ANALYZING THE INFLUENCE OF CONTINUOUS PROFESSIONAL DEVELOPMENT ON TEACHERS' SELF-EFFICACY AND READINESS FOR ONLINE PEDAGOGY AT GULF UNIVERSITY, BAHRAIN

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Abstract

This research aims to understand the effectiveness of Continuous Professional Development on university teachers' readiness and self-efficacy for online pedagogy at Gulf University Bahrain. Using action research as research design, this study was conducted in four phases. In the first phase, a sample of 46 teachers of different genders, ages, and experiences was focused on collecting data on their online pedagogical skills, readiness, and self-efficacy for online pedagogy, using the Need Analysis Survey, Teachers' Readiness for Online Pedagogy Questionnaire, and Teachers' Self-efficacy for Online Pedagogy Questionnaire, respectively. Data from Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire also served as the Pre-test. In the second phase, a four-week Continuous Professional Development model was developed and implemented among these teachers. In the third phase, a posttest was conducted using Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire, followed by semi-structured and focus group interviews. In the last phase, quantitative and qualitative data were analyzed. The quantitative findings suggest that teachers' self-efficacy presented moderate scores, with an aggregate average of 4.3. Post-intervention, a modest increase was observed, culminating in an overall average of 5.2. Similarly, the readiness for online pedagogy showed an initial aggregate mean of 2.6, which post-intervention rose to 3.5. While the improvement is evident, the scores hover around the mid-range, suggesting that a significant portion of the cohort may still be inadequately prepared for online teaching. Qualitative data analysis provides a deep dive into the experiences of Gulf University teachers, revealing a multifaceted narrative that intertwines age, cultural context, and technological adaptation. The age-based digital divide is evident, with younger teachers demonstrating higher levels of self-efficacy for using online pedagogy, thus finding the transition to online teaching more intuitive. In stark contrast, older teachers, especially those above 50, grapple not just with the tools but with a fundamental shift in teaching approach. This thesis presents an in-depth analysis of the substantial changes in the educational landscape triggered by the pandemic, focusing on Gulf University in Bahrain. It highlights the vital role of Continuous Professional Development in enhancing teachers' readiness and self-efficacy for online pedagogy, offering valuable insights and recommendations for educators, policymakers, and future researchers in the education sector. The study significantly contributes to comprehending the dynamics of online pedagogy and the crucial role of continuous professional development in enabling this transition.

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1. Overview

The global onset of the COVID-19 pandemic in 2020 was more than a health calamity; it acted as a transformative force, reshaping numerous sectors. Among these, education emerged as a domain undergoing profound transformation. The pandemic's rapid proliferation necessitated an immediate end of traditional, face-to-face educational interactions, thrusting institutions into a realm of digital pedagogy (Gough, 2021; Greenwood, 2013; Reyes et al., 2018). This wasn't a mere logistical shift; it was a foundational upheaval, challenging long-standing teaching paradigms.

The migration from physical classrooms to digital interfaces wasn't a deliberate evolution but a reactive measure to an unparalleled crisis. While digital education had been gradually making inroads, it predominantly served as an adjunct or alternative to mainstream education, catering to niche segments seeking flexibility (Caro, 2012; Chau, 2010). However, the pandemic's exigencies elevated digital learning from an auxiliary role to the primary mode of instruction for a vast global student populace.

This transition underscored several facets of digital education. It highlighted the adaptability of educational frameworks, with institutions, previously reticent towards digital adoption, now striving for continuity (García & Weiss, 2020). Yet, this commendable adaptability also unveiled stark disparities in digital access, raising alarms about the equitable distribution of online educational resources.

Moreover, the transition spotlighted the pedagogical chasm between conventional and online teaching. Traditional methodologies, optimized for direct interactions, often faltered in the digital milieu, necessitating a pedagogical recalibration tailored for virtual delivery (Hodges et al., 2020). This shift also highlighted the importance of proactive preparedness in education. Institutions equipped with digital frameworks prior to the pandemic demonstrated a smoother transition, underscoring the value of foresight in educational planning (Omar et al., 2010; Sabbah et al., 2021; Sankei et al., 2015).

Amidst this backdrop, the growing demand for online resources catalyzed the edtech sector's response, leading to the accelerated evolution of educational mobile applications. Platforms like

Duolingo, Quizlet, and Khan Academy, previously on the educational periphery, became central tools for teachers and learners navigating this altered landscape (Hung & Zhang, 2012; Krull & Duart, 2017; Ting, 2005). Their dominance wasn't merely a byproduct of the pandemic's constraints. Their modular, flexible design democratized learning, breaking down traditional barriers and offering learners autonomy (Allela, 2021; Shatte & Teague, 2020; Taylor & Hung, 2022). However, while their utility is evident, a critical evaluation of their depth and comprehensive educational impact remains imperative (Oo et al., 2022; Rajasingham, 2011).

Yet, while the convenience of these apps is undeniable, it's essential to critically evaluate their pedagogical impact. Research has indeed shown that such applications can enhance engagement, retention, and academic outcomes (Chee et al., 2017; Lai, 2020). However, one must consider the depth and breadth of learning these platforms offer. While they excel in delivering bite-sized, modular content, questions arise about their efficacy in facilitating comprehensive, in-depth learning experiences that traditional curricula aim to provide (Pachler et al., 2009).

Furthermore, linking back to the earlier argument about the disparities in access to digital resources, it's crucial to recognize that not all students have equal access to these mobile applications. Whether due to economic constraints or lack of digital infrastructure, a significant portion of the student population might be left out, potentially widening the educational divide (García & Weiss, 2020).

The transition to online education, catalyzed by the pandemic and facilitated by the rise of mobile educational apps, has brought to the forefront the pivotal role of teachers in this new landscape. While tools and platforms provide the necessary infrastructure, the efficacy of online instruction hinges largely on the readiness of teachers to navigate and utilize these digital resources effectively. This readiness is multifaceted, encompassing not only technological proficiency but also pedagogical adaptability and psychological preparedness for the digital realm.

(Al-Fraihat et al., 2020; Howard et al., 2021; Paliwal & Singh, 2021; Scherer et al., 2021) underscored the direct correlation between teachers' readiness and the quality of online instruction. This finding resonates with the earlier discussion on mobile apps, where the tools' effectiveness is contingent upon their appropriate utilization. Just as the mere presence of apps like Duolingo or Khan Academy doesn't guarantee learning outcomes, the availability of online platforms doesn't

ensure quality education. The teacher's role as a mediator between the tool and the learner becomes paramount. If teachers are unprepared or resistant to the shift, even the most sophisticated platforms can fall short in delivering meaningful educational experiences, potentially affecting student satisfaction and overall learning outcomes. This argument further emphasizes the necessity of conducting research on teachers' online pedagogical skills.

(Hung et al., 2010) further delve into the nuances of this readiness, emphasizing the technological aspect. Their findings suggest that teachers who are technologically adept are better positioned to foster engagement in online settings. This technological readiness goes beyond basic digital literacy. In the context of the previous arguments, it means not just knowing how to use apps like Quizlet but understanding how to integrate them pedagogically, ensuring that their features are harnessed to enhance learning rather than merely delivering content. These findings underscore the critical importance of further research in exploring and enhancing teachers' technological readiness and pedagogical integration for effective online teaching.

However, while technological readiness is undeniably crucial, it's only one facet of the broader preparedness spectrum. The shift to online teaching also demands a pedagogical adaptation, where teachers re-envision their teaching strategies for the digital space (Martin et al., 2019). Moreover, psychological readiness, encompassing factors like self-efficacy and attitude towards online teaching, plays a significant role. A teacher might be technologically proficient but may lack the confidence or belief in online education's efficacy, potentially hindering their teaching effectiveness (Wang et al., 2004).

Considering these considerations, it becomes evident that a holistic approach to readiness is essential. As the educational landscape continues to evolve, with mobile apps and online platforms becoming integral components, ensuring that teachers are comprehensively prepared to navigate this terrain is of paramount importance. Their readiness, in all facets, significantly influences the trajectory of online education, determining its success or failure in delivering quality, equitable, and meaningful learning experiences. Consequently, there is a pressing need for further research to delve deeper into the multifaceted nature of teacher readiness in the digital era, to inform comprehensive strategies that effectively support educators in delivering high-quality online learning experiences.

The evolution of the educational landscape, marked by the rise of online platforms and the critical importance of teacher readiness, brings to light another equally significant factor: self-efficacy. (Bandura, 1997) conception of self-efficacy, rooted in the belief in one's capabilities, becomes particularly salient when applied to the domain of online education. Just as a ship requires a skilled captain to navigate turbulent waters, online educational platforms necessitate teachers who believe in their ability to harness these tools effectively (Wang et al., 2013). This belief, or self-efficacy, is not merely about technical proficiency but encompasses the confidence to adapt pedagogically and engage students in a virtual environment (Tschannen-Moran & Hoy, 2001).

It's evident that while readiness provides the necessary foundation, self-efficacy acts as the driving force. A teacher might be equipped with the latest tools and platforms, but without the self-belief to employ them effectively, the potential of these resources remains untapped. (Wang et al., 2013) reinforce this notion, highlighting that teachers with higher self-efficacy levels are not only more adept at integrating online teaching strategies but also more resilient in the face of challenges, a trait indispensable in the ever-evolving realm of online education.

However, fostering self-efficacy is not a passive process. It requires targeted interventions, underscoring the significance of Continuous Professional Development. Continuous Professional Development plays a crucial role in enhancing readiness (Abakah, 2019; Farrugia, 2021). Its impact on self-efficacy is equally profound (Abakah, 2023). Tailored Continuous Professional Development programs, which address both the technical and pedagogical aspects of online teaching, empower teachers, bolstering their confidence and belief in their capabilities (Duță, 2012; Iranzo-García et al., 2020; Zaragoza et al., 2021). These programs serve a dual purpose: they equip teachers with the skills to navigate the digital landscape and instill in them the belief that they can do so effectively (Tschannen-Moran & Hoy, 2001).

At the same time, it is also important to understand that the generational gap plays a vital role in operating modern technologies ((Al-Ammary, 2021; Al Musawi et al., 2016; Dutta, 2016). This study delves into the examination of the generational disparity in online pedagogy, shedding light on a crucial and intricate facet of contemporary educational research. The disparity manifests as differing levels of comfort, skill, and competency in utilizing digital resources among educators across different age demographics, presenting unique hurdles and opportunities in the realm of online teaching. A comprehensive exploration of this divide, particularly in the context of

Continuous Professional Development initiatives, offers invaluable insights into effectively supporting teachers from diverse age groups as they transition to online instructional methodologies ((Al-Senaidi et al., 2009).

In synthesizing these arguments, a clear picture emerges. The success of online education is a complex interplay of tools, readiness, and self-efficacy. While tools provide the infrastructure and readiness lays the groundwork, self-efficacy fuels the journey, driving teachers to innovate, adapt, and excel. As the boundaries of education continue to expand, with digital platforms becoming integral, nurturing this triad – tools, readiness, and self-efficacy – through interventions like Continuous Professional Development becomes not just desirable but essential for the holistic development of the educational ecosystem. Given the specific context of Bahrain, further research in this area is crucial for understanding and addressing the unique challenges and opportunities within the local educational landscape, as will be explored in detail in the following chapters.

1.1. Online Education in Bahrain's educational institutions

The trajectory of online education, marked by the critical interplay of tools, readiness, and self-efficacy, finds a unique narrative in the context of Bahrain's higher education system. Historically anchored in traditional pedagogical methods, Bahrain's educational institutions exhibited a conspicuous absence of technology integration. This historical backdrop, when juxtaposed with the sudden, pandemic-induced pivot to online education, paints a picture of a sector caught off-guard, grappling with the complexities of a new educational paradigm.

Bahrain's experience underscores a broader global narrative: the challenges of transitioning to online education are amplified in regions where the digital groundwork is nascent. While the global shift to online platforms was a response to an unprecedented crisis, in Bahrain, it was compounded by the need to bridge a historical technological gap. The abruptness of this transition, devoid of a gradual acclimatization phase, meant that teachers were thrust into unfamiliar territory, often without the requisite skills or confidence (Al-Ammary, 2021; Mirza & Lawrence, n.d.).

Drawing from the earlier discussions on the significance of readiness and self-efficacy, it becomes evident that these factors were particularly salient in Bahrain's context. The lack of technological readiness was not just about the absence of tools but also about the absence of a mindset attuned to digital pedagogy. This, coupled with low self-efficacy stemming from limited exposure to online

teaching methodologies, created a dual challenge. Teachers were not only navigating the technical intricacies of online platforms but were also battling internal apprehensions about their ability to deliver quality education in this new format.

Furthermore, the students, accustomed to traditional face-to-face interactions, faced their own set of challenges. Their learning experience was now mediated by screens, demanding a different set of skills and adaptability. The teachers' lack of readiness and self-efficacy inadvertently trickled down to the students, potentially affecting their engagement, satisfaction, and overall learning outcomes.

In synthesizing Bahrain's experience with the broader themes of online education, a compelling case emerges for the proactive development of both technological infrastructure and human capabilities. As the world moves towards an increasingly digital educational landscape, regions like Bahrain underscore the importance of holistic preparedness. It's a testament to the fact that while tools and platforms are essential, the human elements of readiness and self-efficacy remain at the heart of effective online education. Thus, there is a clear need for further research in this area to deepen our understanding of the intersection between technological infrastructure and human capabilities, particularly within the unique context of Bahrain, to inform targeted strategies for enhancing online education initiatives.

The evolution of the educational landscape, as exemplified by Bahrain's transition to online teaching, underscores the pressing need for a comprehensive approach to teacher development. While the integration of technology in education is paramount, the human element – the teachers – remains central to the effective delivery of online instruction. The challenges faced by regions like Bahrain, characterized by a sudden shift to online platforms without the cushion of gradual acclimatization, highlight the gaps in both technological infrastructure and teacher preparedness. Therefore, further research in this area is imperative to identify and address the specific challenges faced by educators in transitioning to online teaching, ultimately informing targeted interventions that bridge the gaps in both technological infrastructure and teacher preparedness.

