

# Design Students Between Traditional And Digital Learning: Usability Of Learning Management Systems And Preferences For Learning Environment Based On Course Type

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## ABSTRACT

Due to the educational transformation from traditional to digital learning in Jordan, caused by the COVID-19 pandemic, the purpose of this study was to contribute to this transformation in design education. Considering the practical nature of graphic and interior design education, this study aims to evaluate the usability of the Moodle-Learning Management System based on design students' assessments. It also aims to explore design students' preferences for learning environments; (Traditional, Online, Blended) based on course types in design programs (non-design courses, theoretical design courses, and practical/ studio-based courses). A quantitative approach was employed using a designed questionnaire developed from the Shackel usability model (1991) to conduct the research study. A total of (218) undergraduate graphic and interior design students from the design department at Yarmouk University participated in this study, and all the questionnaires were collected and analyzed in SPSS. The findings of this study have indicated that both the practical nature of design education and the late adoption of digital learning affect the usability evaluation of LMS and design students' preferences for the learning environment. It was concluded that there is a need for implementing new pedagogies to enhance design students' experience, satisfaction, and acceptance of digital learning.

Keywords: Blended learning; design education; graphic design; interior design; learning management system; online learning; usability evaluation.

## **1. Introduction:**

The educational transformation from traditional to digital form has become a modern trend in today's education, and the use of Learning Management System (LMS) in digital learning becomes essential tool that helps educators and students manage class materials digitally (Phongphaew & Jiamsanguanwong, 2018). However, since the 90s, digital learning has already taken place in many educational systems across the globe (Sleator, 2010). Excluding the Middle East (ME) and Gulf countries, the movement of digital learning has been slowly raised between 2002-2008 due to the delayed adoption and penetration of the Internet (Mirza & Al-Abdulkareem, 2011). Therefore, during the crisis of COVID-19 pandemic in 2020, universities across the ME regions were in their preparation phase for this transformation. In Jordan, digital learning started as a form of distance learning to avoid the crush of traditional education, and in the post-pandemic period, most of Jordanian universities, such as Yarmouk University (YU) continue on adopting and developing digital learning as a brand-new approach.

### **1.1. Statement of the Problem:**

Despite the vast number of conducted and ongoing research investigating students' acceptance and satisfaction with digital learning, little has focused on students within specific academic disciplines in which learning needs differ. Considering the practical nature of design education, and the late adoption of digital learning in Jordan, this study focused on design students. This study evaluated the usability of the adopted Moodle-LMS at YU (YULMS) based on graphic and interior design students as end-users of the system, and explored their preferences between traditional and digital learning environments according to the course types. Moodle- LMS is an open-source learning platform that helps learners perform their roles fast at less cost (Prasad, 2020). It is the most used within universities across the globe, especially in Jordan (Moodle, 2022; Bouchrika, 2022).

### **1.2. Purpose of the Study:**

The purpose of the study is to investigate design students' acceptance of the new adoption of digital learning and to investigate how a system meets their needs in learning. The significance of the study relayed the reality that YU was the first public university in Jordan to offer design education since 1980 (Yarmouk University, 2022) and recently adopted digital learning in its education system. Beyond these purposes and significance, the lack of research on digital learning in design education was another reason to provide this study as a reference point for further studies.

### **1.3. Research Questions:**

This study sought to answer the following research questions:

**RQ 1:** What are the preferences of YU undergraduate design students for learning environments according to the course types?

**RQ 2:** Was there a significant relationship between choice of learning and GPAs, gender, and design-specific major?

**RQ 3:** How do YU undergraduate design students evaluate the YULMS usability with effectiveness, learnability, flexibility, and attitudes?

**RQ 4:** Were there significant differences between graphic and interior design students' assessments for the YULMS usability?

## **2. Literature Review**

### **2.1. Digital Learning**

Digital learning, is also known as technological learning, it technology-based learning where technological tools such as mobile, computers, software, ...etc. used to facilitate learning in and out of the traditional classroom setting. It can take place in online eLearning online learning (OL) as an alternative of face-to-face/ traditional learning (TL) and it can also be a complementary to it as in blended learning (BL) (Kumar Basak et al., 2018). However, BL is a combination of TL and OL that is used to support the education system (Graham, 2006; Harriman, 2004; Driscoll, 2002). In fact, in our digital age in the 21st century, digital learning has several advantages for education. Such as OL offers many advantages for both educators and students in terms of time, cost, and accessibility, and it supports lifelong learning (Anderson, 2008), and a well-designed OL course must consider some factors, such as organized learning content with appropriate multimedia, learning activities, and teacher-student interaction, and an effective OL environment should measure by students' satisfaction and learning effectiveness (Weerasinghe, Ramberg & Hewagamage, 2009). BL as defined by Colis and Moonen (2001) "a hybrid of traditional face-to-face and online learning so that instruction occurs both in the classroom and online, and where the online component becomes a natural extension of traditional classroom learning" (Colis & Moonen, 2001 cited in Rovai & Jordan, 2004, p.3). A well-designed BL course combines the best elements of traditional and online education, such as consistency of face-to-face meetings, online assessment, synchronous interaction, asynchronous discussions, e-mail correspondence, and a proctored final examination (Martyn, 2003). BL helps students develop their skills in critical thinking, problem-solving, communication, collaboration, and global awareness (Pape, 2010). "It is likely to emerge as the predominant teaching model of the future" (Waston, 2008, p.4).

Looking at the history of digital learning is remarkable Christopher Pappas (2015) described how the historical highlights have shaped the

core of digital learning as distance learning since the 19th century and reaching the 21st century. The first distance course was launched in 1840 by an English teacher Sir Isaac Pitman, where course materials were sent back and forth between Pitman and his students via mailed postcards. By the mid and late 90s, when technology evolved, distance learning, such as digital learning, took place in companies, and the first LMS had introduced to track the learner's progress. By reaching the 21st century, digital learning has been heavily and widely involved in education (Pappas, 2015). With today's exponential growth of technology, digital learning has become an essential part of education, "online education is on track to become mainstream by 2025" (Palvia et al., 2018, p.233).

