

Transforming Preservice Teachers' Learning in Online Courses: A Framework of Instructional Design

Areej ELSAYARY

Zayed University
Abu Dhabi, United Arab Emirates

ABSTRACT

Due to the COVID-19 lockdown, schools and universities worldwide shifted from face-to-face to online learning. Preservice student teachers were placed in an uncomfortable situation that led them to question the way they act and think. Educational plans were then modified to suit the online learning model. The purpose of this study is to investigate the transformation of preservice teachers' learning in online courses, using an instructional design framework. The participants are preservice teachers in a university in the United Arab Emirates (UAE). A concurrent mixed-method approach using quantitative and qualitative data was used. An online survey was adopted to collect quantitative data, and focus group discussions were conducted to collect the qualitative data. The study results showed a positive impact of transforming students' learning in online courses, using an instructional design framework. The study introduced the barriers and challenges preservice teachers faced and how they overcame these challenges.

Keywords: Online learning, Transformative Learning, students' engagement, instructional design

1. INTRODUCTION

In response to the COVID-19 pandemic, schools and universities in UAE had to shift to emergency remote teaching. Accordingly, many gaps occurred concerning online engagement and students' learning environments. Efforts were made to restructure the instructional design of the courses to be suitable for online learning. Schools and universities across UAE adopted different communication platforms such as Zoom, Adobe Connect, Microsoft Teams, etc. As a result of the lockdown, the learning plans in schools and universities were changed to fit the remote learning. There is currently no literature about learning and working after COVID-19. Many questions were raised in different webinars about online/hybrid learning, future jobs needed, competencies, and students' wellbeing.

Students usually develop their understanding of the world when a potential change to their perspectives and frames of reference occurs. It has been stated that students can transform their learning when they are placed in an uncomfortable situation [1]. The COVID-19 lockdown that began in March 2020 is considered an uncomfortable situation for instructors and preservice student teachers. Transformative learning is based on [2] pragmatic aesthetics and application of learning to learners' everyday life and experience, where students should be involved in real-life tasks that require integrated disciplines and critical reflection [3]. Orr [4] claims that transformative learning requires integrated disciplines and the intellect, emotion, and body, focusing on the cognitive, affective, and psychomotor domains. The Head, Heart, and Hand model represented by Orr [4] sets out an effective pedagogy that brings real life into the curriculum and

learning environment, which requires students to be engaged in critical thinking and rational discourse, and to transform their perspectives to solve ill-structured problems. [3]. This model implies considering three important learning domains (cognitive, affective, and psychomotor) in creating the instructional activities that enhance students' engagements. It will focus on a strong pedagogy that develops students' critical thinking, self-direction, communication, collaboration, creativity and innovation, and problem-solving skills. Borup et al. [5] emphasized the importance of considering the three factors of students' engagements (cognitive, affective and behavior) in the instructional design of the online courses. Furthermore, feedback is an essential factor that fosters students' engagement in online learning, through a culminating instructional design framework [6].

This study was conducted in a university in the UAE. The participants were undergraduate student teachers in semesters 4-7. The online courses were designed to consider three different areas that help transform their learning: critical reflection, rational discourse, and perspective transformation. The critical reflection occurs through the cognitive domain of learning, to include problem-solving or challenge, which are considered to enhance students' cognitive engagement. The rational discourse occurs through communication and collaboration using online breakout rooms to argue and discuss their points of view, enhancing students' socioemotional engagement. The perspective transformation occurs through using web-based tools and a learning management system by students to complete their tasks and solve the problems, which enhances their behavioral engagement. This leads to transformative learning where students are engaged in critical reflection, rational discourse and transformation of their perspectives.

This paper investigates how the instructional design framework used can transform preservice teachers' learning in online courses. With reference to the above literature, the following questions are used to guide this study:

1. How does the instructional design framework transform preservice teachers' learning in online courses?
2. What are the challenges and barriers students face in online learning?

2. INSTRUCTIONAL DESIGN FRAMEWORK

The instructional design framework is based on the three main theories (Social Constructivism, Cognitivism, and Behaviorism) used as the backbone of this model. Social constructivism describes teaching and learning as a complex interactive process between teachers and students [7]. Vygotsky [8] described the learning process as the presence of the Zone of Proximal Development (ZPD), where teachers provide a social environment in which students construct knowledge with their

peers to solve complex problems. This allows students to be engaged in rational discourse where they collaborate, communicate, and argue their points of view. It leads to the enhancement of the socioemotional engagement of online learning.

