Transitioning from Physical Classroom to Distance Education during the COVID-19 Crisis: A Lebanese Case Study in Higher Education

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CHAPTER 7

TRANSITIONING FROM PHYSICAL CLASSROOM TO DISTANCE EDUCATION DURING THE COVID-19 CRISIS: A LEBANESE CASE STUDY IN HIGHER EDUCATION

Ahmad Samarji

ABSTRACT

Distance education (DE) is neither a new concept nor process. Learning through postal correspondence can be traced back to more than 150 years. The avenues of DE have evolved from postal correspondence, videotaped lessons, electronic communications, to distance teaching higher education institutes. Up until the start of 2020, DE was an educational process of choice or preference. However, when WHO declared COVID-19 as a pandemic in March 2020, DE was no longer an option but rather the only choice and educational avenue for the majority of the universities worldwide; Lebanon is no exception. This chapter considered the case study of DE at Phoenicia University, Lebanon, studying instructors' attitudes and perceptions about some of the quality attributes of DE such as interactivity, inclusiveness, and immediacy prior to and after their first online semester. A mixed methods approach was adopted, where pre- and post-test surveys were administered with 54 instructors in Spring 2020. Semi-structured interviews were conducted with 12 instructors toward the end of that semester. This study found that the participants held a more positive stance when it came to instructor immediacy following their first

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online semester. On the contrary, instructors' attitudes and perceptions toward interactivity and inclusiveness did not significantly change between the pre- and post-test results, maintaining a less favorable stance of DE for these particular attributes in comparison to physical classroom education. The study concluded that overall, participants perceived DE as an efficient approach given the unprecedented crisis; nonetheless, the effectiveness of such an approach was challenged by many obstacles and limitations due to internet connection issues and the unreliable power infrastructure.

Keywords: Lebanon; higher education; higher education institutions; distance education; online education; online learning; online teaching; COVID-19 Pandemic

INTRODUCTION

Distance education (DE) is defined as "institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (Simonson, Smaldino, Albright, & Zvacek, 2006, as cited in Schlosser & Simonson, 2009, p. 1). Moore (2013) describes DE settings as those occurring when the students and the teacher are separated by location, and sometimes by time, lacking face-to-face interaction. Simonson and Seepersaud (2019) assert that DE is characterized by four main features. The first feature is being institutionally based, differentiating DE from self-study. The second is the separation – geographically and sometimes in time zones – between the students and the instructor. The third feature is interactivity through telecommunications, where interaction can occur synchronously, at the same time, or asynchronously, at different times. The fourth component of DE is the availability of educational resources and their connectedness to the distance learning and teaching process, facilitating such a process between the instructor and the students (Simonson & Seepersaud, 2019).

To many instructors and educators, DE might seem a recent idea, concept, and process. Nonetheless, DE existed well before the introduction of Web 1.0 and Web 2.0 technologies (Moore, 2013). In reality, the concepts, processes, and modes of teaching, learning, and assessment in DE can be traced back to more than 150 years ago (Schlosser & Simonson, 2009). DE has evolved from correspondence study, electronic communications, to distance teaching universities (Schlosser & Simonson, 2009).

Over the past two decades and in the USA alone, online learning became significantly popular. This was best reflected and detailed in Allen and Seaman's (2013) report: "Changing Course: Ten Years of Tracking Online Education in the United States." Compared to 2002, when less than 50% of higher education institutions reported that online education was critical to their long-term strategic planning, Allen and Seaman (2013) found that in a decade, in 2012, this number jumped to become close to 70%. Additionally, they reported that the number of students taking at least one online course in 2012 increased by over 570,000 to a

new total of 6.7 million, denoting an all-time high figure of 32% of all students in the USA (Allen & Seaman, 2013).