Across the Middle East (ME) countries, the digital learning' movement has slowly risen between 2002 and 2008 (Mirza & Al-Abdulkareem, 2011). In UAE, Egypt, and Jordan, the culture of education values traditional learning, and the recognition of fully online degrees is not accredited yet by their legal frameworks (The Open University, 2018). In 2020 due to the Covid-19 pandemic, educational systems across the ME faced many challenges while suddenly implementing OL for distance learning. According to Thomas, Al-Jarrah, & Joseph (2021), in the United Arab Emirates, Qatar, Saudi Arabia, Bahrain, Oman, and Kuwait, the sudden implementation of distance learning caused several challenges for most of their educational systems, educators and learners have reported different issues related to the OL environment: such as safety, privacy, and trust in the system were challenges for students, and the lack of knowledge in planning and developing OL courses was a challenge for most educators who were in their exploration stage. According to Fazza & Mahgoub (2021), students in Qatar have no sense of belonging to the OL environment, where Internet availability is the main challenge for students who live away from the city, and participating in OL class discussions was a challenge for shy students.

In Jordan, schools and universities were not fully prepared to implement distance learning during the pandemic (Alshira'H et al., 2021). As a sample of this study, Yarmouk University (YU) in Jordan has started its preparation for OL implementation by establishing the Center of E-Learning and Open Educational Resources (YUELC) in 2020. According to the YUELC (2022), the center began nine days training program for academic faculty members to prepare them for distance teaching and to increase their experience in using the YULMS system from 34% to 100% and provided students video training in how to use the YULMS in OL courses. In a post-pandemic period, the YUELC designed five years (2021-2025) strategic plan to manage and develop digital learning using the latest methods and technologies to train, equip and empower faculty members from various academic disciplines at the

university. However, in terms of attitude, YU educators and students do not accept the concept of the OL environment, they both complained that OL is less efficient than TL, and students with disabilities as deaf and hard-hearing students lack interaction and motivation (Almahasees, Mohsen & Amin, 2021). Prof. Anis Al-Khasawneh, wrote a public letter to the president of YU, claiming that the OL nature environment negatively affects the educational system; and does not suit the cultural learning where students need to be engaged in university life. He suggested that OL should be implemented only for university-complementary courses, not for specialization courses (Al-Khasawneh, 2021)

## **2.2. Learning Management Systems and usability evaluation**

Learning Management System (LMS) was invented in the 1920s and has developed to be used widely in many education systems around the globe. It is a software application that helps with learning, organizing learning materials for eLearning, virtual, and in-person sessions, and automating learner' tasks (Prasad, 2020). There are different types of LMS, and where most popular is Moodle, the most used across universities (Moodle, 2022) and the most popular among the best free LMSs (Bouchrika, 2022). Moodle-LMS is an open-source and free web-based platform that helps institutions create an efficient education experience, also known as a student-centered learning approach that supplies a high degree of learner autonomy (Maxwell, 1995). A comparison study of Moodle-LMS with other LMSs revealed that based on communication, productivity, and student involvement, Moodle was the most suitable LMS for learning (Subramanian et al., 2014). As a statistic report of 2022, there are (244) countries around the world that have registered sites in Moodle, such as the United States having the highest number of registered sites and Jordan having 199 (Moodle Statistics, 2022).

In terms of LMS usability, the extent of usability refers to which a system is efficient to be used to satisfy the needs of a specified user to achieve a specific goal in a specified context of use (ISO, 2018). There are three well-known models of usability evaluation: the Shackel model, the Nielson model, and the ISO model. All three models measured the usability of a system in terms of its operational level, ease of use, and acceptance. Whereas, in the Shackel model, usability has a higher level in terms of utility; user acceptance and satisfaction have the highest level in usability evaluation. His model of usability is considered the most suitable method for a system usability evaluation (Alabbadi, 2010). Shackel' (1991) usability model categorized the standards of usability evaluation as follows:

- Effectiveness: tasks must be carried out by specified users within a specific environment at a better-than-needed level with a high speed and without errors.
- Learnability: users start training to learn how to use the system within a specified learning time within the amount of training.
- Flexibility: users adapt to perform their tasks in a specified environment.
- Attitude: users' acceptance and satisfaction are highly considered in terms of tiredness, discomfort, frustration, and personal effort (Shackel, 1991, p.25).

### **2.3. Design Education**

For the past two decades, design education has been growing as a pre-professional practice that should connects practice to education to research and back to practice building a bridge between theory and practice (McCoy, 1990, p.20). However, a discussion of design education is always debated between theory and practice, “Many design educators and students believe the purpose of design education is to offer them a studio-based teaching-learning environment, and they see academic theoretical classes steal their time to achieve that purpose” (Swanson, 1994, p. 58). Therefore, design education has been under review by experts in design to declare the concept of design education based on solving real-world problems, which refer to human-centered needs, and to developed different strategies to help design educators and students further their understanding of design, in relation to theory and practice, as an ever-changing and vital field of the twenty-first century (Addison & Burgess, 2020). Meyer & Norman (2020) confirm that design students learn by doing an actual project within a studio environment, and experts must consider design education from both practical and academic perspectives. They also asserted that when schools teach design students problem-solving, challenges should be considered, such as acting in the physical world, dealing with human needs and desires, and working in a group in a social environment. Whereas the current education system does not always prepare design students for these challenges (pp.13-24).

As defined by Abel and Satterfield (2020) “design education is the teaching of theory and application in the design of products, services and environments. It encompasses various disciplines of design” (Abel & Satterfield, 2020 cited in IGI Global, 2020, pp. 80-95). Such as graphic design and interior design both are the most design disciplines that students looking for to pursue a design career. According to the National Association of Schools of Art and Design (NASAD), graphic design is the profession of visual communication that considers the audiences' needs for communication, and interior design is the profession of designing

space environments to serve the specific needs of clients and users with functional and aesthetic-produced design. Graphic design students should learn how to solve simple-to-complex problems related to visual communication that encompass intersections among communication and various social, cultural, technological, economic, physical, and service contexts. Interior design students should learn how to solve simple-to-complex problems related to interior environment space, furnishings, and construction and integrate art and design concepts. Both graphic design and interior design students should have a good relationship with technology and technological innovation (NASAD, 2023).