Cognitivism promotes the important role of the mind in learning, as creative mental processes form the foundation of learning and knowledge acquisition [7]. The cognitivism allows students to be engaged in critical reflection and reach higher order thinking where they understand their strengths and weaknesses and can be independent learners who can set their own goals. It leads to the enhancement of the cognitive engagement of online learning through critical thinking tasks and reflection.

Behaviorism focuses on how people behave while learning as it evolved from a positivist worldview related to cause and effect. Skinner had a momentous influence on the computer-assisted instructional (CAI) model, where a positive learning environment is promoted through encouragement and repetition [7]. This allows students to transform their perspectives through encouragement to solve complex problems using innovative solutions. It leads to the enhancement of students' behavioral engagement in online learning.

Figure 1 shows the framework that guided this study, adapted from Parrish et al. [9]. As shown in figure 1, the framework of this study offers the outlines of the instructional design using the three main theories, to transform students' learning. The first aspect is cognitive engagement, where students develop their critical thinking and independent learning skills through critical reflection tasks. The second aspect is the social emotional engagement that allows students to communicate, collaborate and be self-directed learners through their involvement in rational discourse tasks. The last aspect is the behavioral engagement that allows students to solve complex real-world problems and develop creativity and innovation skills, and which is considered the last stage of transforming their perspectives and how they view the world around them.

3. METHODS

A concurrent mixed method is used with quantitative and qualitative data. The research is designed over a period of one semester in a university in UAE. The participants of the study are preservice teachers in the college of education. The sample was selected randomly ($n_1=45$) from preservice teachers in an early childhood program to do the survey. The sample used for the focus group discussion was also selected randomly ($n_2=15$).

The first tool used in this study is the survey, used to measure the transformation in preservice teachers' perspectives in learning online courses. The survey started with a demographic section followed by closed-ended items in the second section using a 3-point scale with yes, maybe, and no responses. The second section includes twelve items adapted from Strange and Gibson [1]. The third section is a question with multiple responses, to understand the tasks that influenced their online courses, such as discussions, reflection, critical thinking tasks, projects, presentations, observations, planning, evaluating learning environment tasks, and microteaching.

Three focus group discussions with open-ended questions were conducted to understand how preservice teachers changed their perspectives and the barriers and challenges in online learning during the lockdown. The duration of the focus group discussion varied from 40 – 50 minutes. The questions were sent to an educational expert in the field to check the content

and the alignment of the questions to the main purpose of the study. Few terminologies were changed, and the tool was ready to be used. The tool included four open-ended questions: (1) Explain the ways of learning engagement in online courses, and how were the course tasks (projects, microteaching, observation, etc.) accomplished? (2) During your online courses study, what situation(s) did you experience that changed your beliefs? (3) How was communication and collaboration with your peers and instructors? (4) Explain your overall experience in the online learning offered for your course. What support did you receive from your instructor and peers?

The results of the survey were analyzed using descriptive statistics to present percentages, mean, and standard deviation. The focus group discussion results were analyzed and categorized into the three areas of the instructional design framework used to guide this study. The findings of the study were merged, and interpreted with the support of the literature review.

4. RESULTS

Preservice Teachers' Survey

The quantitative data of the preservice teachers' survey are presented and described in tables 1 - 3. Table 1 presents the mean and standard deviation of all the survey items. Table 2 shows the percentages of the responses, ranked according to the highest responses. Item 2 received the most positive responses where 76.7% of participants said "yes" ($M=1.28$, $SD=0.54$). Items 1 ($M=1.42$, $SD=0.58$), 8 ($M=1.51$, $SD=0.69$), 9 ($M=1.44$, $SD=0.62$), 10 ($M=1.42$, $SD=0.62$), 11 ($M=1.37$, $SD=0.61$), and 12 ($M=1.37$, $SD=0.57$) also received high levels of responses and ranged between 60.4% to 76.7%. The fewest positive responses were shown in items 3 ($M=1.58$, $SD=0.54$), 4 ($M=1.79$, $SD=0.67$), 5 ($M=1.67$, $SD=0.56$) and 7 ($M=2.07$, $SD=0.85$) where the percentages of responses who said yes vary between 34.8% and 55.8%.

Students were also asked to indicate which of the online learning tasks influenced their experiences in the online program (table 3). The highest percentages were shown in the online discussions (25.74%), critical thinking and reflection (18.32%), and planning lessons and projects (14.26%).

Focus Group Discussion

Due to the quarantine lockdown, the focus group discussions were conducted virtually using Zoom conference. Preservice teachers' responses are presented below each question.