Online learning might not be as "distant" as DE as it can incorporate a minor face-to-face component versus a major online one; in other words, at least 80% of the course content needs to be delivered online as asserted by Allen and Seaman (2013). Nonetheless, for the general public, online learning is often interchangeably used to mean both online and DE. Hence, this chapter extracted data from Google Trends to see the worldwide popularity of "online learning" as a search term over the past decade. On Google Trends, the zone option "Worldwide" was selected, and the time range was customized to start on 01/01/2010 and conclude on 12/31/2020, covering 11 years: 10 years ranging from 2010 to 2019, inclusive, and the 11th year (2020) being the "pandemic year." Numbers collected via Google Trends represent

> search interest relative to the highest point for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term. (Google Trends, 2021)

The data collected from Google Trends were sorted and categorized to create yearly averages and are presented in Fig. 1.

Regardless of any substantial increase or growth in the number of created DE programs, offered online courses, and reported online enrollments over the past two decades, interest in online learning and DE has experienced an unprecedented, unimagined threshold during the COVID-19 pandemic, as clearly reflected by Fig. 1. The yearly averages detailed in Fig. 1 covered 132 months, out of which only April 2020, enjoyed a 100% peak search popularity for "online learning" (Google Trends, 2021). This is unsurprising, particularly in the month that followed WHO's declaration of COVID-19 as a pandemic and the transition to DE by the majority of education institutes all over the globe.

This chapter will investigate the experience of one of the Lebanese higher education institutions in transitioning from physical classroom to DE amid COVID-19 pandemic. The chapter will particularly investigate the perceptions and attitude of faculty members at Phoenicia University (PU), Lebanon, toward DE before and following the transition to online teaching and learning.

Before embarking on the case study analysis, it is essential to explore some literature review about DE prior to and during the pandemic.

DE PRE-COVID-19

In the last two decades (period ranging from 2000 to 2019) and as a result of the Web 1.0, Web 2.0, and Web 3.0 technologies, much of the attention was drawn toward promoting e-learning and online learning in higher education, where both terms were in some instances interchangeably used. Crook (2013) argues that e-learning as a term was first used in the late 1990s. The term was broadly employed by some authors to incorporate any form of learning that uses information and communication technology (ICT), while was confined by other authors to refer to online learning via the World Wide Web (Crook, 2013). As ICT tools

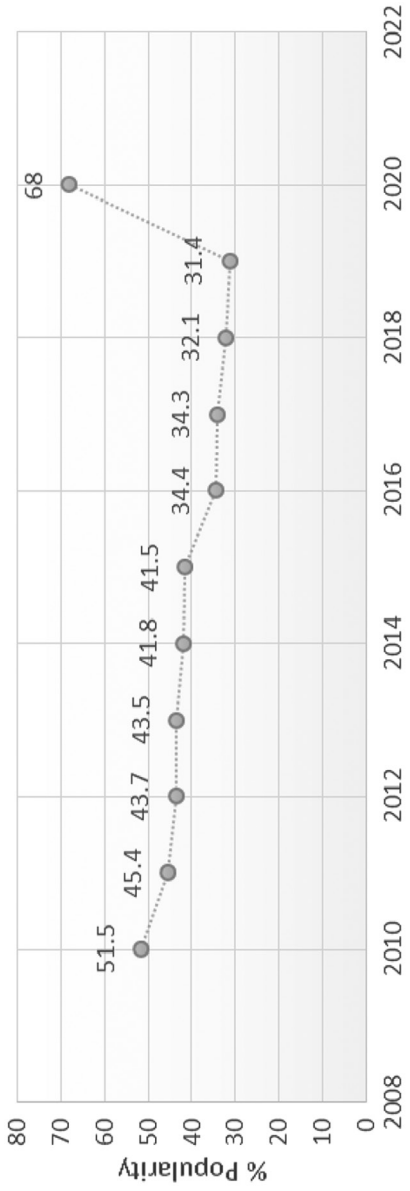

Fig. 1. Interest in "Online Learning" Over Time (Yearly Basis). Original data were collected from Google Trends (2021).

evolved in this period, e-learning started replacing earlier terms such as computer-assisted learning and computer-based training while contributing and witnessing the emergence of terms such as t-learning, learning through interactive digital television, and m-learning, learning through mobile devices (Crook, 2013).