#### **2.4. Design Education at Yarmouk University**

YU was the first public university in Jordan to offer Design education since 1980 (YU, 2015b). However, from 1980 till the year 2020, the learning environment of YU design education valued traditional/ face-to-face learning environment. In 2020, YU adopted digital learning for distance learning. In the post-pandemic period, as a part of the YU educational transformation from traditional to digital form, digital learning has been integrated with the traditional one (YU, 2020). The YU department of design grants bachelor's degrees in four design sub-majors, graphic design, interior design, industrial design, and fashion design, whereas graphic and interior design programs have the highest number of enrolled students. The department also recently started the master's program in design. Undergraduate design students must complete a total of 132 credit hours, as distributed in the following, to gain a bachelor's degree in design.

- 27 credit hours of university requirements (non-design courses)
- 24 credit hours of faculty requirements (non-design courses)
- 81 credit hours of department requirements (design courses)

#### **2.5. Related Studies**

According to Shackel (1991), usability evaluation should be viewed in the stage of human performance and measured by “specified range of users, ... within the specified range of environmental scenarios” (p.24). To serve the purpose of this study, the review of the earlier studies focused on the usability evaluation of Moodle-LMS based on students, with more focus on design students, within universities in Jordan, for two reasons, due to the late adoption of distance learning in Jordan, and because of the reality that within (40) public and private universities in Jordan, Moodle is the most used LMS (Saleh, et al., 2022).

Alshira’H et al. (2021) conducted a study within 24 public and private universities in Jordan on the usability evaluation of LMS platforms based on 350 students across different academic disciplines. The study

revealed that students have a positive attitude toward using LMS. On the other side, the study observed that Jordanian universities used only the Arabic language to display course titles through LMSs without consideration of the existence of international students.

Saleh et al. (2022) conducted a study within various universities in Jordan on the usability evaluation of Moodle-LMS platforms based on user experience (UX) across different academic disciplines. The study revealed that most users were satisfied with using Moodle-LMS because it is a user-friendly platform with a simple User Interface (UI). Users evaluated the usability of Moodle-LMS with very-good scores for efficiency, attractiveness, and perspicuity. With good scores for novelty and stimulation. With low scores for dependability. The study concluded there were variations of usability evaluation among users referring to how each university designs its Moodle-LMS platform. Also, it recommended that UI and UX experts take this part instead to get better UX assessments.

Al-ayach & Hussein (2020) conducted a study at the University of Petra in Jordan to explore the experience of Interior design students in distance learning. The study revealed that interior design students reported three main challenges in the OL environment, poor Internet connection, using devices and technologies, and lack of communication, engagement, and teacher feedback. They claimed a lack of tools that support studio-based learning, such as a whiteboard where they can draw digital sketching.

Ibrahim et al. (2021) conducted a study at the Jordanian University of Science and Technology (JUST) in Jordan to explore architecture students' experience in distance learning. The study revealed that students were satisfied with OL in theoretical courses, not practical/studio-based ones because they faced technical difficulties. However, the study suggested that BL can be a suitable alternative to enhance studio-based learning with technologies.

In summary, previous studies on the usability of Moodle-LMS based on students' experience within Jordanian universities lack focus on specific students from specific academic disciplines. Only one study explored the experience of interior design in distance learning.

### **3. Research Methodology:**

Working from Shackel's (1991) usability model, a questionnaire was designed and developed to serve the purpose of the study and to answer the research questions. The questionnaire consisted of two parts; the first part aimed to explore design students' preferences for learning according to course types. It contained questions related to students' demographic information as gender, GPA, and design-specific major, and four questions about students' preferred choice for learning



(traditional, online, blended) in general and according to course types (non-design, theoretical, practical/studio-based courses). The second part aimed to evaluate the YULMS based on design students' assessments. It contained fourteen statements constructed and developed according to the four standards of usability categorized in Shackel's model as effectiveness, learnability, flexibility, and attitude. A four-point Likert scale was employed in the second part of the questionnaire to reveal various levels of agreement- Strongly agree, Agree, Disagree, and Strongly disagree- reflecting how YU undergraduate graphic and interior design students evaluated the usability of YULMS.

### **3.1. Data Collection and Participants**

A quantitative approach was employed, using a designed questionnaire developed from Shackel's (1991) usability model. The questionnaire was reviewed and evaluated by two academic administration in the Center of E-Learning and Open Educational Resources at Yarmouk University. The questionnaire was designed in both Arabic and English languages for the consideration of international students, and distributed by the department of design at the end of the spring semester of 2022 to avoid any students' consideration about final grades.

Participants of the study were graphic and interior design students from all undergraduate level at the Department of Design at Yarmouk university in Jordan. The number of enrolled undergraduate design students during the spring semester of 2022 were 188 interior design students and 165 graphic design students. A total of 353 undergraduate design students were selected to participate in this study by the end of the semester to avoid any students' consideration about final grades.

### **3.2. Measurement instruments:**

Regarding the YULMS usability in the second part of the questionnaire, a four-point Likert scale, ranging from - strongly agree - strongly disagree- was employed to measure the level of agreement on each of the fourteen statements related to the usability of YULMS usability. The response that indicates the lowest statement approval received a score of 1 with an increase of 1 point for each response (i.e., 1 point for strongly disagree, 2 points for disagree, 3 points for agree, and 4 points for strongly agree. Therefore, the highest score of this instrument was ( $4*14 = 56$ ), and the lowest score was ( $1*14 = 14$ ).