Q1: Explain the ways of learning engagement in online courses. And how were the course tasks (projects, microteaching, observation, etc.) accomplished?

Preservice teachers mentioned different ways of engagement that happened during the lockdown. They stated that communication was difficult in the beginning, but later on, they managed to cope. Many learning engagement ways were shared by them, such as online discussion (forums and online meetings), weekly reflective journals, collaborative work in breakout rooms, and other authentic assessment tasks. The authentic tasks are projects, early years classroom observations, lesson plans, microteaching, evaluating the learning environment, presentations, and debates.

Q2: During your online courses study, what situation(s) did you experience that changed your beliefs?

Student 1: "There was a workshop in my course talking about bringing students' environment and culture into the classroom in a nutshell. It increases my perspective on coping with my students in the future."

Student 2: "I realized that the way I used to plan lessons in face-to-face classrooms is different from the online learning. I learned to change the way of planning online lessons and make it better, using Bloom's taxonomy."

Students 3: "We observed classes online for early years and face-to-face classes before the pandemic. We noticed changes, and we realized the importance of developing new ways of teaching online, as teachers should change their roles."

Q3: How was communication and collaboration with your peers and instructors?

Students mentioned that collaboration and communication were not happening at the beginning of the lockdown, as most of their classes were asynchronous. However, after the educational plans changed, there were online classes which students should attend and meet with their instructor and peers. They felt satisfied by way of the communication they received from their instructors.

Student 1: "We were receiving from the instructor announcements before every class and weekly summary emails about the important topics covered, the due dates of their assignments, and important events that are expected to happen in the following weeks."

Student 2: "We participated in collaborative work through using the breakout rooms during the class time. We were doing certain tasks using Google Docs and iCloud apps that helped us share the screen and work together on the same app."

Student 3: "We created a WhatsApp group for each course to ease the communication between each other. We invited the instructor and shared all the concerns we have, in addition to the questions and feedback related to the assignments. We felt that we could overcome the challenging time we face."

Q4: Explain your overall experience in the online learning offered for your course. What support did you receive from your instructor and peers?

Students were not in agreement about the experience they had in online learning. Some students were able to overcome the challenges and barriers, while others felt uncomfortable with learning online.

Student 1: "It was excellent and easy as we have all the classes were recorded, and we can get back to them anytime we needed. It was difficult in the beginning, but we felt the value of it after we finished the course."

Student 2: "In some courses, the instructors were keen to provide feedback fast and respond to the emails promptly; however, in other courses, we felt difficulty in communicating with instructors and in getting feedback."

Student 3: "I faced many challenges with the online course which had new things for me but, in a few weeks, I realized that I could face it."

Student 4: "Really, there was some pressure, but I liked the online learning, and I hope there will be more opportunities to learn online."

Student 5: "We received emotional support as well as academic support. Our instructors understood the hard situation we faced during the pandemic, as most of us have children who are also learning online. The asynchronous tasks were beneficial in finishing what we need to finish in our peak time of learning

instead of attending class in a time that conflicts with my kids' timing."

5. FIGURES AND TABLES

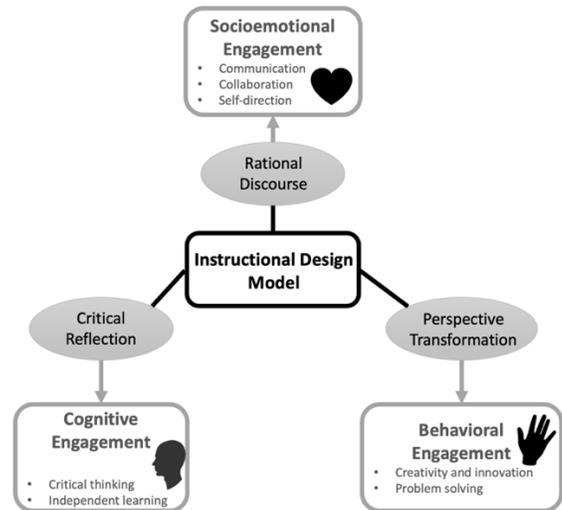


Figure 1. The instructional design framework was developed for online courses.

Table 1. Preservice teachers' survey analysis, to include percentages, mean, and standard deviation.