1.2. Research Questions

In this context, the proposed research emerges as a timely and crucial endeavor. It endeavors to untangle the complex nexus of readiness and self-efficacy, elements recognized as cornerstone

factors for effective online pedagogy and use of Continuous Professional Development as intervention to improve teachers' readiness and self-efficacy for online pedagogy. Thus, the overarching question that guides this study is:

How does Continuous Professional Development influence teachers' readiness and self-efficacy for online pedagogy?

To answer this question, a series of sub-questions were developed to provide a comprehensive answer. The first sub-question that guides this study is:

Q1. What are the challenges and opportunities that teachers perceive in online pedagogy?

Q2. Is there any difference in the self-efficacy and readiness of teachers of different age group post Continuous Professional Development?

Q3. Does teachers' self-efficacy predict their readiness for online teaching?

Considering that the nature of the first three questions requires an objective approach essentially pushes researchers to apt quantitative research methodology. However, this study also aims to delve into teachers' experiential narratives of use of technology, their perceptions of the Continuous Professional Development intervention, and their interaction with teachers of different age groups during Continuous Professional Development to add a layer of introspection. While the formulation and execution of the Continuous Professional Development initiative are undebatable in their significance, discerning its ramifications through the lens of its chief recipients – the teachers – is enlightening. Such firsthand accounts can illuminate the intervention's merits and potential enhancement areas. Additionally, these narratives can furnish a granular understanding of the challenges and opportunities inherent in the shift to online pedagogy, offering a rich, grassroots perspective that enriches the overarching dialogue. Thus, raising questions like:

Q4. How do teachers experience Continuous Professional Development as an intervention for their self-efficacy and readiness of online pedagogy?

Viewing the study in its entirety, it can be perceived as a logical extension in the ongoing dialogue surrounding digital education. While the hurdles associated with tech assimilation, readiness, and self-efficacy have been mapped and deliberated upon, this study endeavors to transition from mere

recognition to tangible solutions. By advocating a strategy anchored in Continuous Professional Development, the research aims to present a pragmatic remedy to the countless challenges teachers confront in this digital era. In its essence, the study not only enhances the scholarly conversation on digital pedagogy but also charts a pragmatic course for educational entities navigating the complicated maze of digital transformation.

1.3. Significance of Study

The educational landscape is continuously transforming, driven by the relentless progression of technology and the evolving theories of teaching and learning. This study is situated at the intersection of these transformative forces. This section highlights the study's significance, emphasizing its contributions to educational research, especially regarding online teaching and teacher development.

Bridging Theoretical Frameworks and Practical Realities

In educational research, bridging the divide between theoretical models and actual teaching practices, particularly with the growing role of technology, is often challenging. This study delves into this issue, offering a detailed examination of how educational theories can be practically implemented, especially in online settings.

The foundations of educational theory have been extensively explored, from behaviorism, which views learning as a change in visible behavior, to constructivism, which focuses on the learner's role in building knowledge. However, applying these theories in real classroom scenarios, especially online, can be complex (Al-Shammari et al., 2019; Ertmer & Ottenbreit-Leftwich, 2010). This study tackles this issue by investigating how Continuous Professional Development programs can enhance teachers' abilities to use these theories effectively in online classrooms.

A crucial element in merging theory with practice is understanding the learning context. The shift to online learning, hastened by the COVID-19 pandemic, underscores the necessity for teachers to modify their teaching methods for the digital domain. Such adaptation demands both technological skill and an understanding of applying learning theories in digital spaces. The evaluated Continuous Professional Development program in the study aims to provide teachers with both the technical and pedagogical skills needed for efficient online teaching (Hodges et al., 2020).

The impact of Continuous Professional Development in improving teachers' readiness for online teaching highlights the importance of ongoing learning and adaptation in education. The study reveals that teachers participating in the Continuous Professional Development program significantly improved in self-efficacy and preparedness for online instruction. This improvement is critical since teacher self-efficacy is known to directly affect student outcomes (Tschannen-Moran & Hoy, 2001). Continuous Professional Development programs that empower teachers to apply educational theories in online contexts can therefore significantly influence education quality.

Furthermore, the study's use of both quantitative and qualitative research methods offers a thorough understanding of Continuous Professional Development's impact. Quantitative data provides objective proof of the program's effectiveness, and the qualitative data offers deeper insight into teachers' experiences and perspectives. This methodological thoroughness ensures the study's conclusions are not only statistically sound but also rich in context and relevant to real-world teaching scenarios.

Another key aspect of the study is its focus on teachers' generational differences. The digital gap between different generations of teachers can challenge the adoption of online teaching methods. By examining how various age groups of teachers respond to Continuous Professional Development and adapt to online education, the study highlights the necessity for diverse professional development approaches. Customizing Continuous Professional Development programs to suit the unique needs and preferences of different teacher generations can more effectively bridge the gap between theoretical understanding and practical application.

Methodological Robustness

In the field of educational research, particularly regarding online teaching and teacher development, the chosen research methods greatly impact a study's trustworthiness, relevance, and overall influence. This study is an excellent example of methodological solidity, vital for producing dependable and practical findings in the realm of educational research.

The adoption of a mixed-methods framework is essential for the methodological robustness of the research. Merging quantitative and qualitative methods, as suggested by (Creswell & Creswell, 2017), provides a more comprehensive insight into the research question than using either method

in isolation. The quantitative portion of this study, which utilized structured surveys and controlled experiments, yielded concrete, objective data on the Continuous Professional Development program's effectiveness. This kind of data is essential for forming a foundational understanding of Continuous Professional Development's impact on teacher self-efficacy and readiness for online teaching. The ability to quantify these aspects lends a level of accuracy and impartiality that bolsters the study's trustworthiness.

On the other hand, the qualitative aspect, featuring detailed interviews and focus group, provided in-depth, nuanced insights into the teachers' experiences within the Continuous Professional Development program. Qualitative research is crucial for grasping the intricate and subtle aspects of human behavior and experiences that are often overlooked in quantitative studies (Merriam & Tisdell, 2015). In this case, the qualitative findings added depth and context to the quantitative results, shedding light on the subjective experiences of teachers adapting to online teaching. This blend of quantitative and qualitative data ensures a comprehensive understanding of the Continuous Professional Development program's effects, confirming the results and boosting the study's overall validity.

The study's design, based on action research, also contributes significantly to its methodological soundness. Action research is a collaborative, democratic method focused on creating practical knowledge for achieving meaningful goals (Reason & Bradbury, 2001). It involves active partnership between researchers and participants to solve real-world problems and enhance practices. In this study, the action research approach enabled ongoing development and refinement of the Continuous Professional Development program, making sure it met participant needs and feedback. This adaptability is essential in educational contexts, where the success of interventions often relies on their relevance and flexibility in specific situations.

Moreover, the study's commitment to validity and reliability is clear. In educational research, validity concerns the accuracy of the findings, or how well a study measures what it intends to measure. Reliability, meanwhile, pertains to the consistency of the findings (Brewer, 2009; Mills, 2000). The use of validated questionnaires in this study ensured that the collected data was both precise and consistent, thus improving the findings' reliability and validity. Additionally, a pilot study conducted before the main research phase was crucial for assessing the practicality and

effectiveness of the research tools and the Continuous Professional Development intervention, helping to identify and resolve potential issues early (Van Teijlingen & Hundley, 2001).

Ethical considerations were also a priority in this study's methodology. Ethical research practices involve upholding the dignity, rights, safety, and well-being of all participants (Phelan & Kinsella, 2013; Vanclay et al., 2013). In this study, ethical standards were maintained through informed consent, confidentiality, and respectful treatment of participants. The researcher's position, especially their relationship with the participants and the context of the research, was also thoughtfully regarded. Such attention to ethics not only ensures the integrity of the research process but also increases the trustworthiness of the findings.

In conclusion, the methodological solidity of this study highlights the importance of a well-planned research approach in educational research. Its mixed-methods framework, rooted in action research, provided an in-depth and nuanced understanding of Continuous Professional Development's impact on teacher preparedness and self-efficacy for online teaching. The focus on validity, reliability, and ethics further strengthens the study's trustworthiness and relevance, making its contributions to educational research valuable and dependable, benefiting educators, policymakers, and researchers.

Empirical Insights into Continuous Professional Development's Impact

The empirical analysis derived from this study presents a comprehensive collection of data and insights, making a significant contribution to educational research. This portion of the study, focusing on the results of Continuous Professional Development initiatives, offers an essential perspective for assessing and understanding the effectiveness of such programs in online teaching contexts.

Central to this examination is the concept of teacher self-efficacy, widely recognized as a critical factor influencing teaching methods and student outcomes (Tschannen-Moran & Hoy, 2001). Self-efficacy, as defined by (Bandura, 1997), is an individual's belief in their capability to execute actions needed for specific performance goals. In education, especially in the demanding context of online teaching, a teacher's self-efficacy can greatly affect their teaching approach, openness to new technologies, and their ability to engage students. The study's findings, showing a marked

increase in teachers' self-efficacy after the Continuous Professional Development program, highlight the crucial role of focused professional development in empowering educators.

The boost in self-efficacy seen in teachers due to the Continuous Professional Development program not only demonstrates the program's effectiveness but also illustrates the dynamic nature of self-efficacy in teaching. As teachers adapt to the complexities of online education, which demand different skills and teaching strategies than traditional classroom settings, their confidence can be significantly tested. The Continuous Professional Development program, by equipping teachers with relevant skills, knowledge, and support, helps bridge this confidence gap. This aligns with (Guskey, 2002) findings that effective professional development can enhance teachers' self-efficacy, leading to improved teaching practices.

The study also focuses on teachers' readiness for online teaching. Readiness includes the technical abilities to use online platforms and the pedagogical flexibility to engage students in a virtual setting. The urgent need for teacher readiness for online education, accelerated by events like the COVID-19 pandemic, is a key area of focus. The study's results, indicating improved readiness in teachers post-Continuous Professional Development, provide empirical support for the effectiveness of Continuous Professional Development programs in preparing educators for online teaching. This corroborates with (Archambault & Barnett, 2010) emphasis on the need to prepare teachers for online teaching challenges.

The study's mixed methods approach significantly enriches its empirical conclusions. Structured surveys and experiments yield quantitative data that serve as concrete evidence of enhancements in self-efficacy and readiness. On the other hand, qualitative data derived from interviews and observations provide an in-depth exploration of teachers' individual experiences, obstacles, and perspectives regarding the Continuous Professional Development program. This qualitative aspect reveals the complex effects of Continuous Professional Development, which not only improves technical and pedagogical skills but also cultivates a supportive network among teachers. Wenger (1998) highlighted the value of these communities in professional growth, emphasizing their role in facilitating knowledge exchange and the sharing of best practices.

Additionally, the study's exploration of generational differences in online teaching adoption adds to its empirical richness. Understanding the varied effects of Continuous Professional

Development on teachers from different age groups offers insights into customizing professional development programs to diverse educator needs. This is particularly relevant considering the digital divide and varying comfort levels with technology among different generations of teachers. By addressing these generational differences, the study contributes to a more inclusive, effective approach to teacher development in online education.

Addressing the Generational Divide in Online Pedagogy

This research investigates the generational gap in online pedagogy, revealing a complex and pivotal aspect of modern educational studies. This gap is defined by varying degrees of ease, expertise, and proficiency with digital tools among teachers of different age groups, creating distinct challenges and possibilities in online education. The thorough analysis of this gap, especially within the framework of Continuous Professional Development programs, provides essential insights into adequately supporting educators from all generations in their shift to online instruction.

In today's digital era, the generational divide in education goes beyond mere age-based differences in using technology. It includes a broader array of attitudes, beliefs, and instructional methods shaped by generational identities. (Prensky, 2001) classification of digital natives and digital immigrants serves as a foundational concept to grasp this divide. Digital natives, often younger educators, are generally seen as more adept and comfortable with technology due to their upbringing in a digital environment (Creighton, 2018; Prensky, 2005). On the other hand, digital immigrants, typically older educators, might lack this inherent familiarity with digital tools and platforms (Autry Jr & Berge, 2011; Guo et al., 2008; Wang et al., 2013). This dichotomous classification has been questioned for overly simplifying a complex issue (Bennett et al., 2008). This study progresses past these basic distinctions by exploring the challenges and requirements of educators from diverse age groups in online teaching.

A notable discovery of this study is how Continuous Professional Development impacts teachers differently based on their age. Older educators, who may initially show reluctance or resistance to online teaching methods, often gain significantly from well-targeted Continuous Professional Development programs. These initiatives, when crafted with an understanding of the unique obstacles faced by these educators, can lead to a more seamless transition to online instruction.

This aligns with (Knowles, 1984) focus on andragogy, or the theory of adult learning, in crafting educational experiences for adults. Andragogy proposes that adult learners benefit from learning experiences that are problem-focused, relevant, and respectful of their existing knowledge and background. Applying these principles in Continuous Professional Development programs can improve their effectiveness in bridging the generational gap.

Additionally, the research emphasizes the need to cultivate a community of practice among educators, surpassing generational limits. (Wenger, 1998) theory of communities of practice underlines the significance of social learning in professional growth. Establishing environments where educators from various generations can exchange experiences, tactics, and insights, Continuous Professional Development programs can encourage intergenerational learning and cooperation. This method aids in narrowing the generational gap and enhances the professional development journey for all involved.

The study further illuminates the role of institutional backing in tackling the generational divide. Institutional policies and practices that acknowledge and cater to the diverse needs of educators from all generations are fundamental. This encompasses providing resources, technology instruction, and continuous support adjusted to varying levels of comfort and learning styles. Leadership plays a vital role in creating a supportive and inclusive environment for online instruction, as (Fullan, 2015) highlights, particularly in integrating technology into teaching.

Beyond institutional support, the study also stresses the significance of self-efficacy in aiding educators' adaptation to online teaching methods. (Bandura, 1997) theory of self-efficacy indicates that an individual's belief in their ability to execute specific tasks profoundly impacts their actions. Boosting self-efficacy among educators, especially those less assured in their technological abilities, is an essential aspect of effective Continuous Professional Development programs. This can be accomplished through modeling, mastery experiences, and positive reinforcement, all critical elements of successful professional development.

