Behavioral Intention of Students in Higher Education Institutions Towards Online Learning During COVID-19

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Abstract  Across the world, Higher Education Institutions (HEIs) were mandatory to transform their teaching model from face-to-face interaction to online learning. Neither the faculty nor the students were ready for this sudden transformation, most of the HEIs were practicing online learning for the sake of changing or technology adoption. COVID-19 changes the HEIs standpoint towards online delivery, as of mid of March 2020, the only online learning come to be the reasonable solution for teaching in schools and HEIs. Therefore, this study aimed to develop a research model to explore the effect of perceived enjoinder, perceived ease of use, perceived usefulness, social influence on the students’ intention and behavioral towards online learning during COVID-19 in Oman. The developed model was validated by employing Structural Equation Modeling (SEM) and the data collected via online questionnaire from 191 students whom have just completed the “Educational Technology” course on Spring 2020 at A’Sharqiyah University-Oman (ASU). The main finding of this study indicating that the identified factors; PEOU and SI significantly influenced students’ Behavioral Intention (BI) towards online learning, where others; PE and PU were not supported in this study.

Keywords  Higher Education Institutions · Covid-19 pandemic · Online learning
1 Introduction

Online learning defined as the process of transferring knowledge to the learner on a site residency or work rather than the learner’s transfer to the educational institution, which is built on a foundation to Communicate knowledge, skills and educational materials to the learner through various technical means and techniques [1]. So, when the learner is away from the teacher, technology can be used to fill this gap between both parties, simulating face-to-face connection to improve knowledge reception among students [2]. Caleb Philips was the first one who delivered online learning through Correspondence Class newspaper in 1729, then in 1922 the University of Pennsylvania delivered some of the courses through the Radio, and then via TV by Standford University in 1968. Thenafter, in 1999 Learning management systems (LMS) came to us like Blackboard and Canvas. In 2002, Massachusetts Institute of Technology (MIT) released 2000 courses online for free which were used by 65 million users from 215 country, followed by Khan Academy in 2008 with 71 million users [3].

On 12th of January (2020), World Health Organization (WHO) named the new Virus which spread in Wuhan (China) as “coronavirus”, then on 30th of January, the new coronavirus was listed under a public health emergency of international concerns, and on February 12th, the new coronavirus infection was named as “COVID-19” [4]. As UNESCO report, 61 countries from Middle East, Africa, Asia, North America and south America have closed their schools and universities [4]. One of the worlds’ leading education business corporations “Pearson” announced that more than 300 million students’ education across the world interrupted by Coronavirus outbreak [5]. After One month, UNESCO officially said that 1.37 billion students and youths across 138 countries were affected by the pandemic. The sultanate of Oman government has taken a decision to suspend the study across the country due to widespread of coronavirus diseases (COVID-19) [6]. Consequently, many countries decreed public and private higher education institution in different parts of the world to suspend face-face teaching and to find an alternative method for online learning.

Students worldwide, pursuing their higher education, found themselves in a sudden change from face-to-face to online learning. A few higher education institutions suspended teaching and some of the institutions continued course offering through online platforms [6]. With a short notice, whole higher education institution had to start online delivery across the world, millions of students had to stay at homes and attending their classes online. The student and teachers have encountered many challenges with using online teaching platforms such as; teaching flow, technical issues, material designing, … etc. Teaching materials had been redesigned to suite online learning, and the assessment concerns were the biggest challenge [7, 8]. In response to these immediate changing, the teachers shifted their teaching applying “flipped classroom” strategy, as it was the case in Oman, in order to increase the students’ involvement and interaction [9].
Despite the wide spread of online learning, no country level statistics is available regarding the students and teachers who experienced e-learning prior to Coronavirus outbreak [10]. For example, a team of researchers in Sultan Qaboos University (SQU), Oman, conducted a research to study the effect of online learning on the SQU students performance, and the main finding was that the students from practical college were not happy with online learning compared to the students from theoretical colleges [11]. However, this result can't assure that the students are ready for online learning. This study, therefore, will measure the students’ perception and behavioral intention towards the online learning in terms of four domains, based on previous literature, namely Perceived Enjoyment, Perceived Usefulness, Perceived Ease of Use and Social Influence. These five domains were extracted from the literatures [12–14], and this study will propose a Fit research model for online learning measurement. Hence, this study aims to address the following research objectives:

1. To identify the factors that influence and motivate students’ behavioral intention towards online learning.
2. To develop a research model to analyze the students’ behavioral intention towards online learning.
3. To validate the proposed model using Structural Equation Modeling (SEM) approach.