DE benefited from the emergence of e-learning and ICT in education to transform its earlier avenues (e.g., correspondence, videotaped lessons, etc.) to new virtual platforms (Moore, 2013; Simonson & Seepersaud, 2019). A great deal of research in this period focused on the quality of DE. Many scholars and educators argued that DE cannot adopt the same quality assurance practices used in physical classroom education nor can it rely on the assumptions aligned with traditional educational settings (Stella & Gnanam, 2004). Quality in DE is not synonymous with excellence but rather refers to the "management of a continuous process aimed at bridging the gap between the expected effect (what ought to be learned) and the actual effect (what has been learned)" (Trentin, 2000, p. 17).

Defining the term "quality" in DE is a complex task that demands consideration of interwoven elements (Trentin, 2000). Hence, many scholars inquired into the various attributes of quality DE, some of which are: inclusiveness, immediacy, and interactivity. A recent study that focused on online programs offered by 16 Australian universities found that teacher immediacy along with an inclusive and interactive design, content, and delivery strongly contribute to a supportive and engaging online teaching and learning environment, leading to an increased student retention rates (Stone & Springer, 2019). A number of studies attributed students' dissatisfaction and inability to persist in virtual learning groups to the lack of interactivity, feelings of isolation and loneliness, and lack of instructor immediacy (Thurmond, Wambach, Connors, & Frey, 2002; Tu & McIsaac, 2002; Willging & Johnson, 2009). Another recent research highlighted the importance of ensuring inclusive teaching practices to decrease barriers and increase opportunities for diverse student populations within online learning environments (Cash, 2019).

Online teaching is not perceived by many teachers and instructors as smooth as physical classroom teaching but as a more demanding process (Cornelius, 2014). This explains the initial resistance revealed by some teachers and instructors at the start of an online teaching program (Redmond, 2011).

DE DURING COVID-19

The literature about DE during the COVID-19 pandemic is still limited as we are in the midst of the crisis. However, what simply defines DE during the COVID-19 pandemic is the fact that it was neither an option nor a matter of choice, but a forced process, forced by the coronavirus crisis. With governments and industries struggling with the pandemic, there was hardly any choice for the higher education sector but to transition all or most of its programs and courses from physical classroom settings to online delivery within a few days or weeks.

One of the recently published papers about the DE model adopted at one of the Turksih universities during the pandemic found that students' views about

online learning were greatly impacted by resources, such as their ability to access online sessions via a computer or a laptop not only via their smartphones and having access to reliable internet connection aside from their mobile internet connection (Ince, Kabul, & Diler, 2020). Another study inquired into high school students' and teachers' perceptions of DE. The study (Hebebci, Bertiz, & Alan, 2020) found that both students and teachers held positive and negative opinions about DE. Sustaining educational activities in a planned and scheduled manner under extraordinary conditions was among the positives. In contrast, limited interactivity (unlike on-campus education), infrastructure problems, and lack of equipment were among the expressed remarkable negatives (Hebebci et al., 2020). A third study examined the attitudes of the academics in sports sciences toward DE during the pandemic. This study generated insights about the impact of a number of factors such as gender, professional seniority, and prior online teaching experiences on the attitude toward DE (Bingol, 2020). A fourth study focusing on online higher education via Open Universities Australia found that among the identified challenges reported by lecturers in their online delivery were having to cope with technical glitches, lack of immediacy, and difficulties with engagement (Chen, Dobinson, & Kent, 2020).

THE CONTEXT OF THIS CHAPTER

Simonson, Schlosser, and Orellana (2011) argue that the literature about DE has matured with numerous research studies and scholarly contributions. This argument holds true prior to the COVID-19 pandemic, as DE was a matter of choice, where each educational institution had the option to offer its programs or part thereof entirely or partially from a distance or through a blended approach. Many institutions continued to deliver their programs on campus explicitly.