Implications for Policy and Practice

The impact of this study reaches further than just academic circles, touching on aspects of educational policy and practical application. The understanding derived from this research can guide the creation of Continuous Professional Development programs that are both impactful in preparing teachers for online teaching and attentive to the diverse requirements of educators. This holds significant meaning for those in charge of educational policy and institutional leadership, who bear the duty of providing teachers with essential skills and knowledge in a constantly changing digital environment (Fullan, 2015).

Fostering Equitable and Effective Online Education

Finally, this research adds substantially to the ongoing discussion about fair and effective online education. It highlights the importance of preparing teachers and building their confidence, essential aspects of delivering quality education in the digital era. The results lay the groundwork for subsequent studies focused on closing the educational gap and ensuring that the shift to online educational settings is inclusive and effective (DeMatthews et al., 2023; Zhao, 2020).

To summarize, this research is a valuable addition to educational studies. It investigates the influence of Continuous Professional Development on teachers' readiness and confidence in online teaching, supported by strong theoretical and methodological underpinnings, and provides important insights and practical implications for educators, policymakers, and researchers. As the educational field keeps evolving, research like this will be crucial in steering us towards an inclusive, effective, and technologically proficient educational future.

1.4. Overview of Methodology

At its core, the research is rooted in a pragmatic philosophical stance, which bridges the divide between positivist and constructivist beliefs about reality and knowledge (Creswell & Creswell, 2017). This stance allows for a balanced exploration of objective realities and subjective experiences, making it apt for understanding the multifaceted domain of online pedagogy, especially in the Bahraini context.

The research employs a mixed-method design, harmoniously blending qualitative and quantitative paradigms. This design choice, as highlighted by (Denzin & Lincoln, 2011) and (Creswell, 2014),

offers the depth of qualitative insights while ensuring the breadth and generalizability of quantitative data. Such a design is particularly valuable when exploring complex social phenomena like the shift to online pedagogy, where both objective metrics and subjective narratives play pivotal roles (Leavy, 2022; Ortiz & Greene, 2007; Terrell, 2012).

Action Research serves as the guiding research design, emphasizing participatory and democratic approaches to bring about tangible changes in practices and understanding (Kemmis & McTaggart, 2007). This design is inherently iterative, allowing for continuous refinement based on real-world feedback. The research unfolds in stages, starting with diagnosing the problem, developing the intervention, implementing it, and finally evaluating its effectiveness. Such a design ensures that the research remains grounded in the practical realities of the educational landscape.

The study's participants comprise 46 teachers from Gulf University, offering a snapshot of the teacher landscape in Bahrain's higher education. These participants, hailing from diverse academic backgrounds and experiences, provide a rich tapestry of insights, making the findings both robust and representative (Gough, 2021; Greenwood & Levin, 2006; Reyes et al., 2018).

Quantitative data was collected using three tools including the Need Analysis Survey which delves deep into teachers' perceptions, competencies, and needs in online teaching. The Teachers' Readiness for Online Pedagogy Questionnaire, a self-constructed tool, gauges teachers' readiness for this new pedagogical paradigm. Lastly, the Teachers' Self-efficacy for Online Pedagogy Questionnaire, adapted from (Tschannen-Moran & Hoy, 2001), measures teachers' confidence and beliefs in their online teaching abilities.

The qualitative phase of the research offers a deep dive into the lived experiences, perceptions, and challenges of teachers transitioning to online pedagogy. This phase, as highlighted by (Malterud et al., 2016; Patton et al., 2015), is instrumental in capturing the intricate nuances, emotions, and beliefs that quantitative data might overlook. Through in-depth interviews and focus group, the study gathers rich narratives that shed light on the multifaceted nature of teachers' interaction with Continuous Professional Development for online pedagogy. The participants' voices, captured verbatim, reveal a spectrum of emotions, from excitement and optimism to apprehension and uncertainty. These narratives underscore the importance of institutional support, Continuous Professional Development, and the need for robust technological infrastructure. They

also highlight the pedagogical shifts required, emphasizing the need for more interactive, student-centered approaches in the virtual classroom (Bogdan & Biklen, 1997; Lichtman, 2023).

Data analysis in the qualitative phase employs a thematic approach, as described by (Braun & Clarke, 2006). This involves meticulously coding the data, identifying patterns, and grouping these patterns into overarching themes. The iterative nature of this process ensures that the analysis remains grounded in the data, allowing themes to emerge organically. The use of software tools, such as NVivo, aids in managing and organizing the vast amounts of qualitative data, ensuring accuracy and consistency in the analysis (Bazeley & Jackson, 2019).

The emergent themes provide insights into the challenges of online pedagogy, such as technological glitches, student engagement issues, and the steep learning curve for teachers. They also highlight the opportunities, such as the potential for personalized learning, the flexibility of online platforms, and the democratization of education, breaking geographical barriers.

1.5. Personal Rational for this study

In the realm of educational advancement and institutional progress, the decision to embark on a journey of scholarly exploration and professional development is often underpinned by a complex interplay of personal motivations. As an individual who holds the esteemed position of university president, coupled with a scholarly background in engineering, my personal impetus to pursue a doctoral journey in education, with a specific focus on investigating teachers' self-efficacy and readiness for online pedagogy, arises from a deeply ingrained dedication to fostering pedagogical innovation, facilitating faculty empowerment, and nurturing a culture of ongoing enhancement. Central to this motivation is a steadfast commitment to promoting educational excellence within the confines of our academic institution as well as in the broader educational landscape. Extant literature underscores the pivotal role of teacher self-efficacy in shaping instructional methodologies and ultimately influencing student academic outcomes (Bandura, 1997). By delving into the intricate nuances of teachers' self-efficacy and readiness for online instructional delivery, my intention is to elevate the quality of education by equipping faculty members with the requisite competencies and confidence to adeptly navigate the digital learning milieu.

Furthermore, this motivation is further catalyzed by a proactive response to the evolving challenges and opportunities in the educational sphere, particularly considering the burgeoning integration of technology into pedagogical practices. Scholarly inquiries have underscored the imperative of addressing teachers' readiness and efficacy in utilizing online pedagogical tools to engender meaningful learning experiences (Mishra & Koehler, 2006). Through rigorous scholarly inquiry and the subsequent development and implementation of a Continuous Professional Development initiative, my aim is to empower faculty members with the requisite resources and support to surmount these challenges and embrace innovative pedagogical strategies.

Moreover, this personal motivation is also underpinned by a genuine thirst for professional growth and scholarly inquiry. Despite my foundational background in engineering, I harbor a genuine ardor for the field of education and an earnest desire to broaden my intellectual horizons. Pursuing a doctoral journey in education affords me the opportunity not only to make substantive contributions to the scholarly discourse but also to expand my own cognitive repertoire and make well-informed decisions that drive educational progress.

1.6. Structure of Thesis

This thesis is based on seven chapters including this introduction chapter. The second chapter titled "Context of Study" presents brief introduction of the Kingdom of Bahrain highlight its education system, particularly its higher education system. Then the chapter presents government's policies towards technology adaptation, particularly the use of technology in education. The chapter then discusses the teacher education and training in the country, particularly the professional development of teachers in higher education. Finally, the chapter provides a brief description of Gulf University, where this study is conducted.

The third chapter presents a comprehensive literature review which started with the discussion on teaching and learning in higher education and the factors that shape these historically. Then the discussion specifically focused on the emergence of technology and the way it shaped teaching and learning in higher education. Here various challenges and opportunities that online pedagogy offers are discussed. Then, the discussion moves toward various factors that influence the use of online pedagogy including teachers' technical competency, instructional designs, emotional and cognitive load on teachers and cultural dynamics that shape the effective use of online pedagogy. The discussion then moves towards teachers' self-efficacy and readiness for online pedagogy.

Finally, comprehensive literature review is made on professional development of teachers in higher education with special focus on Continuous Professional Development.

Chapter 4 presents a detailed account of methodology used in this study. It clarifies the study design and provides justification for the selection of the qualitative and quantitative methodologies. The chapter details the data gathering techniques, from surveys to comprehensive interviews, ensuring transparency and replicability. It also describes the sampling strategy and criteria for participant selection, emphasizing the study's commitment to demographic diversity and inclusivity. Ethical considerations and protocols are underscored to uphold the research's integrity and ethical responsibility.

Chapter 5 presents the quantitative findings of this study. Specifically, in response to the research question 1 (What is the level of teachers' self-efficacy and readiness for online pedagogy?), question 2 (Does teachers' self-efficacy predict their readiness for online pedagogy?), question 3 (Does Continuous Professional Development improve teachers' self-efficacy and readiness of online pedagogy, and Is there any difference in the self-efficacy and readiness of teachers of different age group post Continuous Professional Development?) are answered in this chapter.

Chapter 6, "Qualitative Findings," attempts to answer question 4 i.e., How do teachers experience Continuous Professional Development as intervention for their self-efficacy and readiness of online pedagogy? Based on analysis of semi-structured interviews and focus groups, various emerging themes were discussed particularly related to the generational perspectives on technological adaptation in education; interaction of teachers of different age-groups with one another in Continuous Professional Development for online pedagogy, and the ways Continuous Professional Development influence teachers' self-efficacy and readiness for online pedagogy.

Lastly, Chapter 7, "Summary and Discussion, " weaves together the research findings. It integrates the quantitative and qualitative results into a unified narrative, discussing the study's implications for policy, practice, and further scholarly inquiry. The chapter critically evaluates the research's contributions to the field of educational studies, particularly regarding educator readiness for digital instruction. It recognizes the study's limitations and proposes avenues for future research. The concluding remarks encapsulate the essence of the research, offering inspiration for continued progress in educational methodologies.

CHAPTE 2: CONTEXT OF STUDY

2.1 Introduction

This chapter provides a brief introduction to the context of this study. As this study is to be conducted in the Gulf University located in Bahrain, it is imperative to provide a brief introduction of the Kingdom of Bahrain and its strategic location which influence its policies on economy and education. The chapter then presents an overview of the education system of Bahrain with focus on higher education. In this context, various government policies to boost education of the country are highlighted with a focus on the use of technology. With this backdrop, trends of teacher training, particularly professional development of teachers in higher education is discussed. The chapter ends with an introduction of Gulf University and its policies on online teaching as well as distance education which lay the ground on which this research was conceived and conducted.

2.1. The Kingdom of Bahrain

Bahrain, a cluster of islands in the Arab Gulf, serves as a testament to the region's storied past in commerce and its current economic initiatives. Despite its small size, this nation's geographical positioning at the heart of trading intersections has been crucial, historically linking merchants from Asia, the Middle East, and Africa. Reflecting this rich history of trade, Bahrain's diverse population reached around 1.7 million people in 2020, with a variety of ethnicities predominantly practicing Islam, amidst a cosmopolitan acceptance of other faiths (Central Informatics Organisation, 2020).

In Bahrain, the emphasis on literacy and education has been instrumental in the nation's development, with a remarkable adult literacy rate of 95.7%, underscoring the country's investment in its people as a source of pride (UNESCO Institute for Statistics, 2019). The enthusiasm for education highlights Bahrain's focus on this area, which remains strong even as the country moves its economic reliance away from petroleum.

The nation's economic strategy, which includes a forward-looking embrace of technology and innovation, demonstrates Bahrain's dedication to exploiting digital technology in various industries. This strategy is designed to boost economic performance and maintain its edge in the region. Education is a key part of this endeavor, with the government's proactive drive to merge

technology with educational methods, improving both the effectiveness and reach of its educational system (B. Ministry of Education, 2021).

2.2. Education system of Bahrain

Bahrain's education system is a robust framework designed to cultivate a learned society and drive the nation's economic diversification efforts. It mirrors the country's commitment to continuous improvement and progress in human resource development. The system is structured into formal schooling comprising primary, intermediate, and secondary education followed by higher education. Bahrain's Ministry of Education has established comprehensive educational strategies that have contributed to achieving near-universal enrollment in primary education and a significant gross enrollment ratio in secondary education, which is indicative of the system's accessibility and the government's investment in sustaining educational infrastructure (K. of B. Ministry of Education, 2020).

At the heart of the system is dual emphasis on traditional learning and the need for skills pertinent to the evolving global economy. The curriculum is thus regularly updated to integrate critical thinking, problem-solving, and digital literacy, skills that are paramount in today's information-centric world (Bahrain Quality Assurance Authority for Education and Training, 2018). In addition to government schools, a growing number of private institutions offer curricula ranging from the British and American systems to the International Baccalaureate, catering to the diverse expatriate community and locals seeking an international education.

Tertiary education, too, has seen expansive growth with the establishment of numerous universities and colleges that offer a range of undergraduate and postgraduate programs. These institutions are central to Bahrain's vision of fostering a knowledge-based economy, underscored by the emphasis on research and innovation. Partnerships with global universities and corporate entities have been instrumental in elevating the quality and relevance of higher education programs offered in Bahrain, aligning with labor market needs and global educational standards.

Moreover, the Bahraini government has been active in ensuring that education reform and investment are responsive to the demands of modernization and technological advancements. These efforts are not limited to infrastructure but extend to teacher training programs, reflecting a holistic approach to educational excellence that underpins the nation’s strategic objectives.

2.2.1. Higher Education of Bahrain

The ascendancy of higher education in Bahrain reflects the nation's broader socio-economic aspirations, where tertiary institutions operate as both repositories of knowledge and crucibles for innovation. The transformation within Bahraini higher education over the past decades has been impressive, with a significant increase in both the number and diversity of programs tailored to meet the economic and social objectives of the country (Council, 2021). Gulf University, being a case in point, stands as a beacon of this transformation, drawing on global best practices to enhance its academic offerings and expand its research footprint (University, 2022).

The national framework for higher education pivots on a strategy of inclusivity and quality, with the Higher Education Council of Bahrain steering the sector towards international competitiveness. Through a concerted emphasis on accreditation and quality assurance, Bahrain has cultivated a higher education landscape that not only attracts local students but also positions itself as a regional hub for international scholars (Council, 2021). Institutions like Bahrain Polytechnic have been instrumental in aligning academic programs with industry needs, thereby fostering a workforce that is adaptable to the digital economy's demands.

Research and development have become pivotal, with universities actively engaging in research that supports national industries and contributes to global scientific discourse. The government's support for research initiatives is evident in the allocation of resources towards establishing centers of excellence and encouraging collaborative research projects with international partners (Council, 2021).