### **3.3. Data analysis:**

Statistical tools used to analyze data were descriptive and inferential statistics, a chi-square test of independence, and a Multivariate Analysis of Variance (MANOVA) test, were used to analyze data. Descriptive and

inferential statistics include tables, provide indicators such as frequency and percentages to represent categorical data, and provide mean and standard deviation to represent scale data. The findings of the descriptive and inferential statistics answered the first and third research questions. The chi-square test of independence was run to test if there was an association between the three variables, gender, GPA, and design-specific major, with the preferred choice for learning. The findings of the chi-square test answered the second research question. A Multivariate Analysis of Variance (MANOVA) was run to test the YULMS scale's mean differences based on design student's specific majors, alpha level set at <0.05 deemed statistically significant with a study power of 80.0%. The findings of the (MANOVA) test answered the fourth research question. SPSS IBM software ver28 was used to analyze data.

#### **4. Research Results and Findings:**

##### **4.1. Design students' preferences for learning environment based on course types**

###### **4.1.1. Socio-demographic characteristics**

A total of 218 undergraduate design students from Yarmouk University were enrolled in this study, more than half of sample are female students 128(58.7%) compare to 90(41.3%) male, the distribution of students was roughly equal selected from graphic and interior design specialty 112(51.4%) and 106(48.6%) respectively. Regarding the students' educational characteristics, the results have shown that the majority of them have a very good GPA 100(45.9%). Regarding students' preferences for learning, the results have shown that besides 116(53.2), 98(45.0%), and 85(39.0 %) prefer choosing traditional learning in general, and for non-design courses and theoretical design courses respectively, moreover, the vast majority of sample 195(89.4%) prefer choosing traditional learning for learning practical/ studio-based design courses as well. Table (1) summarizes detailed study sample socio-demographic characteristics.

**Table 1. Study sample socio-demographic characteristics N=218**

| <b>Variables</b>             | <b>Category</b> | <b>Frequency</b> | <b>Percentage %</b> |
|------------------------------|-----------------|------------------|---------------------|
| <b>Gender</b>                | Male            | 90               | 41.3                |
|                              | Female          | 128              | 58.7                |
| <b>Specific design major</b> | Graphic design  | 112              | 51.4                |
|                              | Interior design | 106              | 48.6                |

|                                                                     |             |     |      |
|---------------------------------------------------------------------|-------------|-----|------|
| <b>GPA</b>                                                          | Good        | 53  | 24.3 |
|                                                                     | Very good   | 100 | 45.9 |
|                                                                     | Excellent   | 65  | 29.8 |
| <b>Preferred choice for learning in general</b>                     | Traditional | 116 | 53.2 |
|                                                                     | Online      | 15  | 6.9  |
|                                                                     | Blended     | 87  | 39.9 |
| <b>Preferred choice for learning non-design courses</b>             | Traditional | 98  | 45.0 |
|                                                                     | Online      | 49  | 22.5 |
|                                                                     | Blended     | 71  | 32.5 |
| <b>Preferred choice for learning theoretical design courses</b>     | Traditional | 85  | 39.0 |
|                                                                     | Online      | 49  | 22.5 |
|                                                                     | Blended     | 84  | 38.5 |
| <b>Preferred choice for learning practical/studio-based courses</b> | Traditional | 195 | 89.4 |
|                                                                     | Online      | 8   | 3.7  |
|                                                                     | Blended     | 15  | 6.9  |

#### 4.1.2. Association between students' GPAs, specific design major, gender, and preferred choice for learning

The results of chi-square test in table (2) demonstrate that only 9(17.0%) of students with good GPAs prefer choosing blended learning while 48(48.0%) and 30(46.2%) of students with very good and excellent GPAs prefer choosing blended learning with statistical significant proportion differences  $\chi^2(4) = 15.841$ ,  $p = 0.003$  indicating the choosing preferred learning was dependent on students' GPA categories, whereas no statistical significant association was observed with students' specific design major and gender  $p = 0.096$  and  $p = 0.498$ , respectively.

**Table 2. Association between students' GPA, specific major, gender, and preferred choice for learning**

| Variables                    | Preferred choice for learning |                 |                  |          |    |         |
|------------------------------|-------------------------------|-----------------|------------------|----------|----|---------|
|                              | Traditional<br>N (%)          | Online<br>N (%) | Blended<br>N (%) | $\chi^2$ | df | p-value |
| <b>GPA</b>                   |                               |                 |                  |          |    |         |
| Good                         | 39(73.6)                      | 5(9.4)          | 9(17.0)          | 15.841   | 4  | 0.003   |
| Very good                    | 45(45.0)                      | 7(7.0)          | 48(48.0)         |          |    |         |
| Excellent                    | 32(49.2)                      | 3(4.6)          | 30(46.2)         |          |    |         |
| <b>Specific design major</b> |                               |                 |                  |          |    |         |
| Graphic design               | 52(46.4)                      | 10(8.9)         | 50(44.6)         | 4.689    | 2  | 0.096   |
| Interior design              | 64(60.4)                      | 5(4.7)          | 37(34.9)         |          |    |         |
| <b>Gender</b>                |                               |                 |                  |          |    |         |
| Male                         | 52(57.8)                      | 5(5.6)          | 33(36.7)         | 1.396    | 2  | 0.498   |
| Female                       | 64(50.0)                      | 10(7.8)         | 54(42.2)         |          |    |         |

## **4.2. YULMS usability**

### **4.2.1. YULMS usability based on YU undergraduate design students' assessments**

The YULMS scale has included 14 items rated on a 4-point Likert scale distributed on four dimensions, the mean, the standard deviation, proportional weight, and Relative-Important Index(RII) were computed for scale's items and dimensions. The results in table (3) show that YULMS usability scored a mean of  $2.70 \pm 0.46$ , with high RII indicating 67.5% of the sample have agreed about the usability of YULMS in learning, with some variations regarding the four dimensions of usability as follows:

Regarding effectiveness dimension, the mean score found to be  $2.76 \pm 0.52$  with high RII indicating that 69.0% of the sample have agreed about the dimension generally. Concerning item number (1) achieved the highest mean score  $3.11 \pm 0.66$  with high RII indicating that 77.8% of students have agreed that YULMS runs and displays data on my device easily and quickly, while item number (4) scored the lowest mean score  $2.07 \pm 0.88$  with low RII indicating that 51.8% of students have agreed that YULMS allows me to upload design assignments/ projects in a good size and quality.