So, the current study measures the students’ behavioral intention and perception towards online delivery of courses. The remainder of the chapter is organized into five sections: Model development (Sect. 2), Research Methodology (Sect. 3), Finding and Discussion (Sect. 4). Finally, Sect. 5 discusses the conclusion, limitations of the study and future research directions.

2 Model and Hypothesis Development

In this study, the previous literature has been reviewed in order to accomplish to the first objective of this study. The factors of this study have been clustered as follows: Perceived Enjoyment (PE), Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Social Influence (SI), which are hypothesized to have an effect on students’ behavioral intention (BI) as showed in Fig. 1. This model is based on past studies that have used various information technology adoption theories, including Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) for assessing e-learning users’ behavioral intention [15–18].

Based on the previous literature, we have concluded the factors that hypothesized to influence students’ behavioral intention on online delivery, these factors are listed in Table 1 and detailed in the below subsections:
2.1 Perceived Enjoyment (PE)

The PE known as playfulness [20], and for this study we can define it as the degree of the students’ enjoyment while studying online. Hence, the following hypothesis is proposed;

**H1**: PE has a positive significant influencing on students’ behavioral intention towards online learning.
2.2 *Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)*

Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort [25]. The PEOU and PU were examined and showed that PEOU has a positive significant effect on PU [12, 21]. It means that, as far as the students finds the online learning useful, they will feel significant ease in using it. For this, the researchers proposed the following hypothesis;

**H2**: PEOU has a positive significant influence on students’ behavioral intention towards online learning.

**H3**: PEOU has a positive significant influence on students’ behavioral intention towards online learning.

**H4**: PU has a positive significant influence on students’ behavioral intention towards online learning.

2.3 *Social Influence (SI)*

SI refers to measurements of the perception of how individuals are affected by people around them. It is defined as an important component of the behavioral intention [12, 26]. Consequently, for this study, SI can be defined as the influence of the students’ behavioral intention towards online delivery. Hence, it is postulated that:

**H5**: SI has a positive significant influence on students’ behavioral intention towards online learning.

For the above factors and hypotheses, the research model is developed as Fig. 1 to achieve the first and second objectives of the study.

3 *Research Methodology*

3.1 *Context of Study*

Oman like any other country was affected by the outbreak of COVID-19, which has increased the use of internet and online learning as a solution to the issue of education, resulted from COVID-19 outbreak. With reference to the global digital report statistics which was released in February 2020; 4.66 million people using internet in Oman with an internet infiltration rate of 92% in January 2020, and this number has increased by 18% compared to a year before of the same month. Currently, 2.80 million social media users reside in Oman, the infiltration rate of
Social media in Oman is 56%. This was accompanied by a decree to HEIs in Oman to move to online learning instead of face-to-face learning.

The study was carried out in A’Sharqiyah University-Oman (ASU), which is a private university working under Omani ministry of higher education umbrella accommodating 3650 students. ASU was the first HEIs who started the online learning from the second day of the study suspension, and ASU technological infrastructure was the enabler for this quick response to shifting the teaching model from face-face interaction to virtual communication using various e-learning platforms, such as Moodle, MS Teams, Zoom, YouTube channels, … etc.

In order to validate the proposed research model of this study, a self-administrated online survey has been employed. The link of an online survey was sent to 196 students of ASU who had just completed the course “Educational Technology” in the Spring semester of 2020.