Please indicate your agreement in the following statements:	Mean	Std Deviation
1. I had an experience that caused me to question the way I normally think or act.	1.42	0.58
2. I had an experience that caused me to question my ideas about planning lessons, observing students, or micro teach.	1.28	0.54
3. As I questioned my ideas, I realized I still agreed with my beliefs or role expectations	1.58	0.54
4. As I questioned my ideas, I realized I no longer agreed with my beliefs or role expectations	1.79	0.67
5. I realized that other students were also questioning their beliefs	1.67	0.56
6. I thought about acting in a different way from my usual beliefs and roles	1.51	0.62
7. I felt uncomfortable with the expectations of the assignments	2.07	0.85
8. I tried out new roles so that I would become more comfortable in them	1.51	0.69
9. I tried to figure out a way to adopt new roles, or new ways of acting	1.44	0.62
10. I gathered information I needed to adopt new ways of acting	1.42	0.62
11. I began to think about reactions to my new behavior	1.37	0.61
12. I adopted these new ways of thinking and acting	1.37	0.57

Table 2. The percentages of preservice teachers' responses toward the changes they felt in their learning.

Ranked steps	Please indicate your agreement in the following statements:	May		
		Yes	be	No
5	1. I had an experience that caused me to question the way I normally think or act	62.7 9%	32.5 6%	4.65 %
1	2. I had an experience that caused me to question my ideas about planning lessons, observing students, or micro teach	76.7 4%	18.6 0%	4.65 %
8	3. As I questioned my ideas, I realized I still agreed with my beliefs or role expectations	44.1 9%	53.4 9%	2.33 %
10	4. As I questioned my ideas I realized I no longer agreed with my beliefs or role expectations	34.8 8%	51.1 6%	13.9 5%
9	5. I realized that other students were also questioning their beliefs	37.2 1%	58.1 4%	4.65 %
7	6. I thought about acting in a different way from my usual beliefs and roles	55.8 1%	37.2 1%	6.98 %
11	7. I felt uncomfortable with the expectations of the assignments	32.5 6%	27.9 1%	39.5 3%
6	8. I tried out new roles so that I would become more comfortable in them	60.4 7%	27.9 1%	11.6 3%
5	9. I tried to figure out a way to adopt new roles, or new ways of acting	62.7 9%	30.2 3%	6.98 %
4	10. I gathered information I needed to adopt new ways of acting	65.1 2%	27.9 1%	6.98 %
2	11. I began to think about reactions to my new behavior	69.7 7%	23.2 6%	6.98 %
3	12. I adopted these new ways of thinking and acting	67.4 4%	27.9 1%	4.65 %

Table 3. The percentages of the tasks that influenced preservice teachers in online learning.

Which of the following have influenced your experience?	
Online discussions	25.74%
Critical thinking & Reflection	18.32%
Group projects	10.40%
Group presentations	6.44%
Observations	11.39%
Planning lessons and projects	14.36%
Evaluating learning environment	7.92%
Teaching / Micro-teaching	5.45%
Total	100%

6. DISCUSSION

The findings of the study are presented to address the research questions of the study.

Transformation of students' learning in online courses

Transformation in students' frames of reference occurred when they are placed in an uncomfortable situation [1], where they are engaged in critical reflection, active learning, and rational discourse [3]. The quantitative data show that almost all students reached some level of transformative learning.

Two items show low results, where few students stated that they no longer agreed with their beliefs or role expectations, and they felt uncomfortable with the expectations of the tasks and assignments. Most of the students mentioned that the class discussions (synchronous and asynchronous), reflection statements, projects, and observing early years classes, are the tasks that engaged them in critical reflection and rational discourse where they question their beliefs and change the way they see the teaching and learning process. In response to the open-ended questions, preservice teachers stated that they became more confident in their decisions during the projects and observations. Some students stated that they think about the concepts in more depth and consider all the details of the work needed to accomplish their tasks. These results reflect the cognitive engagement where cognitivism promotes the important role of the mind in learning that forms the foundation of learning and knowledge acquisition [7].

Preservice teachers emphasized the importance of the feedback they received from their peers and instructors through online discussion forums, constructive written feedback, or verbal feedback provided when they present their work. In alignment with the quantitative data, almost all the student teachers mentioned that they had an experience that caused them to question their ideas about completing their tasks. They all agreed that they gathered information to adopt new ways of acting, thought about the change of their reactions to their behaviors, and adopted new ways of thinking and acting. These results promote socioemotional engagement, as where social constructivism describes teaching and learning as complex interactive processes between teachers and students [7]. Furthermore, Vygotsky [8] emphasized the essential role of providing a social environment for students to construct knowledge with their peers to solve complex problems.