The criticality of Continuous Professional Development in enhancing teacher efficacy and readiness for online pedagogy cannot be overstated, especially in the context of a rapidly evolving educational technology landscape. This readiness is not just a matter of technological proficiency but is deeply interwoven with pedagogical skills and adaptive teaching methodologies that are responsive to the diverse learning needs of students.

The incorporation of technology in education, spearheaded by government policies, has necessitated a reevaluation of the role and preparedness of teachers in this new milieu. At Gulf University, for instance, the interplay between Continuous Professional Development and teacher

self-efficacy is a key area of investigation, especially as it pertains to online and blended teaching models which are becoming increasingly prevalent (University, 2022).

Critically, the effectiveness of Continuous Professional Development programs in Bahrain has been subject to scrutiny, with studies suggesting that while there is a general appreciation for the value of Continuous Professional Development, its practical application and impact on pedagogical success require further empirical investigation. Questions persist regarding the extent to which Continuous Professional Development in Bahrain is equipped to address the specific competencies required for online teaching, including digital content creation, virtual classroom management, and online student engagement strategies (Al-Alawi et al., 2009; Elmahdi et al., 2019). This underscores the pressing need for comprehensive research in this domain to shed light on its intricacies and inform the development of tailored Continuous Professional Development programs, thus advocating for the proposed study's significance in addressing this knowledge gap.

The balance between traditional pedagogical approaches and new-age online instruction methods presents an ongoing challenge for Bahrain's higher education sector. As such, Gulf University's commitment to pioneering research in this domain is not merely academic but is deeply tied to the educational fabric of the nation, reflecting a broader policy orientation towards sustainable, knowledge-based economic growth.

The higher education landscape in Bahrain is characterized by its dynamic evolution, responsiveness to technological trends, and the strategic importance placed on research and professional development. It is this environment that shapes the readiness and self-efficacy of teachers in embracing online pedagogy—a cornerstone for future educational success.

2.3. Government’s approach towards technology

Bahrain's government has exhibited a progressive stance on technology enhancement across various sectors, recognizing its transformative impact on economic diversification and societal advancement. This commitment is articulated through strategic frameworks and initiatives such as "Vision 2030" and the "National eGovernment Strategy," which embody the Kingdom's ambitions to evolve into a knowledge-based economy. By fostering an environment conducive to digital innovation, Bahrain is propelling forward not only in education but also in finance, healthcare, and

commerce sectors, which are pivotal to its development agenda (Economic Development Board, 2022).

Bahrain's financial scene has evolved to become a central fintech player within the Gulf. The nation's central banking authority, the Central Bank of Bahrain, has introduced policies encouraging fintech growth, such as creating a specialized unit for fintech and innovation and starting a regulatory sandbox. This sandbox provides a space for testing innovative digital financial products safely (Central Bank of Bahrain, 2021). It has become a magnet for global fintech enterprises and has fostered domestic creativity, enriching the financial sector's vigor.

Likewise, Bahrain's healthcare system has been transformed by technology, underscored by its "National Health Plan." Among the plan's key initiatives is the National Health Information System (I-SEHA), which digitizes healthcare procedures and consolidates patient records electronically. It facilitates a seamless exchange of information among healthcare entities, enhancing patient care and outcomes (Ministry of Health, 2020). These efforts highlight Bahrain's commitment to fusing technology with improved service provision and operational efficiency.

Moreover, the commerce sector has witnessed a significant digital shift with the "Bahrain Economic Vision 2030" promoting e-commerce and digital entrepreneurship. The government has facilitated this through the creation of "Bahrain.shop," a platform that supports local businesses in establishing online retail operations, enabling them to reach wider markets and contribute to economic sustainability (Economic Development Board, 2022).

Bahrain's technology push is not limited to these sectors; the government has been proactive in ensuring that technology underpins all aspects of economic activity. The establishment of the Bahrain Technology Companies Society (BTECH) and the Bahrain Internet Exchange are testaments to the comprehensive approach toward creating a technologically adept nation. These initiatives reflect a broad-spectrum commitment to fostering an ecosystem where technology drives growth and efficiency across sectors.

The country's investment in digital infrastructure signifies a paradigm shift in public service provision. The "Cloud First Policy" of 2019 mandates government agencies to prioritize cloud computing solutions, thereby ensuring agility and cost-effectiveness in public sector operation

(Information & eGovernment Authority, 2019). This policy not only reflects Bahrain's dedication to modernizing government services but also aligns with global best practices.

While these efforts are commendable, the evaluation of their impact remains a crucial task. Studies indicate that while digital infrastructure in Bahrain is robust, the adoption rate and utilization of digital services by the populace lag (Al-Ammary, 2021; Kamali, 2018; Meftah et al., 2015). This discrepancy highlights the need for ongoing assessment and adaptive strategies to ensure that technological advancements translate into tangible benefits for all sectors of society. The identified gap in the utilization of digital services amidst robust digital infrastructure underscores the importance of further research in this area, emphasizing the necessity of our proposed study to delve deeper into understanding the factors influencing technology adoption and its effective implementation for inclusive societal advancement.

Bahrain's government has clearly delineated policies and initiatives for technology enhancement across multiple sectors, forming an integral part of its national development plan. These efforts are critical for the advancement of a modern state that not only leverages technology for economic growth but also for the elevation of societal welfare. However, continuous critical assessment and refinement of these initiatives are necessary to ensure that the investment in technology yields the desired outcomes. This aspect of technology enhancement and its impact on societal welfare will be further explored in subsequent sections, particularly within the context of education, highlighting the integral role of our proposed study in examining the effectiveness of technological interventions in educational settings.

2.3.1. Technology in Education

In the realm of education, the Bahraini government's initiatives for technology enhancement are integral to its strategic vision. This section critically analyzes the scope and impact of such policies within the educational framework, delineating their alignment with the overarching objectives of national development.

The Ministry of Education in Bahrain has been at the vanguard of integrating technology in the classroom, underpinning the importance of digital literacy in today's global economy. The launch of the "King Hamad Schools of the Future" project is a testament to Bahrain's commitment to digitizing education. This initiative aims to modernize schools with state-of-the-art ICT facilities,

promoting innovative teaching and learning methods that resonate with 21st-century skills (Ministry of Education, 2019).

Complementing this, the "Education Reform Project," supported by the Bahrain Economic Development Board, places emphasis on enhancing teachers' competencies in deploying technology within pedagogical practices. This project has facilitated continuous professional development programs, which are crucial for teachers to effectively incorporate digital tools in their instruction and hence, foster an environment conducive to digital learning (Bahrain Economic Development Board, 2020).

The government's allocation of substantial resources to the "Bahrain Teachers College" for the training and development of teachers in the digital domain further underscores the strategic priority given to technology in education. These programs aim to augment teachers' self-efficacy and their readiness to navigate and implement online pedagogy, an aspect central to this study.

In higher education, the "Higher Education Council" has instituted policies to spur the adoption of virtual learning environments across universities in Bahrain. The "National Qualifications Framework" was revised to include technology-enhanced learning outcomes, ensuring that graduates are well-prepared to thrive in a digital economy (Higher Education Council, 2021).

However, it is imperative to scrutinize the effectiveness of these policies beyond their implementation. Research indicates that while infrastructure and teacher training programs are in place, there exists a gap in actual utilization of these technological resources in pedagogical contexts (Dutta, 2016; Jamlan, 2004; Taha, 2014). This gap suggests that ongoing support and monitoring are essential to translating the policy into practice effectively.

The 'Tamkeen' initiative, which operates under the purview of the Labor Fund, has been instrumental in upskilling the Bahraini workforce, including teachers, in digital proficiencies. By offering courses and certifications in collaboration with international tech giants, Tamkeen has substantially contributed to the elevation of technological standards in education (Tamkeen, 2021).

Furthermore, the 'Smart Learning' initiative, introduced by the government, aims to facilitate remote education, a necessity underscored by the recent global health crisis. The initiative's focus on equipping schools and universities with the necessary technological tools for e-learning reflects

a proactive approach to educational continuity in times of disruption (Ministry of Education, 2020).

Critical analysis of these initiatives reveals a concerted effort to align educational practices with global digital trends. However, the true measure of these policies lies in their ability to be internalized within the educational culture. There is a need for continuous research into the adaptation and integration processes of these technological enhancements to ensure they are not merely superficial additions but are effectively enriching Bahrain's educational landscape.

In closing, Bahrain's strategic investments in educational technology set a forward-thinking precedent. Yet, this analysis advocates for the implementation of robust evaluative mechanisms to ensure these initiatives fulfill their intended purpose of elevating educational standards and equipping learners and teachers alike for the digital age.

2.4. Teacher Education and Training in Bahrain

The caliber of teacher education and training in Bahrain has witnessed transformative development over the past decades. This section provides a critical examination of the current state and efficacy of teacher training and education in Bahrain.

Bahrain's investment in teacher education is apparent through the establishment of institutions such as the Bahrain Teachers College (BTC), which serves as the cornerstone for pre-service and in-service teacher education. BTC's curricula are designed to meet international standards while addressing local educational needs, thereby balancing global educational practices with regional relevance (Bahrain Teachers College, 2021).

Teacher training programs in Bahrain have been undergoing significant development, increasingly focusing on advancing teachers' digital teaching capabilities. These initiatives are often established in collaboration with global entities to arm Bahraini teachers with modern teaching methodologies. For instance, Bahrain's joint efforts with UNESCO offer specific workshops and materials designed for the local teaching environment (UNESCO, 2018).

The success of these training endeavors is evident in the enhanced learning outcomes for students and the professional growth of teachers. The Ministry of Education's and Education and Training Quality Authority (BQA) is diligent in monitoring the effectiveness of teacher training by

evaluating educational institutions and the teachers themselves. These assessments are crucial to ensure that advancements in teacher training are reflected in educational practice (Quality Assurance Authority for Education and Training, 2019).

However, a critical gap remains in the research into the long-term impact of these training programs on teacher retention and career advancement. There is evidence to suggest that while training programs are robust in content, the practical application in the classroom varies significantly among teachers (Howard et al., 2016; Şahin, 2006; Uçar Duzan, 2006).

Moreover, the professional development of teachers is increasingly recognized as a continuous process, extending beyond initial certification. The Ministry of Education encourages lifelong learning through its support for teachers pursuing higher education and specialized training. The ministry provides scholarships and incentives for teachers to engage in master's and doctoral programs, both locally and abroad, which is essential for advancing educational practices (B. Ministry of Education, 2021).

Despite these advancements, challenges persist, particularly in the realm of online pedagogy. The sudden shift to online learning platforms necessitated by pandemic has highlighted the need for ongoing Continuous Professional Development programs that address not just the use of technology, but its integration into effective teaching methodologies (Al Mahadin & Hallak, 2021; Al-Rawi et al., 2021; Kamali, 2020). Therefore, there is a pressing need to design more effective Continuous Professional Development interventions tailored to the demands of online pedagogy and to rigorously evaluate these programs to ascertain their impact on enhancing teaching methodologies and fostering successful integration of technology in educational practices.

The Bahraini government has responded to this challenge by launching initiatives aimed at facilitating the transition to online teaching. However, the effectiveness of these initiatives often hinges on the individual teacher’s adaptability and willingness to embrace new technologies, which is not uniformly distributed across the educational landscape (Abdul Razzak, 2013; Al-Wadi, 2022; Mahmood, 2003). Hence, given the variability in teachers' adaptability and willingness to embrace new technologies, further study is warranted to understand the factors influencing successful implementation of government initiatives aimed at facilitating the transition to online teaching.

The critical need for a pedagogical paradigm shift is evident when examining the success rates of technology integration in classrooms. While equipment and digital resources are plentiful, their impact on student engagement and learning outcomes requires further empirical exploration. The Continuous Professional Development programs, thus, need to be continuously updated to keep pace with the rapid changes in educational technology and global best practices (Elmahdi et al., 2019).

2.4.1. Professional Development of Teachers in Higher Education

The Bahraini government has consistently acknowledged the crucial role of teacher professional development in attaining educational distinction. The strategic policy for enhancing the skills of higher education teachers in Bahrain exemplifies the nation's dedication to education quality and the strategic adoption of technology in instruction. This policy is a product of the wider educational reforms in Bahrain, which aim to transform the country into an economy grounded in knowledge(University of Bahrain, 2021).

The approach to teacher professional development in Bahrain is comprehensive, including strategic alliances, investment in teacher training centers, and the assimilation of global best practices. The Bahrain Teachers College (BTC) is at the core of these efforts, providing specialized certification and advanced training to address the dynamic needs of higher education teaching (University of Bahrain, 2021). The government supports teachers' ongoing education with various programs like workshops, symposiums, and digital courses, illustrating a dynamic and tailored approach to continuous professional development that aligns with both international educational advancements and specific local requirements.

Central to Bahrain's Continuous Professional Development policy is the understanding that teacher efficacy in online and blended learning environments is not solely contingent on technical skill proficiency. It also hinges on pedagogical adaptability and the capacity to foster a conducive learning atmosphere in virtual settings. Therefore, the Continuous Professional Development programs are designed to enhance teachers' self-efficacy, equipping them with the confidence and competence to navigate and utilize digital platforms effectively (Allinder, 1994).

The Bahraini government's policy also prioritizes the alignment of Continuous Professional Development with institutional goals and national educational standards. This strategic alignment

is crucial, as research suggests that professional development activities that are disconnected from a teacher's context and the school's mission may not yield the desired improvements in instructional practice (Darling-Hammond et al., 2017). In recognizing this, Bahraini Continuous Professional Development initiatives encourage the practical application of learning, emphasizing the direct relevance of professional development to classroom practice and teacher performance metrics.

Moreover, Bahrain has been proactive in incorporating evaluative measures to assess the impact of Continuous Professional Development programs on teaching and learning outcomes. Though these evaluations have furnished valuable insights, they have also uncovered areas requiring further attention, such as the need for more personalized Continuous Professional Development pathways and for addressing disparities in access to professional development resources among teachers.