Regarding learnability dimension, the mean score found to be  $3.05 \pm 0.59$  with high RII indicating that 76.3% of the sample have agreed about the dimension generally. Concerning item number (5) and (6) of learnability dimension which scored a mean score of  $3.01 \pm 0.67$  and  $3.09 \pm 0.60$  respectively with high RII indicating that three-quarters of the sample have agreed that using YULMS for the first time was easy to learn and has learnable features and functions.

Regarding flexibility dimension, the mean score found to  $2.99 \pm 0.60$  with high RII indicating that 74.8% of the sample have agreed about the dimension generally. Concerning items number (7) and (9) of flexibility dimension which scored nearly similar mean score of  $3.01 \pm 0.68$  and  $3.00 \pm 0.67$  respectively with both high RII indicating that three-quarters of the sample have agreed that YULMS platform has an easy navigation tool and overall it is flexible system to be used.

Regarding attitude dimension, the mean score found to be  $2.34 \pm 0.65$  with negative RII indicating that 58.5% of participants have a negative attitude toward using YULMS with some kind of variation, the item number (10) achieved the highest mean score  $2.96 \pm 0.78$  with positive RII indicating that 74.0% of students were feeling satisfied using YULMS for learning non-design courses, while the item number (12) achieved the lowest mean score  $1.79 \pm 0.90$  with negative RII indicating that the vast majority of students were feeling not satisfied using YULMS for

learning practical/ studio-based courses. In the same context of the attitude dimension, the item number (11) scored a mean score of  $2.73 \pm 0.85$  with positive RII indicating that 68.3% of students were feeling satisfied using YULMS for learning theoretical design courses. While items number (13) and (14) of attitude dimension scored nearly similar mean score of  $2.03 \pm 0.90$  and  $2.18 \pm 0.95$  respectively with both negative RII indicating that half of students were feeling not satisfied using YULMS for communicating and interacting with instructors and colleagues and for achieving learning outcomes of the design program and for improving their performance as design students in classes.

**Table 3. YULMS scale items descriptive statistics**

| Items                                      |                                                                                                                                             | Mean        | SD          | Proportional weight % | RII             |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-----------------------|-----------------|
| <b>Effectiveness dimensions mean score</b> |                                                                                                                                             | <b>2.76</b> | <b>0.52</b> | <b>69.0</b>           | <b>High</b>     |
| 1                                          | YULMS runs and displays data on my device easily and quickly                                                                                | 3.11        | 0.66        | 77.8                  | High            |
| 2                                          | YULMS allows me to access courses and to download course' materials without errors                                                          | 2.94        | 0.79        | 73.5                  | High            |
| 3                                          | YULMS allows me to access exams and move between questions without any errors                                                               | 2.92        | 0.75        | 73.0                  | High            |
| 4                                          | YULMS allows me to upload design assignments/ projects in a good size and quality                                                           | 2.07        | 0.88        | 51.8                  | Low             |
| <b>Learnability dimensions mean score</b>  |                                                                                                                                             | <b>3.05</b> | <b>0.59</b> | <b>76.3</b>           | <b>High</b>     |
| 5                                          | Using YULMS for the first time was easy to learn                                                                                            | 3.01        | 0.67        | 75.3                  | High            |
| 6                                          | YULMS has learnable features and functions                                                                                                  | 3.09        | 0.60        | 77.3                  | High            |
| <b>Flexibility dimensions mean score</b>   |                                                                                                                                             | <b>2.99</b> | <b>0.60</b> | <b>74.8</b>           | <b>High</b>     |
| 7                                          | YULMS platform has an easy navigation tool                                                                                                  | 3.01        | 0.68        | 75.3                  | High            |
| 8                                          | YULMS platform has a logical navigation process                                                                                             | 2.96        | 0.65        | 74.0                  | High            |
| 9                                          | Overall, I think YULMS is flexible system to be used                                                                                        | 3.00        | 0.67        | 75.0                  | High            |
| <b>Attitude dimensions mean score</b>      |                                                                                                                                             | <b>2.34</b> | <b>0.65</b> | <b>58.5</b>           | <b>Negative</b> |
| 10                                         | I feel satisfied using YULMS for learning non-design courses                                                                                | 2.96        | 0.78        | 74.0                  | Positive        |
| 11                                         | I feel satisfied using YULMS for learning theoretical design courses                                                                        | 2.73        | 0.85        | 68.3                  | Positive        |
| 12                                         | I feel satisfied using YULMS for learning practical/ studio-based courses                                                                   | 1.79        | 0.90        | 44.8                  | Negative        |
| 13                                         | I feel satisfied using YULMS for communicating and interacting with instructors and colleagues                                              | 2.03        | 0.90        | 50.8                  | Negative        |
| 14                                         | I feel satisfied using YULMS to achieve learning outcomes of design courses and to improves my performance, as a design student, in classes | 2.18        | 0.95        | 54.5                  | Negative        |

|                                            |             |             |             |             |
|--------------------------------------------|-------------|-------------|-------------|-------------|
| <b>Total scale means score (usability)</b> | <b>2.70</b> | <b>0.46</b> | <b>67.5</b> | <b>High</b> |
|--------------------------------------------|-------------|-------------|-------------|-------------|

#### 4.2.2. YULMS scale's mean differences based on students' specific majors

To investigate if students' responses on the usability of YULMS scale dimensions are significantly different based on their specific design major, the multivariate analysis of variance (MANOVA) result in table (4) revealed that graphic design students significantly have a higher attitude mean toward YULMS than interior design students ( $2.52 \pm 0.63$ ) vs. ( $2.14 \pm 0.62$ ) respectively  $p \leq 0.001$ , additionally, the graphic design students reported a significantly higher mean of YULMS usability than interior design students ( $2.77 \pm 0.51$ ) vs. ( $2.63 \pm 0.40$ ) respectively  $p = 0.025$ . While no statistical significant mean differences were noted in effectiveness, learnability, and flexibility dimensions according to students' majors  $p > 0.05$  for all.

