

# VIRTUALIZATION PROCESS OF LEARNING IN A DEVELOPING COUNTRY

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## ABSTRACT

In some low-resource settings, there are several challenges such as financial crisis, inadequate infrastructure facilities, personal skills efficiency and motivation that contribute or hinder the success of virtualization in an industry. This study investigates the factors that could influence the success of virtualization requirement in the learning industry during and after the COVID phase on students' perceived usefulness and their intention to continue using electronic learning. A qualitative research was conducted among university students through several focus groups and one to one interviews. Several factors that are expected to influence students' perceived usefulness and intentions to continue using online learning were identified and a trifold model was proposed based on three different theories to be empirically tested on a larger scale in the future. This study provides input to improving knowledge of e-learning for educational institutions in developing countries.

## KEYWORDS

Virtualization, e-Learning, Developing Countries, Online Learning.

## 1. INTRODUCTION

The outbreak of the COVID-19 epidemic has irrevocably changed education forever (Dhawan, 2020). While people all over the world were forced to shift from physical classrooms to virtual classrooms due to the burst of the pandemic, one might wonder if this new trend of e-learning would be successful and efficient enough for schools and universities in developing countries to continue using it despite the economic and infrastructure challenges they might face.

Throughout the COVID-19 lockdown period, academic institutions were obliged to adopt the online learning to fill the gap as it was the only alternative and a vital solution to ensure delivering learning process (Dhawan, 2020; Mseleku, 2020). As a matter of fact, e-learning was considered as an innovative and collaborating method to study. But how do students today, and after such an experience, perceive the usefulness of the online learning is still debatable somehow.

While many studies have investigated the perspectives of online learning during and after the pandemic rise (Barnes, 2020), not many of them have investigated the factors that could influence students' intention to continue using the online platforms for learning in developing countries. Cheng (2021) had argued that the online learning success depends on the students' readiness and intentions to continue using the online platform which is usually a good indicator that influences the successfulness and effectiveness of the online experience and the students' learning quality. Thus, it is very crucial to investigate the factors that could affect student's intention to continuously use the online platforms for education as it is an indicator that could lead us to better understand if this new trend could be a successful tool in the future especially that the Covid risk had somehow diminished and most of the students are back to their campuses. This could somehow, help us to better understand if the use of the online platforms for education could satisfy students' needs (Huang, 2019). During the last decade, and with the introduction of the online learning, many studies have focused on examining the students' intentions to continue using the online platforms for education and have used many technology adoption theories and models (Valverde-Berrocoso et al., 2020). This could lead one to assume that the online learning, methods are fully acceptable among users and in any conditions. Nevertheless, there aren't any studies, and not to our knowledge that investigated the virtualizability of the learning process in a developing country. The virtualizability in terms of the suitability and the responsiveness of the online

learning process in an adequate manner especially that in countries where there are low resource settings, there are several socioeconomic challenges such as inadequate facilities, cultural barriers, access to the internet and other reasons that could hinder the use of the online platforms for education. In other examples, an obvious gap in the online learning could be related to practical understandings of the virtualize ability of such a process. Overbry (2008; 2012) proposed a process virtualization theory (PVT) that is grounded on the fact that some processes could be more suitable for being conducted virtually than any others. For example, buying books online showed to be well-suited to virtualization, while the online groceries process has demonstrated to be less efficient.

Nonetheless, and regardless of the variation of existing literature on online learning adoption, none of the current studies in the literature had so far gone further in investigating the process of visualization factors to determine personal factors that affect the user 's perception while using the online platform as a fit for his expectations and continues using it. Thus, and in order to fill this gap in knowledge, this research offers several main objectives:

(1) what are the main requirements for the learning process that could predict the students' perceived usefulness for using the online platform for learning as a result of the covid-19 pandemic in low resource settings?\_(2) what are the main requirements for the learning process that impact students' intentions to continue using OL after the COVID experience? (3) Identify a model that could predict the virtualization process in e-learning in developing countries.\_This study was mainly done in Lebanon, which, according to the Ministry of Economy and Trade Report, (2017), is considered as a developing country. The Lebanese experience with the online learning adoption is expected to inspire other regional countries as Lebanon is looked upon as a leader in information and communication development and in the academic that it offers. For hundreds of years, the geographical location of this country and since the Phoenicians has served as a commercial platform for services and commerce exchange between the Mediterranean coasts, East Asia and India. Lebanon is considered as a role model in business and has a high level of education (Gordon, 2016). Therefore, the Lebanese case in this domain could offer an inspiring example for the e-learning diffusion in other developing countries, especially that it had encountered many difficulties recently after the 2019 revolution that was a result of a deterioration in its economy, infrastructure facilities (electricity which is a must for online use, internet availability etc...) the difficulties which makes it a practical choice for evaluating e-learning in developing countries and particularly in the Middle East ( El Rassi, 2018; El Rassi, 2019; El Rassi ,2020).