Amid COVID-19, DE is no longer a matter of choice or preference; it is now the "no other educational option" that is compatible with governmental imposed health and protective measures, lockdown periods, and curfews. Such an unprecedented situation of "forced online teaching and learning" has created new challenges, opportunities, and a whole range of issues, inquiries, and discussion topics that urge more research.

This chapter will contribute to the emerging literature about DE during the COVID-19 pandemic by analyzing the case study of PU, Lebanon in transitioning from physical classroom education to DE in March 2020, following the Lebanese Ministry of Education and Higher Education's decision to stop physical and on-campus educational and academic activities. PU had to make all the logistic and academic planning and preparations, including training for faculty and staff and briefing students, to move to an online teaching and learning setting for the Spring 2020 semester in a matter of a couple of weeks. Training for the faculty and program coordinators included a series of workshops on how to prompt inclusiveness, promote instructor immediacy, and enhance interactivity in an

online classroom setting and all the recommended pedagogical and curricular changes to offer a richer and more rewarding online academic journey.

A pre- and post-test questionnaires and semi-structured interviews were carried out to study instructors' pre-informed perceptions about DE prior to the start of the semester and any change in such perceptions toward the end of their online teaching and learning journey in this semester. As emphasized by literature, instructors were asked to evaluate online teaching and learning in terms of inclusiveness, interactivity, and immediacy. Additionally, instructors were asked to evaluate how smooth was DE in terms of planning, preparation, delivery, and assessment in comparison to physical classroom education and how effective was such a virtual educational experience.

METHODOLOGY

A case study is a common methodological approach across various fields, including education, that can use qualitative or quantitative data, or even combinations of them (Mills, Durepos, & Wiebe, 2009). Each approach has its advocates and opponents. The "epistemological view" of qualitative research in case study analysis is an "interpretative" one with an "inductive" line of reasoning, whereas, that of quantitative research is an "essentially empirical-analytic" one based on a "deductive reasoning" (Mills et al., 2009, p. 760). Hence, a mixed quantitative and qualitative approach will generally produce more valid, more reliable, and richer findings than what would solely be generated in either methods (Caracelli & Greene, 1997). Mixed methods research provides a "more complete picture by noting trends and generalisations as well as in-depth knowledge of participants' perspectives" (Creswell & Plano-Clark, 2017, p. 33). The mixed design of methods "provides strengths that offset the weaknesses of both quantitative and qualitative data" (Creswell & Plano-Clark, 2017, p. 9), facilitating the triangulation of results (Mertens, 2009).

Therefore, in our case study, a mixed methods approach was adopted to study the perceptions and attitudes of instructors toward DE prior to and toward the end of Spring 2020 semester, after transitioning nearly all courses to an online delivery setting.

The quantitative component in the methodology entailed a pre- and post-test survey that were sent to PU instructors across all colleges. A total of 54 instructors completed both the pre- and post-test questionnaires. The survey was designed to test some of the attributes of quality in DE emphasized in literature, such as inclusiveness, interactivity, and immediacy. Additionally, instructors were asked to evaluate how smooth was DE in terms of planning, preparation, delivery, and assessment in comparison to physical classroom education and how effective was such a virtual educational experience. The designed questionnaire was validated after consulting with two prominent educators in the field of DE. Following validation, the survey was finalized. A five-point Likert scale was used. Table 1 details the questions asked to the instructors.

Table 1. Pre- and Post-questionnaire (Quantitative Component).

