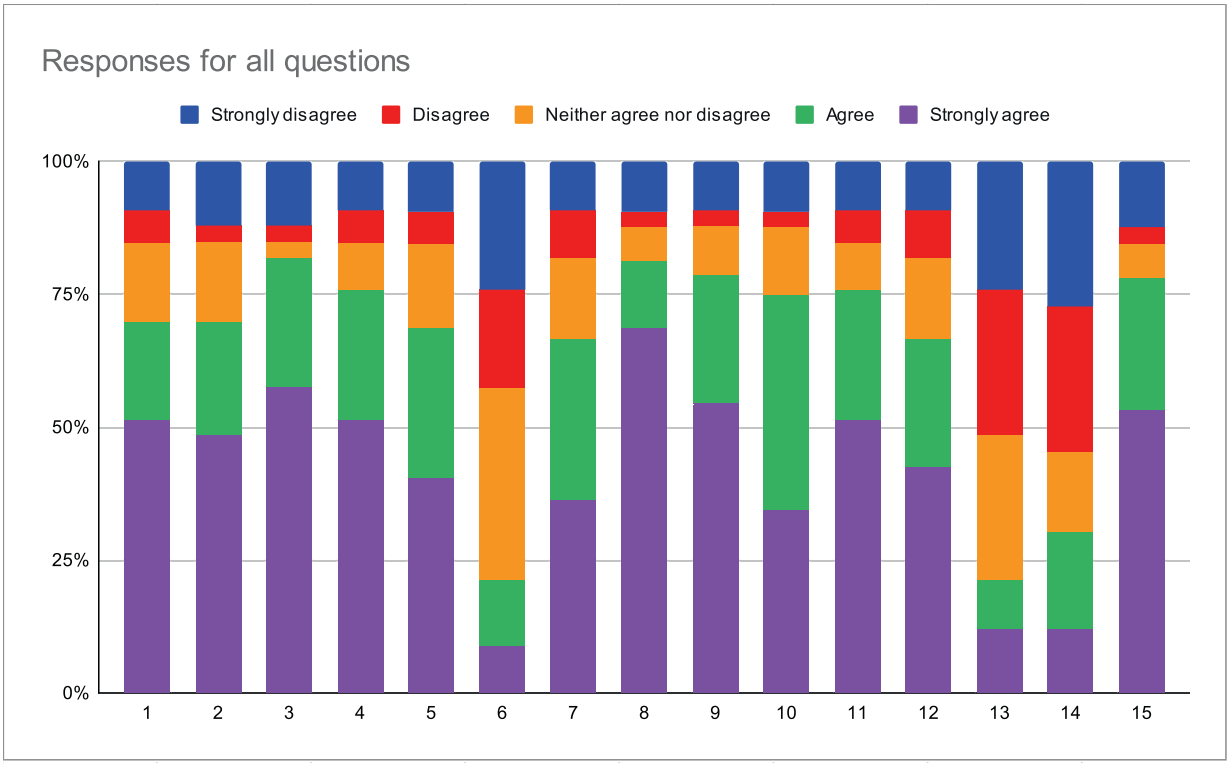


Fig. 2: Answers for questions

blended learning experience for students. As future work, there are several other challenges that need to be analyzed in blended learning, including assessments and evaluations, the use of available tools, and distractions for students. On the other hand, educators perspective about teh same subject is to be studied and analyzed.

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