In the discourse of Continuous Professional Development, critical analyses point to a necessity for ongoing assessment and refinement of professional development policies. There is a call for a more robust research base to inform Continuous Professional Development practices in Bahrain, as existing studies are limited in scope and do not fully explicate the long-term implications of these policies on educational quality (Avalos, 2011). Considering these limitations, it is imperative for future research to delve deeper into the intricacies of Continuous Professional Development implementation and its impact on educational outcomes in Bahrain

2.5. Gulf University

Considering Gulf University, the context of this study, this section provides a brief description of various aspects of Gulf University. As an academic institution, Gulf University mirrors the national ambition to foster a knowledge-based economy, rooted in the rich educational heritage and forward-thinking policies outlined in the previous sections. Established with an international perspective and a local cultural ethos, Gulf University has been progressing under the aegis of the Higher Education Law of 2005 and the updated mandates from the Higher Education Council of 2019. It offers a fertile environment for cultivating scholarly and social progression, with a steadfast commitment to excellence in all its educational programs and research initiatives.

The inception and expansion of Gulf University stands as evidence of Bahrain's dedication to advanced education and the continuous professional growth of its workforce. Formed in response to the escalating demand for sophisticated skills in an evolving economy, Gulf University has seen significant growth in scope and recognition. It strives to be recognized as a global center for higher learning and research while also prioritizing the educational needs of its local and regional communities (Gulf University, 2023b).

Central to Gulf University's ethos is the pursuit of high standards and distinction in education, research, and instruction. The institution houses eight distinct departments with a variety of study programs, including Interior Design Engineering, Electrical & Electronic Engineering, Mechanical Engineering, Law, Accounting & Financial Science, Human Resources Management, Mass Communications, and Advertising & Digital Marketing, serving a student body that exceeds a thousand each year. The university's faculty consists of experienced teachers and prolific researchers, forming the backbone of its academic strength. Gulf University upholds rigorous quality control, consistently upgrading its course content and teaching practices to meet international benchmarks and respond to regional requirements (Gulf University, 2023b).

Strategically positioned, Gulf University enhances its stature as a melting pot of cultural and educational exchange, drawing in academics and students worldwide. Its campus is a beacon of intellectual development, boasting cutting-edge amenities to facilitate a broad spectrum of scholarly pursuits. Collaborative endeavors with industrial and governmental agencies enrich the university's curriculum with real-world learning opportunities, equipping students for current and emergent career challenges (Gulf University, 2023b)

The breadth of Gulf University's sections illustrates its systematic delivery of wide-ranging educational opportunities. The institution's educational strategy balances core theoretical understanding with practical training, aiming to produce well-rounded, industry-ready graduates who can adapt to the ever-changing job market.

In research, Gulf University has carved out a reputation for contributing to both theoretical and applied knowledge. It encourages a research culture that addresses local and regional issues with global relevance, thereby positioning itself as a critical player in the international academic community. Through its research, the university not only contributes to academic discourse but

also to the practical needs of Bahrain's development, as evidenced by the collaborative ventures and research outputs that have practical implications for various sectors (Gulf University, 2023b).

Reflecting on the critical importance of teacher training and professional development, Gulf University's role in preparing teachers for the digital age is significant. It not only provides initial teacher education but also ensures ongoing professional development through continuing education programs, aligning with the government's policy for enhancing educational staff competencies in higher education settings (Gulf University, 2023b).

Gulf University is not just an educational institution but a catalyst for professional growth and innovation. The university's policies and programs are continually evolving, informed by feedback from the academic community and the requirements of the labor market. As a result, the institution maintains a dynamic curriculum that responds to technological advancements and the shifting paradigms of higher education.

2.5.1. University's Policy for online teaching and learning

In the framework of Gulf University's vision for digital education, the policy for online teaching and learning constitutes a critical pivot that aligns with Bahrain's wider educational objectives. Gulf University has systematically evolved its strategies to integrate e-learning, which stands as a testament to the national push towards technological advancement in education. Gulf University's online learning policies showcase a commitment to ensuring accessibility, enhancing interaction, and maintaining quality in higher education's digital realm. The university established its E-Learning Unit with a mission to leverage technology for enriching the learning experience. By maintaining a state-of-the-art e-learning system, the university underscores its resolve to meet and exceed quality standards in education (Gulf University, 2023b). Continuous development of policies ensures that the virtual learning environment is not only a contingency plan but a permanent fixture in the university's educational landscape.

The university's response to the COVID-19 pandemic exemplified the flexibility and preparedness of its e-learning system. Initiatives like the redesign of teaching strategies, restructuring of assessments, and augmentation of digital resources were pivotal in maintaining academic continuity (Gulf University, 2023a). The adoption of project-based and performance-based assessments reflects a shift towards more dynamic and real-world evaluation methods. The

facilitation of regular communication via formal university channels and social media was another step to ensure that the transition to online learning did not impede student support (Gulf University, 2023a).

To further facilitate student engagement, Gulf University provided training and resources to effectively utilize e-learning technologies. The move towards a hybrid classroom model during the pandemic served as a bridge between traditional and digital classrooms, allowing for an inclusive educational setting that catered to diverse student needs. The provision of comprehensive online databases for remote learning supported the infrastructure necessary for successful distance education. (Gulf University, 2023a)

Importantly, the university policy extends beyond mere provision of technology to encompass the creation of a respectful and constructive online community. The guidelines for student conduct in digital communication with instructors and peers emphasize the importance of maintaining professionalism and respect, ensuring a positive and supportive online learning environment (Gulf University, 2023a).

Gulf University's policy for online teaching and learning, thus, reflects a broader commitment to not only adapt to immediate challenges but to anticipate future educational needs. It is both a product of and a contributor to Bahrain's educational transformation, signifying a profound understanding of the pivotal role that technology plays in modern education.

2.6. Summary

The exploration of Bahrain as a dynamic setting for educational progress sets the stage for understanding its national commitment to developing a robust learning culture. Through a lens that shifts from the broad narratives of Bahrain's education policy to the specifics of higher education and professional development, this chapter offered a comprehensive view of the nation's academic landscape. The evolution of the education system is traced from foundational policies to specific initiatives aimed at integrating technology across sectors, with a special focus on enhancing the pedagogical landscape.

Gulf University emerges as an embodiment of these efforts, striving to cultivate an atmosphere where academic rigor and innovative teaching methods are paramount. The critical role of teacher

education and the emphasis on continuous professional development within the university's framework is highlighted as a reflection of the national vision. This synthesis not only bridges the various elements of Bahrain's educational trajectory but also sets the premise for analyzing Gulf University's approach to empowering teachers for online pedagogy. However, amidst the university's diverse faculty comprising individuals of different genders, ages, experiences, qualifications, and disciplines, the abrupt transition to online pedagogy prompted by the COVID-19 pandemic posed unforeseen challenges. This shift raises crucial questions regarding the self-efficacy and readiness of these educators for online pedagogy. It becomes imperative to examine how the university addresses the issues of self-efficacy and readiness through its Continuous Professional Development programs tailored for online pedagogy.

Moreover, the influence of culture and traditions on pedagogy cannot be overlooked, shaping the landscape of online education within the university context. Understanding how these factors intersect with online pedagogy is indispensable for effective implementation. Thus, there is a pressing need for a comprehensive study within the framework of Gulf University to explore these intricacies further and enhance the efficacy of online pedagogy in alignment with the institution's overarching goals.

CHAPTER 3: LITERATURE REVIEW

3.1. Introduction

This chapter delves into various types of literature that have contributed to the conceptualization and strengthening of this research study. It begins with a discussion on the topic of teaching and learning in education, particularly in higher education, and how different social, cultural, political, and technological trends have shaped the concept of teaching and learning. The discussion then shifts to online pedagogy and the challenges associated with it. Most of the challenges covered in this chapter revolve around teachers, particularly their technical competency, instructional designs, emotional and cognitive load, and cultural dynamics, and the ways in which these factors influence teachers' ability to conduct online pedagogy. The chapter proceeds to explore teachers' self-efficacy and readiness for online pedagogy, as well as how professional development, particularly Continuous Professional Development, is utilized to enhance teachers' self-efficacy and readiness for online pedagogy. Just to remind readers, the overarching research question guiding this study is: "How does Continuous Professional Development influence teachers' readiness and self-efficacy for online pedagogy?" This central inquiry is supported by four sub-research questions aimed at providing a comprehensive understanding of the topic. These sub-questions include examining the challenges and opportunities perceived by teachers in online pedagogy, assessing the levels of teachers' self-efficacy and readiness for online teaching, investigating whether teachers' self-efficacy predicts their readiness for online teaching, and exploring the effectiveness of Continuous Professional Development in improving teachers' self-efficacy and readiness for online pedagogy. Furthermore, the study seeks to understand if there are any differences in the self-efficacy and readiness of teachers across different age groups following Continuous Professional Development interventions. Additionally, the subjective experiences of teachers regarding Continuous Professional Development as an intervention for enhancing their self-efficacy and readiness for online pedagogy will be explored. Through addressing these research questions, this study aims to contribute valuable insights into the effectiveness of Continuous Professional Development programs in supporting educators' transition to online teaching and their overall professional development in this context.

3.2. Teaching and Learning in Education

The landscape of higher education is a testament to the relentless pursuit of refining pedagogical practices in alignment with evolving theoretical frameworks, societal demands, and technological progression. The journey from behaviorism, which situates learning as a change in observable behavior (Peel, 2005), to cognitivism, which centers learning as the development of mental processes including memory (Forehand, 2010), reflects the evolution of educational ideologies. Traditional lectures, often critiqued for their limited interactive capacity (Bligh, 2000), have given way to active learning paradigms that endorse student-led activities such as discussions and practical exercises for deeper learning engagement (Freeman et al., 2014).

Emphasizing the cultivation of critical and creative thinking, collaborative skills, and communication abilities, higher education now recognizes the necessity of these competencies for succeeding in an increasingly complex society (Barnett, 1997). Consequently, curricula are being designed to foster these skills through pedagogical strategies that encourage active participation (King, 2002). Innovative educational approaches have emerged, such as inquiry-based (Archer-Kuhn & MacKinnon, 2020; Chan et al., 2016), project-based (Lasauskiene & Rauduvaite, 2015; Shpeizer, 2019), and problem-based learning (Liu & Pásztor, 2022; Savin-Baden, 2000).

The discourse on inclusivity within higher education stresses the importance of recognizing the complex interplay between a student's learning identity and other social identities (Ahmed, 2012; Rind, 2015, 2016). Such considerations necessitate pedagogies that are inclusive and adaptive to the richness of student diversity (Hockings, 2010; Northedge, 2003). Culturally responsive teaching, therefore, becomes imperative, integrating students' cultural backgrounds into educational content and delivery (Gay, 2002).

Technology's central role in education has revolutionized accessibility to knowledge and instructor-student communication (Selwyn, 2014). However, the challenges associated with technology adoption, such as the digital divide and equitable access, persist and are actively debated in academic literature (Van Dijk, 2005). Assessment practices have been reevaluated for their relevance and alignment with practical knowledge application (Gulikers et al., 2004).

From a faculty perspective, embracing innovative teaching methods through professional development is essential to keeping abreast of pedagogical advancements (Steinert et al., 2006). Faculty development programs have been shown to influence teaching behaviors positively and enhance student outcomes (Henderson et al., 2011).

Online pedagogy in higher education is heralded for its unique affordances but is accompanied by challenges, including the demand for self-regulation and adaptive learning strategies (Means et al., 2009). The constant evolution in teaching and learning practices in higher education invites ongoing discourse and research, particularly as the educational community ventures further into the realm of online pedagogy.

3.3. Education Technologies

The 21st century is often regarded as the era of technology; over the last few decades, technology transformed human life, literally bringing another revolution - the digital revolution (Orus et al., 2020; Mikalski, 2020; Katayeva et al., 2023).; Diggory, 2018; Holland, 2015). Certainly, the significance of technology in the educational field is on the rise, and as technological advancements continue, the advantages it offers to students across all educational levels multiply. For instance, Escueta et al. (2017) underscored the value of technology for various educational stakeholders, asserting that 'Governments, schools, and families increasingly value technology as a central part of the education process, and invest accordingly.' Likewise, Nesje & Ruud (2018) noted that current trends in higher education show a movement towards adopting and integrating new tools into the teaching and learning process to support student education. Following this observation, Sutton (2013) highlighted that 21st-century educators must adapt to the technological revolution, preparing both themselves and their students for the technologically advanced world beyond the classroom.

Several authors have highlighted the capabilities of the new technology to improve information access and education. For example, Hoehe (2020) noted that digital technology has transformed human lives, in that we can access almost unlimited amounts of information, just as we can produce, process and store colossal amounts of data. Budhwar (2017) and Ahmad et al. (2016) concurred that it is possible that technology can remove the barriers created by distance and that education can be brought to the student's doorstep. Evidence on the role of technology in education

is presented by Dahlstrom and Brooks (2014), who surveyed 17,452 faculty members and found that 78% were interested in incorporating technology into their pedagogy.

The vast array of methods for exploring the use of technology in education makes it challenging to directly assess or even describe the current state of research in this area. Courville (2011) pointed out that technology has the potential to eliminate physical obstacles to education, like geographic distance and economic barriers, through the promotion of distance learning. Moreover, the rapid increase in technology's role in education, through distance education, Internet connectivity, simulations, and educational games, has significantly heightened the attention on and significance of research in educational technology (Ross, 2010). Thus, technology has become an integral part of education and, during the current wave of COVID-19, became the only means to continue education in almost all schools and universities.

3.3.1. Advantages of Technology in Education

Technology facilitates enriching learning experiences; it enables practical learning opportunities that can be woven into every facet of the school syllabus, encompassing subjects such as mathematics, reading, science, social studies, and other academic disciplines. It empowers students to work together, fostering peer-to-peer learning. This synergy of elements can positively influence student engagement and motivation. The ability to access a computer to research and complete an assignment saves a huge amount of time.

Technology also enhances learning due to its pervasive role in our daily lives. Its widespread use in everyday activities renders it highly relevant to students, creating a relatable context that significantly boosts student learning. Alfiras, M. et al. (2023), studying the advantages of technology in teaching, concluded that educational technology offers many benefits from the students' perspective. It allows the use of resources to help students make the most of their school time, as many students must juggle schoolwork and homework alongside a part-time job. Similarly, various studies have suggested that technology positively influences student learning, leading to increased engagement; consequently, students are likely to absorb more information. Given the swift and widespread emergence of new technologies, technology has become more pertinent to students as it simplifies the learning process and enables them to learn more efficiently in less time.