Question 1	On a scale of 1–5, where 1 means much less interactive, 3 means as interactive, and 5 means much more interactive, how does DE compare to physical classroom education in terms of interactivity?
Question 2	On a scale of 1–5, where 1 means much less inclusive, 3 means as inclusive, and 5 means much more inclusive, how does DE compare to physical classroom education in terms of inclusiveness?
Question 3	On a scale of 1–5, where 1 means much less immediate, 3 means as immediate, and 5 means much more immediate, how does DE compare to physical classroom education in terms of instructor immediacy?
Question 4	In terms of planning, preparation, delivery, and assessment, and on a scale of 1–5, where 1 means much less smooth, 3 means as smooth, and 5 means much more smooth, how does DE compare to physical classroom education in terms of smoothness?
Question 5	On a scale of 1–5, where 1 means much less effective, 3 means as effective, and 5 means much more effective, how does DE compare to physical classroom education in terms of effectiveness?

The qualitative component was conducted through semi-structured interviews. Out of the 54 instructors who completed the pre- and post-questionnaires, 12 participated in short semi-structured interviews toward the end of the semester. Designing the semi-structured questions was informed by the results generated from the quantitative component. Table 2 details the semi-structured interview questions articulated to the 12 instructors.

Both the questionnaires and semi-structured interviews were administered and carried out in English.

DATA COLLECTION AND ANALYSIS

Instructor's attitudes, perceptions, and assessment of DE at PU during the pandemic was tested and evaluated via a mixed methods approach.

Quantitative Method

An online questionnaire was sent to all PU instructors across its six colleges prior to and toward the end of Spring 2020 semester. A total of 54 instructors fully completed both surveys. In addition to demographic questions and as detailed in Table 1, five questions were posed to test instructors' attitude and assessment of how interactive, inclusive, immediate, smooth, and effective was DE when compared to physical classroom education. All five questions were based on a

Table 2. Semi-structured Questions (Qualitative Component).

Question 1	In your own words and after delivering your courses online in this semester, how do you perceive DE?
Question 2	In your own words and after delivering your courses online in this semester and thinking about your previous teaching and learning experiences prior to the pandemic, how would you compare DE to physical classroom education?

five-point Likert scale. Using SPSS, a one-way ANOVA test was used to analyze the data at a significance level of 0.05.

Question 1 prompted participants to compare DE to physical classroom education in terms of interactivity. The one-way ANOVA test results are detailed in Table 3.

As the *p*-value (0.67) is >0.05, it is evident that there is no significant difference between the pre- and post-tests, and that the overall average of instructors' attitude toward the attribute of interactivity remained nearly the same, with a slight decline in the average toward DE being less interactive than physical classroom education.

Question 2 focused on testing instructors' perceptions on how DE compares to physical classroom education in terms of inclusiveness. The results are detailed in Table 4.

As the *p*-value (0.280) is >0.05, it is evident that there is no significant difference between the pre- and post-tests, and that the overall average of instructors' attitude toward inclusiveness in DE as compared to physical classroom education remained nearly the same, with a slight decline in the average in the post-test results toward DE being less inclusive than on-campus education.

Question 3 investigated instructors' pre- and post-perceptions of immediacy in DE compared to physical classroom education. The results are detailed in Table 5.

As the *p*-value (0.0426) is <0.05, it is evident that the mean value is significantly different between the pre- and post-tests and that the overall average of instructors' perception of the immediacy attribute in DE has increased from 2.32 to 2.77, and the median has jumped from 2 to 3, inclining toward being more comparable to that in physical classroom education.

Question 4 investigated instructors' pre- and post-perceptions of how smooth is DE in comparison to on-campus learning in terms of planning, preparation, delivery, and assessment. The results are detailed in Table 6.

Table 3. Collected Data – Question 1.

	Mean	Median	*P*-value
Pre-test	2.26	2	0.67
Post-test	2.16	2	

Table 4. Collected Data – Question 2.

	Mean	Median	*P*-value
Pre-test	2.55	2	0.280
Post-test	2.30	2	

Table 5. Collected Data – Question 3.

	Mean	Median	*P*-value
Pre-test	2.32	2	0.0426
Post-test	2.77	3	

Table 6. Collected Data – Question 4.