To accomplish the study's main objective outlined in this introduction, we proceed by presenting a literature review concerning the e-learning and the exploited theories in the literature.

## **2. LITERATURE REVIEW**

### **2.1 E- Learning**

E-learning has recently become more crucial for educational institutions especially in a world where the fierce competition has become global. The introduction and adoption of new methods and tools in educational institutions, such as delivery and support systems had a great effect on their performance (Broadfoot, 2016). Before proceeding further, we aim at briefly defining e-learning. E-learning could be related to any learning mean that is enabled electronically or empowered by the use of digital technologies. Other scholars have defined it as a concept that refers to the use of applications, learning methodologies or processes. Thus, it is not easy to agree on a definition that could be adopted but we may summarize it as the employment of online technologies to facilitate the access to educational materials such as online courses or online exams. Several schools and higher educational institutions have realized what e-learning could bring to them in terms of added value as it could shape people's knowledge and enhance their skills. E-learning could take different shapes and types and could also be employed with different techniques. Nevertheless, several authors believe that e-learning could be considered as an interesting alternative for teaching students (Lam, Williams & Chua, 2007).

## 2.2 Theoretical Frameworks

There have been many research studies that focused on the e-learning perspective in the literature. While most of them have examined the factors that could possibly influence students' acceptance, others have investigated the adoption and the e-learning use. Some of them have verified how to predict the use of theoretical knowledge of causal connections such as Davis and Venkatesh (2004). These authors used the Technology acceptance model (TAM) to study the use and acceptance of a new system based on the perceived usefulness variable while Bhattacharjee and Premkumar (2004) provided an empirical evidence on predicting the user's approach when testing the users' acceptance. In more recent studies, there has been more focus on the students' continuous intention to use the online learning system (Valverde-Berrocso et al., 2020). Nevertheless, after going through several research studies in this field, we notice that the IS theory has been used with many other theories to explain the e-learning adoption and predict students' intention to continue or not to continue using the online learning system. Theories such as TAM and others perceive the e-learning from a limited usefulness perspective. While the TAM, UTAUT and DOI theories measure the usefulness of a certain system by investigating how the users evaluate it, the Process of Virtualization Theory for example explicates the usefulness based on the process characteristics and the system's abilities which allows for more significant explanations.

The Process virtualization which is almost new in the IS discipline (Overby, 2012), comprises four major constructs (sensory requirements, relationship requirements, synchronism requirements, and identification and control requirements) that are usually expected to influence a process and detect whether it is responsive or resistant to being piloted virtually.

### 2.2.1 Motivation

Contextual characteristics, according to Farid and Lamb (2020), have a significant impact on motivation. Prior studies had proven that perceived utility was a significant influence in shaping the formation of motivation and feelings, if this viewpoint was accepted. Perceived usefulness, for example, enhanced learners' motivation in the computer-assisted language learning environment, according to Hsu's and Li (2017) research. Increased learners' perceived usefulness, according to Chan and Norlizah (2017), could boost their learning motivation. Similarly, Kong and Wang (2021) observed that students' motivation to study is boosted by perceived usefulness. According to Kim and Shin (2021), integrative motivation mediates the link between learners' self-efficacy and their actual learning capacity, meaning that integrative motivation is a reaction to subjective traits such as perceived self-efficacy.

### 2.2.2 Self-Efficacy Theory

Self-efficacy refers to a person's belief in his or her capacity to carry out the actions necessary to meet specific performance objectives (Bandura, 1997). A person's conviction in his ability to regulate his own motivation, behavior, and social environment is referred to as self-efficacy.

Self-efficacy was developed as a predictive variable using the Technology Acceptance Model (TAM) and Computer Self-Efficacy (CSE) (Davis 1989). The variable is used to determine a person's ability to use technology to obtain access to healthcare information and services. This predictor was used in particular to evaluate people's ability to use mobile phones to get prenatal care and information in distant regions.

### 2.2.3 Attitude (Theory of Planned Behavior)

Prior behavioral science research has revealed that one's attitude influences one's evaluation of a certain behavior, issue, or action (Hagger et al, 2002). As a result, past experiences and empirical findings from studies based on the Theory of Planned Behavior (TPB) prompted the addition of attitude as a predictor variable (Ajzen, 1999; Hagger et al, 2002). In the TIPFit approach, attitude is critical in determining how patients and caregivers perceive an intervention before and after exposure. We expected that when the advantages of an intervention become more realistic as a result of sustained usage, attitudes alter.