These students have studied first-half of the semester through face-to-face interaction and due to COVID-19, they studied online for the second-half of the semester. For this reason, the authors selected them as a sample for the study, as they can compare between two models of learning (Face-To-Face and Online learning). The survey consists of 18 questions based on Table 1 of previous studies. The selected sample studied “Educational Technology” course beside other courses through the online mode for the second half of Spring 2020 using Moodle, Microsoft Teams, Zoom, YouTube channels and WhatsApp groups as channels of communications. In response to the online survey, 191 students participated out of 196 students, registered for the course, to whom the invitation link was sent via the WhatsApp group which was created previously for the purpose of communication. The sample of this study was restricted to the students who had just completed the Educational Technology course.

In total, 191 students from Educational course subject. The participants (191 females) there were no male registered for this subject in this semester, with 99% of (18–24) age group, were the majority of them with “Good level” in computer skills level (49.2%) and (80%) of the respondents were using both (Computer and Mobile) as a channel of communication while studding online. Further details shown in Table 2.

3.2 Measurement Development and Pilot Study

The dependent variable of this study covered the behavioral intention towards online learning. Table 2, showed the independent variables and dependent variable which represent the model factors, with each factor consisting of numerous items that are measured on a five-point Likert scale (ranging from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’). The utilized items were all extracted and adopted from previously validated scales as shown in Table 3. A minimum of three items were adopted to measure each factor to ensure proper reliability as suggested by [27].
Table 2 Respondents’ profile

| Variable                  | Data   | Respondents | Percent |
|---------------------------|--------|-------------|---------|
| Age-Group                 | 18–24  | 189         | 99      |
|                           | 25–30  | 2           | 1       |
| Computer Skills Level     | Beginner | 21        | 11.0    |
|                           | Average | 62         | 32.5    |
|                           | Good    | 94         | 49.2    |
|                           | Advanced | 14        | 7.3     |
| Channel of Communication  | Computer | 12        | 6.3     |
|                           | Mobile  | 17         | 8.9     |
|                           | Both    | 162        | 84.8    |
| Residence area            | Semi-city | 128       | 67.0    |
|                           | City    | 44         | 23.0    |
|                           | Remote Village | 19 | 9.9 |
| Internet Connection Type  | WiFi    | 113        | 59.2    |
|                           | 4G      | 78         | 40.8    |
| Total                     |         | 191        | 100%    |

Table 3 Measurement variables and representative items

| Variables | Code | Items                                                                 | Sources |
|-----------|------|----------------------------------------------------------------------|---------|
| PE        | PE1  | I experience great pleasure when using Online learning more than traditional learning | [13, 28] |
|           | PE2  | I feel satisfied when I use Online learning more than traditional learning |         |
|           | PE3  | I feel pleasure when I use Online learning more than traditional learning |         |
| PU        | PU1  | Using Online learning helps me to complete my assignments quickly more than traditional learning | [14]    |
|           | PU2  | Using Online learning increases my learning achievement more than traditional learning |         |
|           | PU3  | Using Online learning makes it easier for me to better understand |         |
| PEOU      | PEOU1 | I find it easy to use online learning | [14]    |
|           | PEOU2 | It is easy for me to become skillful in using Online learning |         |
|           | PEOU3 | Overall, Online learning is easy for me to use |         |
| SI        | SI1  | People who are important to me think that I should use Online learning rather than traditional learning | [13, 28] |
|           | SI2  | Students who use online learning enjoy greater recognition from teachers than those who use traditional learning |         |
|           | SI3  | Students who use online learning at university enjoy better grades than those who use traditional learning |         |
|           | SI4  | People nearby me recommend to use online learning rather than traditional learning |         |

(continued)
The Survey consisted of two divisions; an introduction and demographic section, and the questions section. The first section introduced the research information about the objectives and the educational terminologies with their consent request and authors obligation to ensure them with their privacy right. The demographic part contains gender, age group, computer level skills, and the used devices. The questions section was divided into Five-Dimensions (PE, PEOU, PU, SI, and BI) based on a 5-point Likert scale.