**Table 4. YULMS scale's mean differences based on students' specific design major**

|                       | Effectiveness |      | Learnability |     | Flexibility |     | Attitude                       |      | Overall score "Usability" |      |
|-----------------------|---------------|------|--------------|-----|-------------|-----|--------------------------------|------|---------------------------|------|
|                       | Mea           | SD   | Mean         | SD  | Mea         | SD  | Mea                            | SD   | Mean                      | SD   |
| <b>Specific major</b> |               |      |              |     |             |     |                                |      |                           |      |
| Graphic design        | 2.79          | 0.59 | 3.03         | 0.6 | 2.97        | 0.6 | 2.52                           | 0.63 | 2.77                      | 0.51 |
| Interior design       | 2.73          | 0.43 | 3.07         | 0.5 | 3.01        | 0.4 | 2.14                           | 0.62 | 2.63                      | 0.40 |
| F-value               | 0.708         |      | 0.240        |     | 0.237       |     | 20.476                         |      | 5.063                     |      |
| p-value               | 0.401         |      | 0.624        |     | 0.627       |     | <b><math>\leq 0.001</math></b> |      | 0.025                     |      |

#### 4.2.3. Association between disagreement of effectiveness and attitude dimensions and students' specific design major

The results in table (5) revealed that the interior design students are significantly have a higher proportion of disagreed answers regarding item number (4) of effectiveness dimension and item number (12) of attitude dimension compared with graphic design students. Indicating that the interior design students disagree that YULMS allows them to upload design assignments/ projects in a good size and quality more than the graphic design students (72.6% vs. 58.0%) respectively,  $X^2(1) = 5.116$ ,  $p = 0.024$ . Furthermore, the interior design students have negative attitude more than the graphic design students toward using YULMS for

learning practical/ studio-based courses (84.0% vs. 16.0%) respectively,  $\chi^2(1) = 5.554$ ,  $p=0.018$ .

**Table 5. Association between disagreement of effectiveness and attitude dimensions and students' specific design major**

| Items                                                                                                                         | Responses | Specific design major |                 | $\chi^2$ | df | P value      |
|-------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|-----------------|----------|----|--------------|
|                                                                                                                               |           | Graphic design        | Interior design |          |    |              |
| <b>Item number (4) of Effectiveness:</b><br>YULMS allows me to upload design assignments/ projects in a good size and quality | Disagree  | 65(58.0)              | 77(72.6)        | 5.11     | 1  | <b>0.024</b> |
|                                                                                                                               | Agree     | 47(42.0)              | 29(27.4)        |          |    |              |
| <b>Item number (12) of Attitude:</b><br>I feel satisfied using YULMS for learning practical/ studio-based courses             | Disagree  | 79(70.5)              | 89(84.0)        | 5.55     | 1  | <b>0.018</b> |
|                                                                                                                               | Agree     | 33(29.5)              | 17(16.0)        |          |    |              |

## 5. Discussions and conclusion

Considering the late adoption of digital learning in Jordan and the practical nature of design education, this study aimed to explore the preferences of YU undergraduate graphic and interior design students between traditional and digital learning according to course types and to evaluate the usability of YULMS based on their assessment.

Regarding preferences of design students for learning, the study found that the vast majority of YU undergraduate design students preferred traditional over blended and online learning in general and for practical/ studio-based courses. However, design education at YU requires a combination of (53.1%) theoretical courses and (46.9%) practical/ studio-based courses (YU, 2016).

Regarding the YULMS usability, design students agreed with effectiveness, learnability, and flexibility, indicating that the system is easy, learnable, and flexible, excluding submitting projects and assignments of a good size and quality. Students, especially interior design students, have a negative attitude toward using YULMS for practical and studio-based courses, communication, interaction, achieving design program learning outcomes, and improving their performance as design students. In fact, design students typically learn by doing, creating practical projects, solving real-world problems, thinking critically, and communicating in group collaboration (AIGA, 2010). However, for submitting design projects and assignments, design students need a high-capacity system to upload their files appropriately.

According to Moodle (2022b) the standard ways students can submit assignments are: file submissions, online text, and audio or video, and the site-wide uploading the file has a limit of 100MB. Whereas YULMS set up a maximum upload limit of 20MB, and this could be the main challenge that YU design students face when using the system for submitting their projects and assignments and start looking for other ways to send their works to educators, such as email, we transfer, google drive, Facebook messenger and other technological tools.

However, for students who are newly experienced in digital learning, using technology might not be professional where digital education lack of technology usage. In fact, technology integration is essential for students of this digital century, who have been named by Marc Prensky as Digital Natives (Prensky, 2001) and referred to as 'Generation Z' who have born after 1980. This generation of students growing up surrounded by technology, social media, mobile devices, computers, and the internet, and are more open to digitalized learning than traditional learning (DeRome, 2019). Therefore, the use of technology in learning help them in how they receive, interrelate, interact, and use materials and data. In design education, using online technologies improves the physical nature of the studio-course environment; in how to be technologically oriented (Bender & Verdevoogd, 2006). However, the role of faculty and administrators is to engage students with innovative technology to capture learning (Bown, 2012) and the role of educators is to use a wide variety of digital tools to plan and deliver interactive instruction to their students (Smaldino et al., 2019).

Therefore, the study concluded that the sudden implementation and the late adoption of digital learning across Middle East countries, such as Jordan, caused several challenges for educators and learners within universities, where digital education is still in its phase of preparation at a time when global education has been transforming from traditional to digital learning. Thus, the sudden and late adoption of digital learning caused several challenges such as lack of technology usage, most universities do not take the full benefits of modern technologies, and lack of teachers' experience, most educators use online technologies to deliver only a lecture style learning. Therefore, it is expectable for design students, who need to learn by doing practical projects within a studio environment with the use of innovative technologies, to face several challenges in learning. Moreover, to lose their passion for digital learning environment and be not satisfied with the used LMS especially for practical/studio-based courses. In light of this global transformation in education from traditional to digital form, the study recommended that there is a need for implementing new pedagogies to enhance the experience of YU undergraduate design students in digital learning.