Most of the preservice teachers agree that they tried out new roles in order to become more comfortable in them. Also, they tried to figure out a way to adopt new roles or new ways of acting. During the focus group discussion, they emphasized that sometimes they were confused about trying new ways and acting roles. They felt more comfortable when they shared their opinions with their peers and instructors. They were more convinced when observing their instructor and peers while using different applications to do different tasks in innovative ways. These results emphasize the behavioral engagement where students could to try out new roles to complete their tasks and solve problems. This is aligned with Skinner, who had a momentous influence on the computer-assisted instructional model where the positive learning environment is promoted through encouragement and repetition [7].

Challenges and barriers students face

Preservice teachers and instructors faced many barriers and challenges at the beginning of the pandemic lockdown. Later on, many of these problems were solved, and they found ways to cope with these challenges.

One of the challenges they faced was the change in learning from face-to-face to online learning. They were not feeling comfortable in learning and attending online classes, either synchronously or asynchronously. They felt isolated from the external world and found difficulty in communicating with their instructors or peers. They added that they felt reassured when they were updated with their tasks, due dates, and classwork when they were reminded by receiving announcements and weekly summaries of the work sent to them before each class and by the end of the week. These challenges explain the uncomfortable situation that students were placed in. It led them to question their beliefs about how they normally act, which is considered an important stage toward transformative learning [1].

Some preservice teachers expressed the feeling that they were overwhelmed at the beginning of the lockdown due to the number of tasks required and how they would collaborate to accomplish their tasks. However, the online educational plans were changed after two weeks, and students were then able to become more organized. They added that the nature of the tasks was changed to move from recalling information to solving problems, answering open-ended questions, reflecting in their online journals, presenting their work, and doing their projects. It is important to consider the three factors of students' engagement (cognitive, affective, and behavioral) in the instructional design of the courses [5].

Communication is set as a challenge that preservice teachers faced in online learning, especially at the beginning of the lockdown. They mentioned that some students were not responding or participating in online classes. In addition, they felt that they could not meet their instructors easily to ask questions, share concerns, or get feedback on their work. After two weeks of the lockdown, communications were improved to have fixed hours per week where the instructors were available to all students through links uploaded on their learning management system. In addition, the announcements, weekly emails, and WhatsApp groups made the communication easier where they were able to share concerns and ask questions either with their peers or instructors. These results align with Czerkowski & Lyman [6], who emphasized the important role of feedback to foster students' engagement in online learning.

Class participation was another challenge when preservice teachers felt uncomfortable using their cameras and microphones to present their work. Some of them preferred to record videos and shared them with their instructors to receive feedback. Some students were encouraged to participate, present their work, argue their points of view respectfully, and engage their colleagues in discussions. This made the shy students encouraged and motivated to change their ways of learning and started to think of new ways to present their work innovatively using new approaches. The positive learning environment is influenced by the computer-assisted instructional model that emphasizes encouragement and repetition [7].

Time management is another challenge where most students felt that they did not have time to finish all the required tasks from all the courses. They mentioned that they have weekly tasks to submit, which caused pressure to finish them, especially during the first two weeks of the lockdown. However, they expressed their positive agreement about learning online and how they changed their perspectives on their previous working methods after the changes were made to the educational plans. They said that they were going into detail and were able to think critically about the work done with the support they received from their instructors. This is one of the important factors of the affective engagement (socioemotional) mentioned by Borup et

al. [5], who emphasized that instructors should support students by showing them that they know them and care about them.

7. CONCLUSIONS

This study aimed to transform preservice teachers' learning in online courses, using a framework of instructional design. The instructional design model used in this study was efficient in transforming students' learning through engaging them in critical reflection, rational discourse, and uncomfortable situations that led to change their perspectives about how they view the world and themselves. The results align with Singleton [3], who emphasized the importance of transforming students' learning by engaging in critical reflection, rational discourse, and uncomfortable situations that change their frames of reference. In addition, the study promoted their cognitive, socioemotional, and behavioral engagements in online learning. Borup et al. [5] support these results; they emphasized the important role of cognitive, socioemotional, and behavioral engagements necessary for academic success. For cognitive engagement, instructors need to think of ways to help students maintain attention, focus on learning, and provide support in the place and time they need it. Regarding socioemotional engagement, instructors need to reach out to students and let them know that they care, are available to support when needed, and are passionate about the subject they teach. Finally, behavioral engagement occurs when instructors can remind students of the due dates of the submissions and follow-up with them about their assignments, especially those students who are beginning to fall behind.

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