In order to verify our collected data at earlier phases of this study, we wanted to confirm the collected data reality, to do so, we have checked the reality of first 30 respondents out of 191. With SPSS V.23, we have checked the data reliability. According to [29], Cronbach’s Alpha cut-off is 0.7. Table 4 below shows that all constructs had a satisfactory value (above 0.7) of Cronbach’s Alpha, indicating that the used measurement is reliable and this confirms the reliability of the survey.

| Table 3 (continued) |
|---------------------|
| **Variables** | **Code** | **Items** | **Sources** |
| SI5 |  | Overall, use of online learning will improve my social image among the college |  |
| BI | BI1 | I intend to begin/continue use Online learning to interact with colleagues and lecturers | [14] |
|  | BI2 | I will continue to use Online learning as a learning tool |  |
|  | BI3 | I will strongly recommend use of Online learning to others |  |
|  | BI4 | Overall, I intend to continue using Online learning rather than traditional learning |  |

| Table 4 Reliability Result |
|---------------------------|
| **Variables** | **No. Items** | **Cronbach’s Alpha** |
| Perceived Enjoyment while studying Educational Technology Course (PE) | 3 | 0.919 |
| Perceived Usefulness while studying Educational Technology Course (PEOU) | 3 | 0.836 |
| Perceived Ease of Use while studying Educational Technology Course (PEOU) | 3 | 0.825 |
| Social Influence while studying Educational Technology Course (SI) | 5 | 0.849 |
| Behavioral Intention while studying Educational Technology Course (BI) | 4 | 0.802 |
4 Finding

4.1 Common Method Bias (CBM)

In order to make sure that the collected data were free of any nature of biasness, we have used Common Method Bias (CBM) through Harman’s single test factor using SPSS V.23. In this study, the first component of “Total Variance Explained” recorded less than 50% of all variables in the instrument. Podsakoff et al. [30] has recommended this for behavioral research, as the first factor accounted for the collected data of this study is about 43% of the overall variance, which confirms that CBM does not affect the result, as showed in Table 5.

4.2 Measurement Model Assessment

The study used SEM method to validate the proposed research model in order to achieve the third objective of this research, and SMART PLS 3 used for data analysis. Composite Reliability (CR) was used to assess the reliability value of the model variables, and the threshold for CR should not be less than 0.06 in order to be accepted, and the values above 0.70 are considered satisfactory [31]. Table 6 showed that the CR values for the variables were above 0.07, thereby this indicates good internal consistency reliability. Furthermore, the factor loading and Average Variance Extracted (AVE) were used to assess the convergent validity of the measurement model. As we can notice from Table 6, the factor loading in the range of 0.712–0.899, while the benchmark value is 0.7 as per Hair et al. [29]. Thereby, our measurement validity for the proposed model has strong validity and acceptable reliability as shown in Fig. 2. The authors also checked the discriminate validity by Cross-loading for the items-level and Fornell-Larker criterion for the constructs level. The loading values must be higher against their respective construct compared to other constructs, and our research model loading values are higher against their respective constructs as showed in Table 7.

| Component | Initial Eigenvalues | Extraction Sums of Squared Loadings |
|-----------|---------------------|-------------------------------------|
|           | Total              | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| Total     | 9.146              | 43.555        | 43.555       | 9.146 | 43.555        | 43.555       |

Extraction Method: Principal Component Analysis
Table 6  Result of measurement model-convergent validity