## References

- Abel, T., & Satterfield, D. (2020). What is design education. IGI Global. Retrieved June 21, 2022, from <https://www.igi-global.com/dictionary/hci-and-user-experience-design-education/7307>
- Addison, N., & Burgess, L. (Eds.). (2020). *Debates in Art and Design Education* (2nd ed.). Routledge. <https://doi.org/10.4324/9780429201714>
- AIGA. (2010). Learning through design: AIGA Design Educators Community. Design Educators Community Learning Through Design Comments. Retrieved December 21, 2022, from <https://educators.aiga.org/learning-through-design/>
- Alabbadi, M. M (2010). Learner's acceptance based on Shackel's usability model for supplementary mobile learning of an English course. In *Proceedings of the 2nd International Conference on Computer Supported Education, (CSEDU2010), April 7-10, 2010, Valencia, Spain.* pages 121-128 DOI: 10.5220/0002810101210128
- AL-ayash, A., & Hussein, M. F. (2020). Distance education technology tools in interior design During COVID-19 Pandemic (UOP&UOG students as a case study). *Palarch's Journal of Archaeology of Egypt/ Egyptology*, 17(7), 13184–13202. ISSN 1567-214x. Retrieved from <https://archives.palarch.nl/index.php/jae/article/view/5070>.
- Al-Khasawneh, A. (2021, September 11). A message to the President of Yarmouk University. *Ammon News*. Retrieved July 18, 2022, from <https://www.ammonnews.net/article/633698>
- Almahasees, Z., Mohsen, K. & Amin, M. (2021) Faculty's and students' perceptions of online learning during COVID-19. *Front. Educ.* 6:638470. DOI: 10.3389/feduc.2021.638470
- Alshira'H, M., Al-Omari, M. & Igried, B. (2021). Usability evaluation of learning management systems (LMS) based on user experience. *Turkish Journal of Computer and Mathematics Education*, 12(11), January 2021, 6431-6441
- Anderson, T. (2008). *The Theory and Practice of Online Learning* (2nd ed.). Athabasca University Press
- Bender, D. M. & Vredevoogd, J. D. (2006). Using Online Education Technologies to Support Studio Instruction. *Journal of Educational Technology & Society*, 9(4), 114–122. <http://www.jstor.org/stable/jeductechsoci.9.4.114>
- Bouchrika, I. (2022, November 30). 15 best free learning management systems for 2023. *Research.com*. Retrieved December 9, 2022, from: <https://research.com/software/best-free-learning-management-systems#:~:text=Moodle%20is%20arguably%20the%20most,to%20create%20personalized%20learning%20environments>
- Bowen José Antonio. (2012). *Teaching naked: How moving technology out of your college classroom will improve student learning* (1st ed., Ser. 9781118110355). Jossey-Bass, a Wiley imprint.
- DeRome, J. (2019, April 11). Designing for digital natives: Are you ready for generation Z? *UserTesting*. Retrieved January 5, 2023, from: <https://www.usertesting.com/blog/gen-z>

- Driscoll, M. (2002) Blended Learning: Let's Get beyond the Hype. IBM Global Services. Retrieved September 13, 2022, from: [http://www-07.ibm.com/services/pdf/blended\\_learning.pdf](http://www-07.ibm.com/services/pdf/blended_learning.pdf)
- Fazza, H. & Mahgoub, M. (2021) Student engagement in online and blended learning in a higher education institution in the Middle East: Challenges and solutions. *Studies in Technology Enhanced Learning*, 2(1) pp. 417-431. 10.21428/8c225f6e.5bcbd385.
- Graham, C. R. (2006). Introduction to Blended Learning. Chapter 1 in the *Handbook of Blended Learning: Global Perspectives, Local Designs* (pp. 3–21). essay, San Francisco, CA: Pfeiffer Publishing
- Harriman, G. (2004). What is blended learning? E-Learning Resources. Retrieved September 13, 2022, at: [http://www.grayharriman.com/blended\\_learning.htm](http://www.grayharriman.com/blended_learning.htm)
- Ibrahim, A. F., Attia, A. S., Bataineh, A. M., & Ali, H. H. (2021). Evaluation of the online teaching of architectural design and basic design courses case study: College of Architecture at JUST, Jordan. *Ain Shams Engineering Journal*, 12(2), 2345–2353. <https://doi.org/https://doi.org/10.1016/j.asej.2020.10.006>
- Kumar Basak, S., Wotto, M., & Bélanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. *E-Learning and Digital Media*, 15(4), 191–216. <https://doi.org/10.1177/2042753018785180>
- ISO. (2018). Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts. International Organization for Standardization. Retrieved August 10, 2022, from <https://kebs.isolutions.iso.org/obp/ui#!iso:std:iso:9241:-11:ed-2:v1:en>
- Martyn, M. (2003). The Hybrid Online Model: Good practice. *Educause Quarterly*, NO. 1, 2003, 18 -23, *EDUCAUSE Review*. Retrieved July 2022, from <https://er.educause.edu/-/media/files/article-downloads/eqm0313.pdf>
- Maxwell, L. (1995). Integrating Open Learning and Distance Education. *Educational Technology*. November-December, 43-48.
- McCoy, K. (1990). Professional Design Education: An Opinion and a Proposal. *Design Issues*, 7(1), 20-22. <https://doi.org/10.2307/1511467>
- Meyer, M. W., & Norman, D. (2020). Changing Design Education for the 21st Century. *She Ji: The Journal of Design, Economics, and Innovation*, 6(1), 13–49. <https://doi.org/10.1016/j.sheji.2019.12.002>
- Mirza, A. A., & Al-Abdulkareem, M. (2011). Models of e-learning adopted in the Middle East. *Applied Computing and Informatics*, 9(2), 83–93. <https://doi.org/10.1016/j.aci.2011.05.001>
- Moodle. (2022). Online learning with the world's most popular LMS. Moodle. Retrieved November 21, 2022, from <https://moodle.com/>
- Moodle Statistics. (2022). Moodle statistics. Moodle Statistics. Retrieved November 21, 2022, from <https://stats.moodle.org/>
- Moodle. (2022, b). Documentation. Using Assignment - MoodleDocs. Retrieved September 21, 2022, from [https://docs.moodle.org/401/en/Using\\_Assignment](https://docs.moodle.org/401/en/Using_Assignment)