Moreover, it was affirmed that technology can be a powerful tool for transforming learning. Likewise, Budhwar (2017) perceived that, with the help of technology, education is no longer boring and cumbersome for students, as educational technologies have made it more interesting and easier to access. According to Suleman (2012) and Sudarsana (2019), teachers play a vital and crucial role in integrating technology into teaching and learning processes and, therefore, teachers must have the experience and skills to use technology effectively. Therefore, technology has the potential to strengthen and enhance the connections between teachers and students, transform traditional methods of learning and collaboration, close longstanding disparities in equality and accessibility, and tailor educational experiences to suit the diverse needs of every learner. When educators skilfully incorporate technology within various subjects, they transition into roles as mentors, subject matter experts, and facilitators. This underscores the fact that technology plays a crucial role in making both teaching and learning more impactful and enjoyable.

Keeping in mind the core objective of educational technology, also known as instructional technology, is to enhance the educational process (Klimova et al., 2023). They projected that the landscape of future educational institutions, including schools, colleges, and universities, will undergo significant transformations due to the influence of technology in the years ahead. Technology has the power to empower both educators and learners, drive innovation, and facilitate the cultivation of 21st-century competencies. This highlights the role of technology as a potent instructional medium, viewed as a mechanism for addressing a broad spectrum of educational challenges such as motivation, discipline issues, dropout rates, school violence, foundational skills, critical thinking, and a myriad of other educational matters. In a broader context, it encompasses the creation, implementation, and assessment of systems, methodologies, and supports within the realms of learning and instruction. The array of benefits offered by technology positions it as an invaluable educational instrument that teachers can leverage to meet the diverse requirements of their students.

Sutton (2013) noted that the implementation of technology in the classroom makes students feel more comfortable and makes the material appear more applicable to the real world. Also, Englund (2015) emphasised that teachers' conceptions of and approaches to teaching with technology are central to the successful implementation of educational technologies in higher education. The argument of Sutton and Englund show that technology has different capabilities that can be used

to enhance teaching and learning. There are many tools in technology that facilitate teaching and learning such as the databases that can now be used to enhance performance, changing the way students are taught and placing a new focus on skill-based performance over knowledge retention. Such advantages show the importance of technology for students practice and cognition since they can use different tools to enhance their understanding for the materials and their skills in manipulating learning materials.

Reflecting on the evolving landscape of education, it's pivotal to recognize that educational technology, or instructional technology, aims at enhancing the educational process as a significant transformation in the structure of schools, colleges, and universities soon, driven by technological advancements was predicted. Technology is poised to empower educators and students alike, catalyse change, and facilitate the acquisition of 21st-century competencies. This illustrates that technology serves as an effective teaching tool, addressing various educational challenges such as engagement, discipline, dropout rates, school violence, foundational skills, and critical thinking, among others. Broadly, it encompasses the creation, implementation, and assessment of systems, methods, and supports within the realms of learning and instruction. The advantages of technology position it as a pivotal resource for teachers to meet student needs effectively.

Adding to this, it was highlighted that a vast array of resources, beyond what textbooks offer, is accessible to educators through digital devices like computers and tablets. These tools not only engage students through innovative features and applications but also introduce diverse methods for presenting new information. Recognizing the individuality of learning styles, technology accommodates varied educational approaches, ensuring that students remain attentive and interactive. Today's students, often referred to as digital learners, thrive in interactive environments, and technology facilitates this engagement, aiding them in maintaining focus and accelerating learning. Moreover, technological proficiency is indispensable beyond the confines of primary and secondary education. Given the rapid pace of technological evolution, early acquaintance with technology is beneficial for children, preparing them for inevitable interaction with digital tools across all sectors. In the contemporary era, technology integration extends beyond basic computer literacy to become an integral element of daily life, with that adept in its use poised for success in the professional realm.

To conclude, the primary focus in using educational technology is on the educational value of the tools and applications used, how useful they are in the acquisition of knowledge, whether there is an interaction between users and tools, and the positive effects of using them. Technology can be used as a tool for establishing meaningful projects to engage students in critical thinking and problem-solving. Technology can be used to restructure and redesign the classroom to produce an environment that promotes the development of higher-order thinking skills (Kurt & Kurt, 2010). Technology also increases student collaboration, and collaboration is a highly effective learning tool. Students cooperatively work together to create projects or learn from each other by reading the work of their peers (Keser & Ozdamli, 2011).

3.3.2. Challenges of Educational Technologies

A pivotal element in effectively integrating educational technology within higher education is the ability of educators to understand the reasons, timing, and most appropriate methods for deploying educational technologies (Elkaseh, 2015 & Schneckenberg, 2010). This competence involves not just familiarity with the tools themselves, but a deep understanding of pedagogical principles that guide the effective use of technology to enhance learning outcomes.

The necessity for professional development among teachers is critical to facilitate conceptual shifts and enhance the utilization of educational technology. Inamorato et al. (2019) and Englund et al. (2015) have emphasized the importance of aiding the growth of seasoned educators who may predominantly employ a teacher-centered instructional style. Englund et al. (2017), Trigwell, and Prosser (2004), along with Åkerlind (2003), argue that orienting professional development efforts towards early-career academics could yield more enduring and transformative effects on the educational landscape. By assisting higher education instructors in revising their teaching and learning paradigms, a more proficient application of educational technology can be realized, potentially overcoming the stagnation in educational innovation since the advent of the digital era in higher education.

Nonetheless, a significant obstacle to the integration of educational technologies lies in the scarcity of continuous professional development for educators expected to incorporate such technologies

into their teaching practices, especially those who are either unprepared for or struggling with new technological tools. For instance, Noble et al. (2015) found that among the top challenges faced by educators in providing access to educational technology was the lack of adequate professional training. Similarly, Nagel (2013) identified this as the foremost challenge. Hyndman (2020), on the other hand, pointed out that difficulties may also stem from the technology itself or the availability and appropriateness of professional development programs aimed at enhancing teachers' digital proficiency. Without addressing these issues, there is a real danger of cultivating a generation of students who are not adequately prepared for the digital age. This shows that even though educational technologies have different merits, limitations are still there, and this requires educational institutions to work on these challenges faced by teachers. Qualifying teachers is one of the solutions that could help in overcoming different challenges, especially when teachers have the capabilities to enhance their skills in using technologies and solve some issues related to teaching with technologies, which has a positive impact of teachers' mobile learning self-efficacy.

In summary, the key factors in the deployment of educational technology are its capacity to make teaching and learning more engaging and enjoyable, and its ability to eliminate boundaries on what students can create. For the 21st-century learner, the involvement of digital devices like computers, cell phones, iPads, or SMART Boards makes learning significantly more appealing. Studies have shown that the use of educational technology not only improves skills and cognitive attributes but has also led to a surge in learning opportunities and access to new information, particularly through mobile devices. However, with the rapid advancement and integration of new technologies, questions emerge regarding the preparedness of teachers to adapt to these changes, their willingness and capability to employ educational technologies, and whether educational institutions are adequately equipped with contemporary technological resources. The challenges posed by technology are encountered by educational bodies worldwide, notably within the Gulf region as identified indicating a pressing need for further investigation in this field.

3.4. Mobile Learning

In today's interconnected world, technology plays a crucial role in spreading knowledge across both formal and informal learning environments. The concept of mobile learning (m-learning) varies in its definition and understanding among scholars. Diez et al. (2017) describe m-learning

as an educational process facilitated by mobile devices, broadening the reach and flexibility of teaching methods. Abu-Al-Aish (2014) view m-learning as the utilization of mobile devices for learning at times and places that suit the learners' needs, often complementing conventional education. Heflin (2017) emphasizes the role of digital mobile technology in education as central to the dynamic and growing field of mobile learning, wherein educators leverage mobile devices alongside collaborative learning spaces to enhance educational outcomes. Furthermore, Darmaji et al. (2019) regard mobile technology as a revolutionary form of communication and information technology, designed to fulfil the informational needs of individuals.

This technological integration has facilitated the emergence and expansion of distance learning, e-learning, and m-learning. The ubiquity of mobile technology in contemporary society has fundamentally altered how individuals access information, establishing mobile learning as a relatively novel yet indispensable tool in achieving high-quality education and learning experiences. Hence, a smartphone transcends its basic functionality to become a portable educational tool, offering learning opportunities at the convenience of the user (Qureshi et al., 2020; Kearney, 2012).

We've reached a pivotal point in the evolution of technology, marked by the widespread availability of tablets and mobile devices catalysing substantial change (Fietzer & Chin, 2017; Kuan et al. 2023). Advances in wireless infrastructure and cloud computing now allow the remote management of both private and public essential systems, enabling educators and learners to integrate technology seamlessly into their daily routines (Lieberman, 2019; Sung, Chang & Liu, 2016; Camilleri et al., 2023). Education is undergoing a transformative phase, necessitating adjustments in teaching and learning methodologies to align with societal needs (Romero-Rodríguez et al., 2020). Particularly during the COVID-19 pandemic, the reliance on online platforms and mobile devices became critical for maintaining educational activities. The pandemic highlighted the utility of technology in education, bringing the potential of mobile learning technologies into sharper focus for educators. This experience should serve as a catalyst for the continued and expanded use of technological tools in education beyond the pandemic. The adaptability, ease of use, and varied practices introduced or expanded during this period are key components of mobile learning that have demonstrated significant benefits.

Within the realm of higher education, mobile learning (m-learning) is defined as the educational approach that incorporates mobile and handheld devices, including smartphones, laptops, and tablet PCs, to facilitate teaching and learning processes (Giousmpasoglou & Marinakou, 2013). This definition underscores the role of portable technology in creating flexible and accessible educational experiences. Simply put, m-learning is defined as 'the process of learning mediated by a mobile device. M-learning systems enable remote access to learning materials on m-learning tools such as smartphones, notebooks, and iPads. Similarly, m-learning as learning delivered using mobile technology such as smartphones, iPods, MP3 players and personal digital assistants (PDAs) ((Iqbal & Bhatti, 2017). The concept of mobile learning is linked to accessibility of the learning materials offline (pre-downloaded) or online, enabling the learner to have access to these materials anywhere. The core objective of m-learning technology is to improve effectiveness in pedagogical approaches for better results.

The proliferation of portable devices ranging from mobile phones to laptop computers and the emergence of new mobile technologies have motivated educators and researchers to consider using them as a new medium for learning (Shorfuzzaman & Alhussein, 2016). For example, it has been found there are approximately 5.20 billion unique mobile phone users in the world today – that is, more than two-thirds (67%) of the world now uses a mobile phone. There are 4.66 billion people around the world who now use the internet, close to 60% of the world's total population, and the number is still growing, with the latest data showing that over 321 million new users came online in the twelve months to October 2020. Internet users are currently growing at an annualised rate of more than 7%, equating to an average of more than 875,000 new users each day. Many internet users (91%) use mobile devices for online access at least some of the time, alongside computers for internet activity.

In the context of the Kingdom of Bahrain, there were 1.65 million internet users in Bahrain in January 2020, representing an increase of 110,000 (or 7.1%) between 2019 and 2020. Moreover, internet penetration in Bahrain stood at 99% in January 2020 while the number of mobile connections in Bahrain in January 2020 was equivalent to 131% of the total population. The data reports for Bahrain were taken before the COVID-19 pandemic; internet usage will have grown significantly due to the Ministry of Education's advice that learning should be conducted online. Thus, learning is no longer restricted to classroom settings and conducted by

only by instructors. Rather, mobile learning has reached a stage that involves the application of portable devices as well as wireless technologies and allows learners to learn anywhere and at any time (Abu-Al-Aish, 2014; Wang et al., 2009)(Abu-Al-Aish, 2014).

3.4.1. Elements of Mobile Learning

Every day, increasing numbers of academics and higher education providers are becoming aware of m-learning systems and why these are becoming prerequisites for education in the 21st century. Unyfed (2018) and (Ozdamli & Cavus, 2011) jointly corroborated that the learner, teacher, environment, content, and assessment are the basic elements of mobile learning, as shown in Figure 2.1.

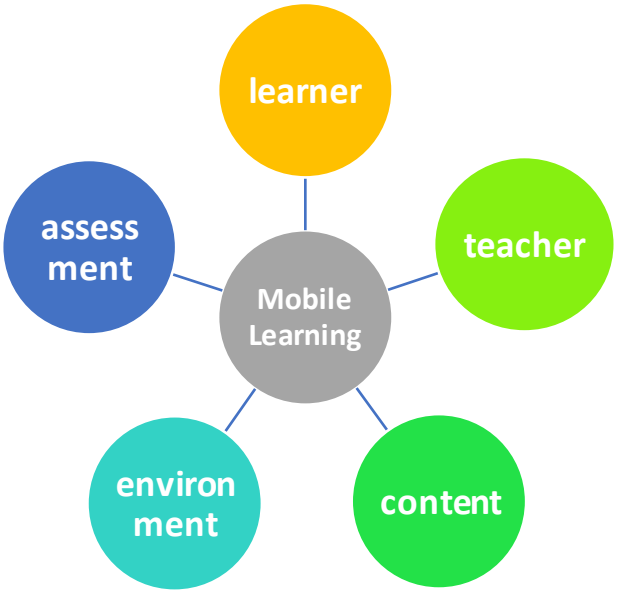

Figure 1. Elements of Mobile Learning

Learner - Learners are at the centre of all teaching and learning activities according to new educational approaches (Idris, et al., 2023; Shazali, et al., 2023; McCarthy, 2015). At the Gulf University, students or learners are always the top priority. Irrespective of the mode of learning, its goals cannot be met without the growth of learners (Unyfed, 2018). Today, m-learning strategies are expected to be interesting, engaging and flexible, so that the learners are given the best possible chance of academic success. All the other elements support the learner because m-learning builds on the learner's interests, experiences and needs. (Ozdamli & Cavus, 2011)

claimed that, as the m-learning concept implies, this pedagogical approach places the student at the centre of the learning process. The learner plays an active role from the determination of the goals through to the evaluation stage. For example, as stated by Unyfed (2018) and (Ozdamli & Cavus, 2011), learners can access information when they need, are responsible for own learning, discover and use their own learning styles, create and share new information or products, study collaboratively with their peers, evaluate themselves and other groups, have access to study material at any time and are empowered to learn at their own pace through the delivery of content-rich information to students' fingertips, enhancing the learning experience through improved engagement and interaction and dramatically improving communication between students, staff and faculties.