| Constructs               | Items    | Loading* | AVE**   | CR***   |
|--------------------------|----------|----------|---------|---------|
| Perceived Enjoyment      | PE1      | 0.844    | 0.748   | 0.899   |
|                          | PE2      | 0.883    |         |         |
|                          | PE3      | 0.867    |         |         |
| Perceived Usefulness     | PU1      | 0.829    | 0.674   | 0.861   |
|                          | PU2      | 0.852    |         |         |
|                          | PU3      | 0.780    |         |         |
| Perceived Ease of Use    | PEOU1    | 0.868    | 0.776   | 0.912   |
|                          | PEOU2    | 0.895    |         |         |
|                          | PEOU3    | 0.880    |         |         |
| Social Influence         | SI1      | 0.727    | 0.541   | 0.855   |
|                          | SI2      | 0.758    |         |         |
|                          | SI3      | 0.712    |         |         |
|                          | SI4      | 0.723    |         |         |
|                          | SI5      | 0.757    |         |         |
| Behavioral Intention     | BI1      | 0.746    | 0.7      | 0.903   |
|                          | BI2      | 0.827    |         |         |
|                          | BI3      | 0.899    |         |         |
|                          | BI4      | 0.868    |         |         |

*Individual Item reliability (>0.70), **Composite reliability (>0.70), ***Average Variance Extracted (>0.50)

Fig. 2  Measurement model result
4.3 Structural Model Assessment

As long as the research model passed the first stage of assessment (Measurement Model), then the study moved to the structural model assessment to test the hypothesis of the proposed research model. (i.e., H1–H4; as showed in Fig. 1. Table 8, which shows the result of validation, and the results show that H2, H3 and H5 are supported as t-values are above 1.96 and p-values were below 0.05, and H1 and H4 have t-values below 1.96 and p-values above 0.05, which are not supported as recommended by Hair et al. [29].

The above result showed that BI is affected strongly by (SI) and (PEOU); (β = 0.404) and (β = 0.203) respectively, and PEOU has strong effect on PU, with less effect by (PU) and (PE); (β = 0.133) and (β = 0.122) respectively on BI.

Cohen (1988) [32], suggests that if the value of $R^2$ above 0.67 is high, value ranging from 0.33 to 0.67 are moderate, whereas the values between 0.19 and 0.33 are weak, and values less than 0.19 are unacceptable, thereby our research model is

| Table 7 | Discriminant Validity by Fornell-Larker Criterion |
|---------|-----------------------------------------------|
|         | Perceived Ease of Use | Social Influence | Behavioral Intention | Perceived Enjoyment | Perceived Usefulness |
| Behavioral Intention | 0.837 | | | | |
| Perceived Ease of Use | 0.643 | 0.881 | | | |
| Perceived Enjoyment | 0.636 | 0.685 | 0.865 | | |
| Perceived Usefulness | 0.63 | 0.718 | 0.703 | 0.821 | |
| Social Influence | 0.705 | 0.639 | 0.697 | 0.653 | 0.735 |

The value in the BOLDFACE are the square root of AVE

| Table 8 | Path Coefficient of the research hypothesis |
|---------|-------------------------------------------|
| Hypo   | Relationship | β   | Std. Error | T-Value | P-Value | Result       |
| H1     | PE—>BI      | 0.122 | 0.089     | 1.371   | 0.171   | Not Supported |
| H2     | PEOU—>BI    | 0.203 | 0.091     | 2.226   | 0.026   | Supported*   |
| H3     | PEOU—>PU    | 0.726 | 0.040     | 18.125  | 0.000   | Supported**  |
| H4     | PU—>BI      | 0.133 | 0.092     | 1.440   | 0.151   | Not Supported |
| H5     | Social Influence—>BI | 0.404 | 0.077     | 5.259   | 0.000   | Supported**  |

Significant at P** = <0.01, P* < 0.05
This result suggests that the proposed research model variable (PE, PEOU, PU, SI) explained 0.56% of the variance of behavioral intention. Therefore, above 0.35 of the effect sizes is considered to be large, ranging 0.15–0.35 is considered as medium effect size, between 0.02 and 0.15 is considered to have small effect size, and less than 0.02 is considered to have no effect size. Table 9 elaborates the result of this research model. Predictive Relevance $Q^2$ in SMART PLS3, according to [33], the $Q^2$ should be more than 0. In the current study, the result is 0.393, which is an accepted value.