### 3. METHODOLOGY

#### 3.1 Research Methodology

In order to answer our research questions and based on the above stated literature review that had allowed us to develop a basic idea, we opted to continue our study with a qualitative technique in order to answer the above questions. According to Benbasat et al (1987), a qualitative study allows us to explore "a phenomenon in its natural surroundings, using multiple data collection methods to gather information from one or a few entities". Individual interviews and focus groups are, indeed, the most appropriate qualitative methods for our study, and this is for a variety of reasons. Firstly, they can be considered as a primary data method for gathering information from expert people. Secondly, they allow us to better understand the human behavior while collecting data on opinions, perceptions and attitudes in order to explain the factors that impact a certain behavior in a new setting. These two approaches focus on the "how" and "why" of a decision-making rather than the "what," "where," and "when" (Kendall, (2008).

#### 3.2 Field of Choice, Data Collecting Source and Method

For the purpose of our study, we chose our data sample from university students because the majority of e-learners are young. Typically, at this age, also known as the "Z" generation, they are internet savvy users and most of them do not have any problem using the internet. Not like the older age that are more reluctant and find difficulties in using new technologies and internet (Jariah et al, 2004). We pursued the study by performing planned discussions and interviews with a small group of people that was managed by a moderator and that is by relying on the literature. We started with three focus groups, each group consisted of 8 students and we also did 12 semi-structured interviews. Each interview was scheduled for about an average of 50 minutes. The collection of the data took almost 75 days and the information gathered during the interviews started to reflect a saturation as of the 12<sup>th</sup> interview which allowed us to conclude that the collected information represents a good understanding of the phenomenon we aim to study. Thus, we have created an interview guide based on the related literature which major objective was to answer our major research questions. Therefore, and based on the data that was collected during this study, we had identified relevant categories and that is by using the open coding. This had allowed us to identify the interesting elements for our study in the data. Then, we opted for the axial coding that had allowed us to link the existing data to the literature. By applying this method, we have conducted an analysis of the interviews, while going over the main themes of our research study.

### 4. RESULTS

In this section we will start by presenting the results of the interviews and focus groups that we have conducted. Our major objective is to iterate between the literature and the results as follows:

-Personal attributes: Personal attributes could be related to self-efficacy and motivation. Self-efficacy is based on an individual's conviction in their own ability to achieve a goal, which is required to create particular performance attainments (Bandura, 1997), whereas motivation is based on an individual's desire to achieve a certain goal. Motivation is what explains why people keep doing something or cease doing it at a certain point in time. Internal elements that lead an agent to wish to engage in goal-directed behavior are sometimes referred to as motivational moods. Different mental states are said to compete with one another, with only the most powerful mood determining behavior. Based on the conducted interviews, major factors that could influence person's attitude towards e-learning are self-efficacy and learning motivation.

The below table represents some of the quotes that were expressed by the focus group members and the interviewers.

Table 1. Personal attributes: Technology Self-Efficacy and Learning motivation

Verbatims	Axial coding	Theoretical concepts	Respondents out of 36 students
-“It is ok for me to use the internet for e- learning even if there is no one around to show me how to do it.” -“It is not an issue, I can manage. I always did”	Self confidence in achieving a task through technology	<b>Technology Self-Efficacy (TSE)</b> Kim and Shin, 2021; Kong & Wang, 2021; Farid & Lamb,2020; Li, 2014.	31 students (86%)
-“I like to continue using it. It is useful and efficient. But it is not my first choice. I still prefer to come and take my courses on campus”.	Desire to achieve certain goals	<b>Learning Motivation (LM)</b> Hsu and Li, 2017; Kim and Shin, 2021; Kong & Wang, 2021; Farid & Lamb,2020;	32 students (89%)

- Practice: Strong relationships with instructors, students, and peers may drastically improve students' motivation and hence boost learning in practice. Students that have more solid relationships have shown higher academic engagement, better social skills, and exhibit more good conduct. For many, these ties were severed when schools shuttered their doors in April 2020. Building trusted connections, on the other hand, will be crucial in dealing with the months of stress and missing or incomplete academic lessons that have followed. The below table represents some of the quotes that were expressed by the focus group members and the interviewers.