	Mean	Median	*P*-value
Pre-test	2.10	2	0.444
Post-test	2.23	2	

As the *p*-value (0.444) is >0.05, it is evident that there is no significant difference between the pre- and post-tests and that the overall average of instructors' post-perception of how smooth is DE in terms of planning, preparation, delivery, and assessment did not significantly improve and sustained its declination toward being less favorable.

Question 5 investigated instructors' pre- and post-perceptions of the effectiveness of DE compared to physical classroom education. The results are detailed in Table 7.

As the *p*-value (0.0151) is <0.05, it is evident that the mean value is significantly different between the pre- and post-tests and that the overall average of instructors' perception of the effectiveness of DE has increased from 2.26 to 2.84, and the median has jumped from 2 to 3, inclining toward being more comparable to that in physical classroom education.

Qualitative Method

Twelve instructors out of the fifty-four who completed the pre-and post-survey, participated in the semi-structured interviews. To comply with the research ethics requirements and keep participants' identities anonymous, the identity of the 12 interviewees were respectfully coded as P1, P2, P3, …, P12.

The first open-ended question prompted interviewees to share their perceptions of DE after delivering their courses online in Spring 2020. Except for a few responses, the majority of the responses were generally positive toward DE. These positive responses were coded under two main themes.

The first theme reflected DE as "fun, novel experience. It is what the world is going towards nowadays" (P3). It is a "promising and great opportunity" (P7) and "serves the future of work and mobility as it gives learners the opportunity to study anywhere and at any time" (P11).

The second theme emphasized DE as the practical and efficient model during a crisis. Several participants emphasized DE as "a way to sustain a virtual educational bond when physical interaction is not possible" (P1) and "a great alternative during difficult times" (P9). DE is "very practical and efficient, especially in critical situations" (P5).

Nonetheless, the majority of the positive opinions/perceptions about DE were followed by conjunctive adverbs to "contrast" the preceding positive opinion. In

Table 7. Collected Data – Question 5.

	Mean	Median	*P*-value
Pre-test	2.26	2	0.0151
Post-test	2.84	3	

other words, the majority of the participants who expressed positive views and opinions about DE, employed a connecting adverb (e.g., but, however, instead, etc.) to contrast that the many attributes of DE are being limited and capped by the unreliable power and internet infrastructure in Lebanon. Examples of these contrasting comments are: "… but technically challenging given our infrastructure" (P7), "… instead, many of these great opportunities were capped by the limitations in the internet connectivity in our country" (P9), and "… however a challenging one in the Lebanese context" (P2).

The second open-ended question prompted interviewees to compare their current DE experience to their experiences with on-campus education prior to the pandemic. A number of participants asserted toward the end of the semester that DE experience was better than what they have expected. P11 argued that "I found it much better than what I expected. Aside from the power cuts and internet connection interrupts, all went good!." P5 asserted that "the training we received at the start of the semester was very useful, and I was able to apply some of the verbal and non-verbal immediacy techniques which smoothed the feeling of separation." The experience was "eye-opening" for P6 as the participant was able to "discover that so many online tools are available to facilitate learning online … and [to use] many websites and Apps to support students' understanding and help them apply the knowledge they've gained in different contexts."

On the contrary, a number of instructors were concerned that "the unstable internet connection and power outages made interactivity and inclusiveness more challenging, despite the many opportunities DE brings along" (P12). Likewise, P4 argues that "it was sometimes hard to ensure that all students are interacting with me when few students might drop out of the online meeting due to electricity or internet issues, challenges we never had to face while on-campus." Similarly, P6 who had an overall positive experience with DE admitted that "it was very difficult to encourage participation in class especially since some students did not have constant access to internet and electricity."

More than half of the participants emphasized that DE was not as smooth as physical classroom education as it required much more time and ~~was~~ effort when it came to planning, preparation, delivery of specific content, and assessment practices. For instance, P8 commented "it requires double the effort in terms of planning, teaching, and assessment."