- NASAD. (2023, January 9). Handbook 2022-23 - National Association of Schools of Art and design. NASAD.org. Retrieved January 20, 2023, from <https://nasad.arts-accredit.org/>
- Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: Worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management*, 21(4), 233–241. <https://doi.org/10.1080/1097198x.2018.1542262>
- Pape, L. (2010). Blended Teaching & Learning. *School Administrator*, 67(4), 16–21. Retrieved September 2022, from <https://eric.ed.gov/?id=EJ888152>
- Pappas, C. (2015, October 8). The history of blended learning. *eLearning Industry*. Retrieved August 21, 2022, from <https://elearningindustry.com/history-of-blended-learning>
- Phongphaew, N., & Jiamsanguanwong, A. (2018). Usability evaluation on Learning Management System. *Advances in Intelligent Systems and Computing*, 39-48. doi:10.1007/978-3-319-60492-3\_4
- Prasad, D. R. K. (2021, May 12). A brief history of the LMS. *eLearning Industry*. Retrieved December 15, 2022, from <https://elearningindustry.com/brief-lms-history>
- Prasad, RK. (2020, December 28). A brief history of the LMS. *eLearning Industry*. Retrieved September 1, 2022, from <https://elearningindustry.com/brief-lms-history>
- Prensky, M. (2001). Digital Natives, digital immigrants part 1. *On the Horizon*, 9(5), 1–6. <https://doi.org/10.1108/10748120110424816>
- Rovai, A.P., & Jordan, H.P. (2004). “Blended Learning and Sense of Community: A comparative analysis with traditional and fully online graduate courses”. *International Review of Research in Open and Distance Learning*, 5 (2)
- Saleh, A. M., Abuaddous, H. Y., Alansari, I. S., & Enaizan, O. (2022). The evaluation of user experience on learning management systems using UEQ. *International Journal of Emerging Technologies in Learning (IJET)*, 17(07), 145–162. <https://doi.org/10.3991/ijet.v17i07.29525>
- Shackel, B., 1991. Usability – Context, framework, definition, design, and evaluation. In B Shackel, B. and Richardson, S. (Eds.), *Human Factors for Informatics Usability*, Cambridge University Press, Cambridge, UK, pp. 21-38
- Sleator, R. D. (2010). The evolution of eLearning background, blends and blackboard .... *Science Progress*, 93(3), 319–334. <https://doi.org/10.3184/003685010x12710124862922>
- Smaldino, S. E., Lowther, D. L., Mims, C., & Russell, J. D. (2019). *Instructional Technology and media for learning*. pearsonhighered.com (12th ed., Ser. 13: 978-0-13-428748-5). Pearson Education, Inc. Retrieved January 1, 2023, from <https://www.pearsonhighered.com/assets/preface/0/1/3/4/0134287517.pdf>.
- Subramanian, P., Zainuddin, N., Alatawi, S., Javabdeh, T., & Hussin, A. R. (2014). A Study of Comparison between Moodle and Blackboard based on Case Studies for Better LMS. *JOURNAL OF INFORMATION SYSTEMS RESEARCH*

- AND INNOVATION, 6, 26–33. Retrieved July 6, 2022, from <https://seminar.utmspace.edu.my/jisri/Library.html>.
- Swanson, G. (1994). Graphic Design Education as a Liberal Art: Design and Knowledge in the University and the “Real World.” *Design Issues*, 10(1), 53–63. <https://doi.org/10.2307/1511656>
- Swerdloff, M. (2016). Online Learning, Multimedia, and Emotions. In *Emotions, Technology, and Learning*. <https://doi.org/10.1016/b978-0-12-800649-8.00009-2>
- The Open University. (2018, November). ONLINE LEARNING IN TERTIARY EDUCATION IN THE MIDDLE EAST AND NORTH AFRICA. Retrieved August 15, 2022, From <https://www.open.ac.uk/research/sites/www.open.ac.uk.research/files/files/Documents/Online%20learning%20in%20tertiary%20education%20in%20the%20Middle%20East%20and%20North%20Africa%20.pdf>
- Thomas, B., Al-Jarrah, A., & Joseph, N. (2021). Blended Learning in HEIs in the Middle East: Institutional Framework for Adoption and Implementation. *IGI Global*, 10.4018/978-1-7998-8085-1. ch.14.
- Watson, J. (2008). (rep.). *Blended Learning: The Convergence of Online and Face-to-Face Education. Promising Practices in Online Learning*. North American Council for Online Learning, April 2008. Retrieved October 2022, from <https://eric.ed.gov/?id=ED509636>.
- Weerasinghe, T., Ramberg, R., Hewagamage, K., 2009. Guidelines to design successful online learning environments. Conference: e-Asia 2009. Volume: In proceedings of e-Asia 2009.
- YULMS. (2022.). Yarmouk University Learning Management System: Log in. Yarmouk University Learning Management System: Log in to the site. Retrieved July 2022, from <https://elearning.yu.edu.jo/second2022/login/index.php>
- Yarmouk University. (2022). Department of Design. Fine arts College. Retrieved August 2022, from <https://finearts.yu.edu.jo/index.php/design-about-en>
- YUELC. (2022). e-Learning and Open Education Resources Center. Retrieved August 2022, from <https://elc.yu.edu.jo/>