Teacher – Teaching involves the transmission of knowledge from one individual to another. M-learning amplifies an educator's capacity to accomplish this by employing novel teaching tools and methodologies (Unyfed, 2018). It offers a versatile platform where lessons can be delivered through videos, online materials, or interactive group discussions, providing the benefit of allowing students to access content on any device, anytime (Pedro et al., 2018). As a result, the contemporary utilization of technology for information storage significantly enhances students' ability to access information.

In the Gulf region, universities have recognized that the shift in media formats has transformed many educators from being experts to presenters of others' expertise. In such contexts, it's necessary for the role of educators to evolve from mere conveyors of expert knowledge to facilitators of diverse viewpoints. As mobile technology reshapes the responsibilities and roles of learners, the educator's role is gradually shifting towards that of a consultant. In this capacity, educators are required to identify students' interests, link these interests with the learning objectives related to the subject, and provide means to achieve these objectives tailored to the individual learner's conditions. Imtinan (2013) highlighted critical functions of teachers within mobile learning environments, emphasizing their competence in utilizing necessary mobile tools and technologies, assessing the strengths and weaknesses of applied methods, addressing shortcomings through alternative strategies, and fostering a supportive and advisory presence. They are also expected to build confidence in course content, engage in learning alongside their students, overcome obstacles while boosting learner motivation, organize activities that promote

interactive collaboration among groups, and conduct process evaluations. Yet, amidst these multifaceted roles, educators must effectively deliver their planned lessons, adeptly alternating between roles such as orchestrator and facilitator as the situation demands (Rapanta et al., 2020). Even though the Gulf University has a direction to enhance the use of technology in the process of teaching and learning, the overall performance is still in need for more effort to support it, so this study examines the transition of teachers' roles for the significance of mobile learning at the Gulf University.

Content – The traditional classroom tools like chalkboards and overhead projectors are becoming a thing of the past. Unyfed (2018) argued that m-learning not only serves to disseminate information but also transforms content delivery into an enjoyable and interactive process, significantly boosting student engagement. Features such as interactive games, quizzes, videos, and the capability for one-to-many sharing exemplify the diverse functionalities m-learning introduces. Mitchell & Reushle (2013) emphasize that learning content should be designed in such a way that it allows users to efficiently locate the information they need. Furthermore, the research by Rapanta et al. (2020) highlighted the necessity for learning activities to incorporate specific attributes—namely, a blend of social, cognitive, and facilitative elements—alongside the imperative to tailor assessment methods to align with evolving learning paradigms.

Environment – The nexus between student engagement, academic achievement, and the learning environment is unmistakable. An m-learning strategy empowers educators to craft a learning ambiance that fosters a positive educational experience. Unyfed (2018) highlighted that m-learning not only grants students access to course materials from any device but also organizes information in a logical manner and cultivates a virtual space where students can engage with peers and educators. This interaction can range from posing questions and exchanging ideas to seeking feedback. The role of educators, as noted by Rapanta et al. (2020), involves curating tasks, environments, and resources conducive to learning. Thus, it's crucial for the learning environment to bolster interaction among student groups as well as between students and teachers. Tools like wikis, social networks, and blogs serve as excellent platforms for enhancing social interactions, further enriching the educational experience.

Assessment – M-learning platforms offer educators enhanced capabilities to publish grades and deliver more comprehensive feedback on assessments than traditional methods might allow. For

instance, an educator could illustrate a point by comparing a screenshot from a specific textbook page with a student's incorrect exam response, facilitating a clearer understanding of mistakes (Unyfed, 2018). Assessment plays a pivotal role in a holistic m-learning program, where mobile technologies offer sophisticated means to evaluate, document, and communicate learner performance to instructors. Thus, student assessments should leverage diverse tools such as database logs, specialized software, online exams, chat rooms, discussion boards, online quizzes, and project evaluations. Moreover, it's encouraged that students engage in self and peer assessments.

Pappas (2015) emphasizes that each unit or module within e-learning platforms should incorporate assessment activities, underscoring the necessity for assessments to be integrated components of the learning experience. The strategic inclusion of assessment in mobile learning ensures the provision of well-crafted evaluations, enabling learners to assimilate essential knowledge and achieve their personal or professional objectives effectively.

3.4.2. Features of Mobile Learning

Andre (2019) delineated the fundamental aspects and traits of mobile learning (m-learning), highlighting its ubiquity and reliance on portable, blended, private, interactive, collaborative tools, which offer instant access to information. Mobile devices now facilitate learning at any place and time, catering to the diverse learning preferences of students for efficient and effective education (Ismail et al., 2011).

Ubiquitous/Spontaneous: M-learning stands out for its spontaneity and context-awareness, allowing learning in any setting (Ozdamli & Cavus, 2011). Research into ubiquitous learning shows that mobile and portable technologies enable access to information regardless of physical location (Pimmer et al., 2016), enhancing learning opportunities significantly beyond traditional methods through its interconnected, real-time, and interactive nature, supplemented by User-Generated Content for convenient and immediate learning experiences.

Portable size of mobile tools/microlearning: The compactness of mobile learning tools underscores their portability, making them ideal for use in various learning scenarios (Ozdamli & Cavus, 2011).

Microlearning, specifically designed for mobile devices, breaks down information into manageable, bite-sized pieces, facilitating learning at any time and place.

Blended/Gamification: Incorporating m-learning into a blended learning framework enhances the strengths of both in-person and online education (Wilson, 2019; Ismail et al., 2011). Gamification of lessons, by making learning more game-like, increases student engagement and knowledge retention.

Private: M-learning offers a private learning experience, accessible to individual students on their devices, enabling them to connect and download content independently from others (Ozdamli & Cavus, 2011).

Interactive: The integration of advanced technologies in m-learning environments introduces an interactive dimension to educational activities (Valverde-Berrocoso et al., 2020). Students engage actively with content through various levels of interactivity, with technology serving as an interactive partner in the learning process.

Collaborative: Mobile technologies facilitate communication among students and between students and teachers, supporting collaborative learning endeavours (Ozdamli & Cavus, 2011). Encouraging peer learning and the creation of microlessons by students for their peers can significantly enhance engagement and contextual relevance.

Instant information: The essence of using mobile tools lies in their capacity to provide immediate information (Ozdamli & Cavus, 2011; Cohen, 2010; Ismail et al., 2011). Content tailored to this need enables learners to swiftly locate pertinent information, addressing their queries promptly.

3.4.3. Advantages of Mobile Learning

The ascendancy and endorsement of mobile learning (m-learning) are accelerating globally, propelled by the increasing availability of cost-effective mobile devices and the requisite infrastructure to support mobile technology (Jalil et al., 2015). Kumar & Chand (2019) point out that mobile learning technologies enable anytime, anywhere learning, a development facilitated by the widespread, affordable access to mobile devices. This accessibility has prompted

educational institutions worldwide to adopt mobile technology for innovative teaching and learning methods.

The Higher Education Academy report of 2014, as cited by Vrana (2018), identified several potential advantages of mobile and wireless learning. These benefits include the personal, private, and familiar nature of mobile devices; their role in lowering perceived learning barriers; the pervasive ownership of mobile phones among learners; the high portability of devices enabling learning from any location; the capability of mobile devices to integrate learning into daily life, utilizing otherwise idle time; and the facilitation of immediate communication and data sharing. Additionally, mobile learning supports context-aware learning, real-time data capture, mentor-student interaction, timely reminders for learners, and the delivery of just-in-time e-learning resources. It also encourages the integration of abstract and concrete knowledge, enhancing both field and classroom learning.

As technology evolves to become more potent and widespread, it offers educators an asset to facilitate learning. Many higher education institutions are implementing m-learning to introduce flexibility into educational processes. The advancements in mobile technology over the past decade have rendered learning more accessible, supporting education both in and outside the classroom. Educators and researchers play a crucial role in promoting mobile technologies as learning tools, enhancing students' educational experiences whether onsite or remotely.

The rapid progression of mobile technology and the ubiquity of wireless devices have positioned mobile learning as a viable solution for delivering ICT training to educators (Yusri et al., 2015). The integration of mobile technology in education is anticipated to significantly impact learner experiences and outcomes, making education more dynamic and accessible, thereby freeing students from the confines of the traditional classroom.

In the sphere of higher education, m-learning has been associated with various student benefits, including improved academic performance (Shuja et al., 2019), enhanced motivation (Valeeva et al., 2019), and the development of skills such as self-regulation (Khan et al., 2019a) and cooperative work (Romero-Rodríguez et al., 2020). These advantages underscore the multifaceted impact of m-learning, which supports continuous, flexible learning; encourages both informal and

formal learning; aids personalization; and fosters ubiquitous, contextually relevant learning experiences.

Research also indicates that the m-learning environment in higher education positively affects system quality, influencing students' perceptions of usefulness and ease of use (Fox, 2019; Khan et al., 2019; Lim et al., 2019). M-learning not only helps students develop various skills but also promotes collaboration, knowledge sharing, and thus, enhances learning outcomes.

In Spain, a study by Domingo and Garganté (2016) on the impact of mobile technology in classrooms from teachers' perspectives found that m-learning primarily facilitated access to information, introduced new learning methods, and increased engagement. However, collaborative learning was seen as less impacted. An investigation by Hur, Wang, Kale, and Cullen (2015) into student teachers' perceptions of mobile device integration in classrooms highlighted the importance of perceived usefulness and self-efficacy for technology integration.

In the Gulf Cooperation Council (GCC) context, research in Oman, the United Arab Emirates (UAE), and Bahrain has explored the factors driving and the status of m-learning adoption in higher education. Studies by Sarrab et al. (2018) and Al-Emran and Shaalan (2016) have examined challenges, learner attitudes, and instructor perspectives regarding m-learning. These studies underscore the benefits of mobile learning, emphasizing its accessibility, usefulness, and positive reception among students, thus advocating for its appropriate application across educational settings (Mohtar et al., 2023).

3.4.4. Challenges of Mobile Learning

Incorporating portable technology and gadgets into learning spaces while prioritizing student mobility, m-learning introduces diverse prospects in the realms of educational theory and application (Berger et al., 2018). Nevertheless, the assimilation of m-learning within higher education may face numerous obstacles. Tabor (2016) outlines these hurdles as issues with connectivity, the constraints of small display sizes, the limitations of processing capacity, insufficient storage, brief battery lifespan, diminished input functionality, non-intuitive user interfaces, and intricate input procedures. The diminutive nature of keyboards or touch interfaces might necessitate more time for learners to locate information than to peruse it. Furthermore, recent

advancements in technology have been leveraged to enhance student engagement and learning effectiveness (Senaratne & Samarasinghe, 2019). Present studies assess m-learning's place within existing educational frameworks, advocating for its legitimacy as an instructional strategy (Tabor, 2016); (Kumar & Chand, 2019); (Khalil-Ur-rehman et al., 2020). The smartphone paradigm is crucial in m-learning for education, yet its implementation poses technical and cultural hurdles for educational frameworks. Universities might gain by identifying m-learning adoption factors to navigate these challenges (Huan et al., 2015). With the m-learning market growing more international, acknowledging cultural variances becomes essential for universities and training bodies to achieve a competitive advantage.

O'Bannon and Thomas (2014) analysed the impact of educators' ages on their attitudes towards mobile phone usage. Findings revealed no significant age-related differences among teachers below 32 and those between 33–49 years, unlike those over 50, who differed markedly in mobile phone ownership and classroom use support, alongside their perceptions of mobile features and instructional hurdles. In each scenario, the older educators showed lesser enthusiasm for smartphone ownership, classroom mobile usage, feature benefits, and viewed obstacles as more severe. Moreover, Hur & Bannon (2013) discovered that most student educators deemed mobile device integration highly beneficial for students and were eager for instructional use, despite concerns over classroom management and skill deficiencies preventing classroom application. These studies in the U.S. suggest that technologically adept teachers implement m-learning successfully in classrooms. Teachers above 50 faced difficulties and were less inclined towards mobile device classroom integration. In contrast, student educators found mobile devices extremely beneficial but lacked confidence in classroom management with these tools. Therefore, educating both teachers and students on m-learning is critical for its effective deployment in educational settings.

Additionally, Naismith et al. (2004), as mentioned by (Abu-Al-Aish, 2014), highlighted essential challenges in m-learning implementation. Among these, privacy issues arise since m-learning can access environmental information about users. M-learning's mobility connects learners to activities anytime, anywhere, potentially decreasing engagement with instructors or curricula. Moreover, sustaining learner interaction over time necessitates efficient mobile devices for organizing and reflecting upon the m-learning journey, particularly for lifelong learners. The informality of m-

learning, while enhancing informal learning opportunities, might lead learners to prioritize leisure over educational tasks, such as engaging on social networks. Also, the desire for personal device ownership and control can pose institutional challenges in governing technology usage (Okai-Ugbaje et al., 2022).

Designing m-learning applications with pedagogical integrity is vital for enriching learning experiences within mobile settings, especially in higher education, where bridging formal and informal learning gaps is paramount for achieving pedagogical objectives (Jalil et al., 2015). Awareness of the factors affecting m-learning acceptance in higher education is essential. The voluntary engagement and cognitive participation in m-learning activities are critical for its success. M-learning significantly supports the development of innovative, collaborative, and communicative learning environments (Al-Hunaiyyan et al., 2018) (Pollara, 2011). However, realizing these goals via m-learning necessitates that educators are well-versed in effective instructional methods, possibly requiring specific training to enhance m-learning's efficiency and effectiveness.

Moreover, m-learning is grounded in a constructivist approach, as (Giousmpasoglou & Marinakou, 2013) noted, where learning is seen as an active construction of new ideas based on existing knowledge. M-learning also aligns with connectivism theory, advocating for learners to actively seek meaning through network engagement; learning is essentially about forging connections and developing a network. Yet, this presents a challenge in m-learning execution.