DISCUSSIONS AND FINDINGS

The quantitative data analysis showed no significant differences between the pre- and post-test results when it ~~comes~~ to instructors' attitudes and perceptions toward interactivity and inclusiveness in DE compared to physical classroom education with a slight decline in the overall average in the post-test results, asserting their stance that DE ~~is~~ less interactive and inclusive than on-campus education. Data analysis from the qualitative component provided justifications to such a stance, as the majority of interviewees stated that the unreliable internet connection and power outages made it very challenging to make sure that all students

were engaged and ensure inclusiveness. Additionally, quantitative data analysis revealed no significant change in instructor's attitude toward how smooth DE ~~is~~, maintaining a stance that it ~~is~~ less smooth than physical classroom education. The qualitative component provided further details about this stance as the instructors found DE much more time and effort consuming in terms of planning their lessons/lectures, preparing online teaching and learning material, delivering the content, and administering online assessment tasks.

On the contrary, quantitative data analysis revealed a significant change in instructors' attitude and perceptions toward immediacy in an online setting, and the post-test results showed a positive change in their stance, leaning toward perceiving instructors' virtual presence in a DE setting as immediate as instructors' actual presence in a physical classroom. Semi-structured interviews revealed that such a positive change was attributed to the training that faculty received prior to starting their online teaching and learning journey, where both verbal and non-verbal immediacy techniques and approaches in a virtual setting were explored. The training also incorporated techniques and methods to promote interactivity and prompt inclusiveness; however, the poor internet and electricity infrastructures in Lebanon hindered instructors from making full use of these techniques and methods. Hence, the attributes of interactivity and inclusiveness were not as positively perceived as immediacy in DE.

Additionally, quantitative data analysis revealed a significant change between the pre-test and post-test means when it came to instructors' attitudes and perceptions about the effectiveness of DE in comparison to physical classroom education, leaning toward perceiving DE as effective as on-campus education. Nonetheless, the post-test mean increased to 2.84 and did not reach or exceed 3, where 3 was defined on the five-point Likert scale as "DE is as effective as physical classroom education." This also applied to all the other attributes, where the pre- and post-test means ranged between 2 and 3, never equaling nor exceeding 3. This clearly indicates that overall instructors perceived physical classroom education as more effective, immediate, interactive, inclusive, and smooth than online teaching and learning. However, the significant increase – though still below 3 – in instructors' average attitude toward effectiveness and immediacy in addition to the results generated from semi-structured interviews (e.g., P9's argument that many of the opportunities that DE could have brought were capped by the infrastructure) clearly suggest that participants found DE an efficient teaching and learning approach during the pandemic rather than an effective one. Additionally, in terms of quality and considering inclusiveness, immediacy, and interactivity as some of the major attributes of quality DE, data analyses from both the quantitative and qualitative components strongly suggest that the quality of such an online teaching and learning experience was negatively impacted in terms of interactivity and inclusiveness but positively impacted in terms of immediacy. Such a discrepancy between the quality features of DE map to the discrepancy between efficiency and effectiveness of such an experience. In other words, such an online teaching and learning experience was efficient in connecting and being immediate with the students and in delivering the content given the circumstances, but was not effective as physical classroom education due to the challenges with interactivity

and inclusiveness (e.g., students dropping out of online meetings) and the capped online opportunities because of the poor infrastructure.

Findings from this case study will contribute to the emerging literature about DE amid COVID-19 and will inform future studies, discussions, and approaches post-COVID-19 about how to consider and balance between the effectiveness and efficiency of online teaching and learning and ensure that the attributes of quality DE are maintained.

LIMITATIONS

The results from this case study analysis is limited by the small sample size and the context, the Lebanese context. Generalizing of results from this study are limited to higher education institutes in countries who suffer similar issues in terms of poor internet connection and unreliable electricity and power infrastructure, for these two major issues significantly impacted participants' attitudes and perceptions toward DE.

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AQ3

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