Table 2. Practices

Verbatims	Axial coding	Theoretical concepts	Respondents out of 36 students
-“ I honestly enjoy walking and looking around the campus life. That is why I prefer being physically present”.	Feeling people and physical aspects of the campus around	<b>Sensory requirements (SR)</b> Kim and Shin, 2021; Farid & Lamb,2020; Overby, 2008; Overby, 2010.	29 students (80.5%)
-“what I like when I am on campus is that I can be in direct contact with my friends, peers, meet new people and build strong ties with them. Which is not an option when I am online”.	Maintaining bonds and good relationships with people around	<b>Relationship requirements (RQ)</b> Hsu and Li, 2017; Kim and Shin, 2021; Kong & Wang, 2021; Farid & Lamb,2020; Li ,2014; Overby, 2008; Overby, 2010.	33 students (92%)
-“it is crucial for me to know which one of my friends or colleagues could be attending the university classes with me.” -“I feel more comfortable when I know which other colleagues are attending the course with me .”	Personal identification around	<b>Identification and control requirements (IR)</b> Hsu and Li, 2017; Kim and Shin, 2021; Kong & Wang, 2021; Farid & Lamb,2020; Li ,2014; Overby, 2008; Overby, 2010.	32 students (89%)

-Representation relationship: Representation relationship refers to the technology capacity to mimic or replace the physical learning process. This variable was developed from PVT-IT (Overby, 2008; Overby, 2010) and Task Technology-Fit (TTF) (Goodhue and Thompson, 1995). In telemedicine, for example, mobile phones may be combined with wireless sensors and multimedia technologies to allow patients and physicians to consult remotely. However, in low-resource environments, such services are difficult to supply due to insufficient connection (Overbru, 2010).

Table 3a. Technology

Verbatims	Axial coding	Theoretical concepts	Respondents out of 36 students
-“ when I am on campus, I enjoy my classmates presence which I miss online. Especially that the online connection is not available sometimes”	Enjoying a closer relationship with others on campus	<b>Representation relationship</b> Agrawal et al, 2020; Mburu & Oboko, 2018; Mbuthia et al, 2021; Mechael et al, 2010; Overby, 2008; Overby, 2010;	29 students (80.5%)

-Reach: Reach is a measure of technology's capacity to give adequate access to e-learning at a lower cost, in a shorter amount of time and at a person's convenience sometimes. Due to extensive distances, economic issues, infrastructure failing sometimes, limited e-learning and cultural obstacles, most of m-Health programs for example in developing economies programs fail to offer enough access to maternity care services and information, according to evaluated research (Agrawal et al, 2020; Mburu & Oboko, 2018 Mbuthia et al, 2021; Mechael et al, 2010). As a result, we investigated how online learning may provide sufficient reach for e-learning.

Table 3b. Technology

Verbatims	Axial coding	Theoretical concepts	Respondents out of 36 students
-“ easy for me to attend classes online as long as I have internet”. -“ taking courses online is convenient. No need to relocate especially with the financial crisis and the increase in fuel price. It is really convenient”	Reachable anytime, anywhere	<b>Reach.</b> Agrawal et al, 2020; Mburu & Oboko, 2018; Mbuthia et al, 2021; Mechael et al, 2010; Overby, 2008; Overby, 2010.	27 students (75%)

-Perceived usefulness and intention to use: According to Davis (1986)'s Technology Acceptance Model, perceived utility is the most crucial component in user acceptance of a technology, ahead of perceived ease (TAM). Perceived utility and perceived ease of use both influence behavioral intention to use, which is defined as a person's conscious decision to do or not undertake a future activity. "The degree to which a person believes that employing a given system would enhance their job performance," Fred Davis defined perceived usefulness (PU) as "the degree to which a person thinks that implementing a certain system would improve their work performance." It relates to whether or not a piece of technology is considered useful for the task at hand.

Table 4. Perceives usefulness and intention to use

Verbatims	Axial coding	Theoretical concepts	Respondents out of 36 students
-“ it could be if you can offer me internet and electricity. Know those are things that are hard to reach these days. Despite all that, I still intend to use it again if available.”	Learning affects the decision of usefulness and intention to use and is related to self-efficacy.	<b>Perceived usefulness; intention to continue use; Learning.</b> Davis 1989; Mbuthia et al, 2021; Rahmi et al, 2018; Overby, 2008; Overby, 2010.	27 students

## 5. DISCUSSION

After identifying the problematic related with online learning, we conceptualized the construct. A construct is defined by Edwards and Bagozzi (2002) as “a conceptual term used to describe a phenomenon of theoretical interest”.