## 5 Discussion

This study aimed to investigate the behavioral intention of students in HEIs towards online learning. The first hypothesis investigates the influence of PE on students’ behavioral intention towards online learning, and the findings showed this hypothesis was not supported. This finding is different from past studies [13, 28]. This finding is also not in line with past studies that confirm technology and e-learning are preferred by students because it changes the method of teaching from teacher-centered approach to student-centered approach [34, 35]. This might be attributed to COVID-19 outbreak, which has affected the students’ leaning, especially that online learning might be the first experience of the majority of the students. This first experience might explain the novelty effect of the use of technology on the students’ behavioral intention towards online learning [36]. So, they did not find online learning of that difference from traditional learning.

Besides, the study also investigated the influence of PEOU on students’ behavioral intention towards online learning, and the findings supported this hypothesis, which is in line with past studies [14, 37]. This finding supports that students’ behavioral intention towards online learning increases when they find the use of online learning easy. This might be explained by that the student of the current generation might not need any ICT training since technology has become a part of our everyday life. So, students, especially university students, might not need training to use technology for online learning, since they have a good experience in terms of technology use [34]. Hence, easiness is not significant in its influence on students’ behavioral intention towards online learning.

The third hypothesis of the study investigated the influence of PEOU on PU, and the findings supported this hypothesis, which is in line with past studies [12, 21].

| Table 9 Effect size $f^2$ | Construct relation | $f$-Square | Result |
|---------------------------|--------------------|-----------|--------|
| Perceived Ease of Use     | 0.040              | Small     |
| Perceived Enjoyment       | 0.013              | Small     |
| Perceived Usefulness      | 0.020              | Small     |
| Social Influence          | 0.170              | Medium    |
That is, the aim of the students is to gain knowledge and to improve their learning, so as long as they achieve such learning goals, the use of technology will be easy. This is in line with previous studies which showed that technology might provide students with different learning materials and tools, which help them to improve their learning [38].

The fourth hypothesis investigated the influence of PU on students’ behavioral intention towards online learning, which was not supported in this study, which is different from the findings of past studies [14]. Hence, PU does not increase the intention of students to use online learning. This might be explained by that the outbreak of COVID-19 has a negative impact on students’ psychology and their restfulness, and this might affect their learning achievement. Such specific situation of COVID-19 might explain why this hypothesis was not supported.

The fifth hypothesis investigated the influence of SI on students’ behavioral intention towards online learning. This hypothesis was supported, and it is in line with past studies [13, 28]. This finding shows that social image of students among their classmates has a significant influence on their intention towards online learning, and their self-image has an impact on online learning. That is, students learn in a small community, and technology might be viewed as a part of the prestige of the students. This might explain the influence of IS on students’ intention to study through the online mode.

To conclude, the study has five hypotheses, from which two hypotheses were not supported. The unsupported hypothesis might be due that students of the current generation do not find any difficulty in using technology, so ease of use is not significant in its influence on their behavioral intention towards online learning. Also, COVID-19 outbreak has a major impact on students’ psychology such as anxiety, motivation and restfulness. Such psychological aspects might be the explanation why PU did not influence students’ behavioral intention towards online learning. Besides, the proposed model of the study showed that it is effective in investigating students’ behavioral intention towards online learning, so it can be used in future studies or replicated in other learning context.

6 Conclusion, Limitation, and Future Research

The main finding of this study was a developed model to analyze the students’ behavioral intention of online delivery based on the data collected from “Educational Technology” students from ASU. SPSS was used for descriptive statistics and Smart PLS used for measurement and structural model assessment. Theoretically, this study contributes to the current concerns on students’ intention towards online learning. (a) The study confirms the students’ behavioral intention towards online learning. (b) It confirms the relationship between perceived usefulness and ease of use. The research result has a practical value in terms of understanding students’ intention of online learning using various technologies.
This study, with a special focus on A’Sharqiyah university students, identified a group of significant factors affecting their intention to continue learning in an online environment.

Few limitations were encountered, collected data was collected from students with basic skills of educational technology tool, so the result can’t be generalized for other students and university. Therefore, the future researchers advised to collect data from different institutions and with different methodologies.

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