### 5.1 Conceptualization of Constructs

In the first phase, we expressed our problematic as the need to understand the “process requirements that predict students' perceived usefulness and intention to reuse the online learning after Covid 19”. Thus, we defined several factors that influence students' perception and intention to use. Subsequently, a list of personal, practices and technological attributes that are related with the online learning behavior have been developed throughout an inclusive search in the literature.

In a second phase, the qualitative study aimed at emphasizing any attitude that could be related to personal, practices and technological attributes that our interviews may correlate with the literature review related to online learning.

Also we tried to relate these attributes to any possible additional dimensions that were not mentioned or found in the literature review (Hudson et al, 1998). We had also screened the list of interviews to make sure that our sample would include interviews with different perspectives and backgrounds (for example, gender, cultural background, region, etc...). The answers were then checked by a coding team that consisted of two researchers who attempted to identify the key themes and illustrative quotes.

Based on the findings, we were able to identify two potential dimensions for personal attributes, three potential dimensions for the processes in addition to two potential dimensions for technology characteristics. The latent dimensions identified in table.1 for personal attributes are self-efficacy (Hagger et al, 2002; Kong & Wang, 2021; Kim and Shin ,2021) and motivation (Kim and Shin, 2021; Kong & Wang, 2021; Farid and Lamb,2020; Li ,2014). The latent dimensions identified in table 2 processes included sensory requirements, relationship requirements, identification and control requirements. The potential dimensions initially identified in table 3.a and 3.b representation relationship and reach (Kim and Shin, 2021; Kong & Wang, 2021; Farid and Lamb,2020). In addition, as our sample consisted in general of 3 focus groups (8 participants in each group) and 12 individual semi structured interviews, most of them were university undergraduate students that had experience the online learning at least during COVID if not before. They perceived that the technology self-efficacy is a major attribute that could influence their perception about online learning (86%) and that learning motivation could have a weight and influence on the online perceived usefulness and their intention to reuse the system after covid. (89%) (Ajzen, 1999; Bandura, 1997; Kong & Wang, 2021; Kim and Shin ,2021). Furthermore, we have identified a second construct that could influence their opinion about perceived usefulness and related to processes and it includes “Sensory requirements” ( 80.5%), “relationship requirements (92%) and Identification and control requirements (89%). This has been related in the literature to many research papers that have discussed the virtualization process theory among others (Overby, 2008; Overby, 2010).

A third construct that we call technology has been identified while iterating back between the literature and the students’ opinions and it is composed of “Representation relationship” (80.5%) and “Reach” (75%), (Mbuthia et al, 2021; Mechael et al, 2010; Overby, 2008; Overby, 2010).

Based on our preliminary findings, we conclude that those attributes represent the major components that could influence students’ perceived usefulness for the online learning and their intention to continue using the same system and that learning motivation could be considered as a mediator variable between self-efficacy and perceived usefulness and between perceived usefulness and intention to continue using the online platform or education. Therefore, the analysis of the qualitative study leads us to propose the following model to answer our research questions:

Based on this model, the following hypotheses are proposed and are recommended to be tested with a larger sample with quantitative data if possible:

H1-a. The higher the students’ SE is, the more positive the impact on their learning motivation (LM) is.

H1-b. The higher the students’ learning motivation (LM) is, the more positive the impact on their perceived usefulness of e-learning is.

H2. The higher the students’ SR is, the lower the impact on their perceived usefulness of e-learning is.

H3. The higher the students’ RQ is, the lower the impact on their perceived usefulness of e-learning is.

H4. The higher the students’ ICR is, the lower the impact on their perceived usefulness of e-learning is.

H5. The higher the students’ RR for the learning process are, the more positive the impact on their perceived usefulness of e-learning is.

H6. The higher the students’ Rc for the learning process are, the more positive the impact on their perceived usefulness of e-learning is.

H7. The higher the students’ PU for the learning process are, the more positive the impact on their ICU of e-learning is.

## 6. CONCLUSION, LIMITATIONS AND FUTURE RECOMMENDATIONS

This study, without exception, contains a number of shortcomings. Participants were depicted as homogeneous entities apart from their gender in our study environment and owing to time constraints. Additional study might be conducted to look at additional factors, such as the influence of the Lebanese culture’s cultural background and the impact of the second language on online learning intention and attitude.

Furthermore, it is strongly advised that we test this model on a bigger sample size, as this would provide us with more reliable findings. Both genders should be represented in the sample, which should be drawn from different institutions (one from the French system and the other from the American system) or areas. For this reason, and after gathering a vast amount of data, the use of structural equation modeling to test the suggested model is recommended. Structural Equation Modeling (SEM) technique is highly recommended in IS and is very efficient to test a complex model with several variables (Chin et al., 1995).

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