In a U.S. study, Goad (2012) utilized a Mann-Whitney U test, finding no significant difference in technology usage attitudes between STEM and non-STEM teachers. However, a t-test indicated that STEM teachers self-reported significantly higher skill levels in designing and accessing technological lessons than their non-STEM counterparts. As technological proficiency increased, so did the teacher's lesson design and access capabilities, indicating that technological skills are precursors to m-learning implementation. This underscores the necessity of training educators in m-learning for its successful integration.

To encapsulate, the core advantage of m-learning lies in its capacity to provide educational content ubiquitously, thus engaging students more effectively. This facet underscores its importance to higher education worldwide, despite its relatively new entry. Its widespread acceptance among

university students underscores the need for educational institutions to stay abreast of mobile device utilization trends and the evolving landscape of m-learning. The relevance of mobile technology in education, particularly highlighted during the COVID-19 pandemic, emphasizes the necessity of equipping educators with the requisite technological proficiency for maximizing the benefits of m-learning. The pandemic period showcased m-learning as an effective strategy for crafting educational activities, thereby affirming its value. This inquiry adds to the academic dialogue by examining the significant pedagogical application of m-learning within the context of Gulf University's faculty.

3.4.5. Online Pedagogy in Higher Education

Online pedagogy's ascent in higher education has been both an innovative advancement and a complex challenge, especially given the rapid and necessary transition catalyzed by global events. The efficacy of online learning, while sometimes contested, shows promise under certain conditions (Allen & Seaman, 2013; Jaggars, 2014). Student engagement in virtual classrooms, lacking physical cues, requires multifaceted strategies to maintain motivation and interaction (Dixson, 2015; Martin et al., 2012).

Technological advancements serve as both catalysts and barriers in the realm of online education, introducing a set of complexities that can enhance or hinder learning experiences, especially in the face of global digital inequality (Selwyn, 2011; Q. Wang et al., 2013). Pedagogical diversity in online instruction can range from direct instruction to constructivist approaches that leverage collaboration and social learning (Garrison et al., 1999; Vygotsky & Cole, 1978).

Assessment within online modalities calls for innovative methods that align with virtual environments and promote application-based learning (Olt, 2002). The swift growth of online education platforms has led to a reliance on less empirically grounded pedagogical models and underscores the need for rigorous instructional design and delivery methods (Y. Zhao et al., 2005). Faculty readiness for online teaching has emerged as an area in need of development, highlighting the gap in preparation for teaching in virtual classrooms (Baran et al., 2011).

The growing field of online education necessitates a concerted effort to address the unique challenges it presents, ensuring the delivery of high-quality, accessible, and equitable education across diverse learning landscapes.

3.5. Challenges of Online Pedagogy for Teachers in Higher Education

The introduction of online pedagogy in higher education heralds a flexible approach to learning while presenting a host of challenges for teachers. The adaptation from conventional to digital teaching requires a comprehensive understanding of the obstacles that teachers face, such as technological proficiency, pedagogical adjustments, and student engagement in an impersonal medium. This critical review engages various empirical studies and theoretical perspectives to parse out the multifaceted nature of these challenges.

3.5.1. Technical competency

Technical competency is foundational to the effective administration of online education, significantly affecting the caliber and efficiency of the educational experiences that learners receive (Dahlstrom et al., 2013; Martin et al., 2020; S. D. Smith et al., 2009). The progression towards digital learning underscores the pressing need for teachers to acquire and refine a wide array of technical abilities for proficient functioning in an online instruction environment. The scholarly inquiry into technical competency delineates a broad array of hurdles that teachers encounter, encompassing the mastery of diverse educational technology platforms to the application of digital evaluation mechanisms and the development of digital content to elevate learning (Dahlstrom et al., 2013; Martin et al., 2020; S. D. Smith et al., 2009).

(S. D. Smith et al., 2009) early work drew attention to the unease and unpreparedness of teachers in confronting the technical demands of online education. Such hesitancy underscores the transformation in digital literacy that is expected of teachers, who have historically been ingrained in in-person teaching modalities. The adaptation to online teaching platforms is not simply a matter of grasping new technologies but also about integrating these tools effectively to maintain and improve the quality of pedagogy.

(T. Johnson et al., 2012) amplify this notion by associating limited technical proficiency with a decline in instructional quality and student interaction methods. They emphasize that teachers are

tasked not just with the dissemination of content but also with fostering an interactive educational setting that calls for a harmonious blend of technical savvy and pedagogical expertise. An educational void emerges when there is a mismatch between the technical skills available and those requisite for proficient online instruction, potentially diminishing student engagement and educational outcomes.

Recent discussions by (Martin et al., 2020) suggest that adept online instruction necessitates teachers to utilize sophisticated educational technologies tailored to varied learning preferences and needs. However, the potential of such technologies remains untapped or improperly employed due to a lack of sufficient training or support for teachers, leading to substandard educational encounters.

The transition to technology-integrated education demands a reevaluation of instructional strategies. As proposed by (Greenhow & Lewin, 2019), online educational settings necessitate distinct approaches to curriculum delivery and student assessment, which diverges from traditional educational practices. This complexity requires teachers not only to be proficient in technology but also to develop and apply new pedagogical strategies effectively.

Furthermore, the synthesis of technical competency with the faculty's capacity for critical assessment and selection of digital tools is essential. The Technological Pedagogical Content Knowledge (TPACK) framework proposed by (M. J. Koehler et al., 2007), posit that efficacious teaching with technology is contingent upon a teacher's understanding of the relationship between their subject content, pedagogy, and the technology at their disposal.

Continuous Professional Development is thus essential, as highlighted in literature, underscoring the need for persistent and strategic training programs that address teachers' specific contexts (Desimone, 2009). Such Continuous Professional Development programs may be evaluated for their effectiveness in fostering technical proficiency and in enhancing overall teaching practices continually.

Teachers' perceptions of and attitudes towards the use of educational technology also play a crucial role in their technical development (Ertmer & Ottenbreit-Leftwich, 2010). While some teachers are optimistic about the transformative potential of technology in teaching and learning, others

may view the adoption of new technological skills as a daunting task that requires considerable time and effort.

Variability in technical competencies across different educational settings is also a significant concern, with several influencing factors such as institutional support, resource availability, and individual motivation affecting technology adoption in teaching (Hennessy et al., 2007). Consequently, it is imperative that strategies for enhancing technical competency are customized to address the wide array of factors impacting teachers' ability to navigate and excel in online teaching environments.

Literature paints a complex picture of the technical competency landscape within online education, indicating an acute need for teachers to continuously evolve their technical skills to meet the demands of modern educational delivery. As universities globally, including those in Bahrain, pivot towards online pedagogy, and the Continuous Professional Development of teachers becomes critical in ensuring their self-efficacy and readiness to deliver quality education through digital platforms. This study attempts to contribute to the field by evaluating the effectiveness of Continuous Professional Development programs in enhancing teachers' technical competencies, readiness, and self-efficacy, providing valuable insights into informed policy-making and institutional support measures.

3.5.2. Instructional designs

The expanse of literature surrounding online pedagogy illuminates the pressing need for educational methods and instructional designs that respond to the distinct nature of the digital learning environment (Conrad & Donaldson, 2011)(Siemens, 2005) (H. Huang, 2002) (Allen & Seaman, 2014)(Palloff & Pratt, 2002)

This transition from conventional, instructor-centered teaching to learner-focused online methodologies signifies more than a mere shift in delivery platforms; it represents a fundamental change in educational paradigms. (Conrad & Donaldson, 2011), advocate for this change, suggesting a pedagogical shift towards placing learners at the heart of their educational journey, thereby endorsing the principles of constructivism and connectivism as cornerstones for online instructional strategies.

Constructivist theory, with its emphasis on learning as a process shaped by individual experiences and reflective practices, is particularly relevant to the design of online instruction. It encourages departure from passive reception of information to an engaged, active participation in the learning process (Conrad & Donaldson, 2011). According to (Siemens, 2005), in his connectivism theory, complements this view by framing learning as a distributed process, extending across a networked array of connections, facilitated by technology and driven by the diversity of available information and perspectives.

Adopting these theories for online instructional design requires teachers to transform their role from providers of knowledge to facilitators of learning, navigating students through an intricate web of digital resources (H. Huang, 2002). This necessitates instructional designs that align with complex, non-linear learning trajectories, ensuring that course objectives, activities, and assessments foster skills relevant to real-world applications.

(Allen & Seaman, 2014) support the crucial alignment of educational outcomes with content delivery, pedagogical methods, and technology to enhance the learning experience. They argue for the integration of technology as a deliberate component of instructional design, rather than as a mere adjunct to traditional methods.

Furthermore, (Palloff & Pratt, 2002) emphasize the importance of robust assessment strategies within online learning, advocating for the development of integrative assessments that provide authentic evaluation of student understanding. These assessments are intended to be not only summative but also formative, offering continual feedback that is integral to the constructivist and connectivism approach to education.

Despite the soundness of these instructional theories, their practical application is often met with challenges, as (Anderson, 2008) critiques the real-world difficulties teachers face, including inadequate training in online course design and the inertia of educational institutions that may default to traditional methods without adapting to the intricacies of the digital landscape.

Access and equity in online learning also present significant challenges, as highlighted by (Gorsky & Caspi, 2005), who address the need for instructional designs that cater to diverse student backgrounds and levels of digital literacy. Razzak (2022) noted the same issues in Bahrain context

where learners habitual of learning via traditional face-to-face teaching approaches found themselves in trouble in accessing and operating technology. This inclusivity is critical to bridge the digital divide and ensure equitable learning opportunities for all students. At the same time, it also highlights the importance of teachers' skills to design and deliver such instructional designs to cater to the students' diverse needs.

Resistance from faculty towards adopting new technologies and methodologies is not uncommon, often requiring institutions to offer considerable support and incentives to encourage adoption (Keengwe & Kidd, 2010). (M. Koehler & Mishra, 2009) suggest that such support is key to the successful integration of online instructional designs that are learner-centered and conducive to active, engaged learning experiences.

The research literature advocates for a reimagined approach to instructional design in online education, one that transcends technical proficiency and engages with robust, theory-based pedagogical strategies. This approach must be adaptive, reflective, and responsive to ensure that learning in the digital age is not only accessible and engaging but also equitable and effective across diverse educational contexts.

3.5.3. Emotional and cognitive load on teachers

The burgeoning field of online education has markedly influenced the pedagogical landscape, necessitating teachers to develop proficiencies beyond their traditional instructional roles. This transformation, while technologically driven, is inseparably intertwined with the cognitive and emotional labor that teachers undertake. Emerging from this intricate backdrop is a concern for the increased emotional and cognitive load borne by teachers, which is multifaceted and carries significant implications for their well-being and effectiveness.

(Bolliger & Wasilik, 2009) findings point to the magnified workload that accompanies online teaching, including the provision of continuous feedback and support to students. The immediacy and availability expected in virtual classrooms often blur the boundaries between work and personal time, leading to extended working hours and increased screen time. (Carroll et al., 2022; Y. Gold & Roth, 2013; Rudow, 1999) concur, documenting a rise in teacher burnout and stress, attributes commonly associated with increased workload in online teaching environments.

The load on teachers is further compounded by the necessity for continuous learning and adaptation to stay abreast with evolving technological tools and instructional design principles. This expectation to maintain dual competencies in content and technological adeptness imposes a substantial cognitive load. In cognitive theory terms, this constant need to toggle between different forms of work and interaction within the online teaching milieu leads to an increased intrinsic cognitive load, which is the effort associated with the task itself, and an extraneous cognitive load, which is the load imposed by the way information or tasks are presented to the teacher (Sweller, 1988).

The emotional toll on teachers in the digital age also stems from the transition from a more physical communal classroom environment to the relatively isolated nature of online interactions. Emotional labor, as (Hochschild Arlie, 1983) described, is the process by which individuals manage their feelings and expressions as part of their job role. For teachers, this includes maintaining a positive presence in virtual environments, exhibiting patience and understanding, and offering encouragement to students who may themselves be struggling with online learning modalities.

Furthermore, research has illuminated the psychological effects of this heightened emotional and cognitive load. Studies have shown that sustained periods of high workload and stress without adequate support can lead to decreased job satisfaction, diminished performance, and heightened susceptibility to mental health issues among teachers (Friedman, 2013; Kyriacou, 2001). When the demands of an occupation outpace the resources available to cope with those demands, as is frequently experienced in online teaching, the result is often chronic stress, which can culminate in burnout (Maslach et al., 2001).

Efforts to mitigate these pressures have centered on professional development and support systems that aim to provide teachers with strategies to manage online teaching demands effectively. However, while such programs are valuable, they often do not address the systemic issues that create excessive workloads, nor do they sufficiently alleviate the additional emotional labor resulting from the depersonalized nature of virtual classrooms (Darby, 2019). Moreover, the narrative of resilience in teaching often overshadows the institutional responsibility to ensure a sustainable work environment (Sutton & Wheatley, 2003).

Institutional policies and educational frameworks must therefore be scrutinized and reformed to reflect a deeper understanding of the cognitive and emotional exigencies of online teaching. This includes recognizing the complex interplay between the effective use of technology, pedagogical excellence, and the subjective well-being of teachers. The recognition of teachers' cognitive and emotional labor is not only a matter of empathy but also of effectiveness and sustainability in delivering quality education (Dolan, 2011).

This expanded discourse suggests that practical measures, such as the judicious use of synchronous and asynchronous tools, clear communication protocols, and reasonable expectations for student engagement, are crucial. There is a need for balance in the workload of teachers, acknowledging that not all educational objectives require the same level of technological integration or synchronous interaction, and that workload intensification can have diminishing returns on educational quality (Van der Spoel et al., 2020).

The consideration of these dimensions—emotional and cognitive load, work-life balance, the necessity for Continuous Professional Development, and systemic support structures—reflect an ongoing conversation that is critical to the vitality of the educational profession. Without addressing these concerns, the potential for online education to enrich and diversify learning experiences may be compromised by the declining well-being of its teachers. Further research is needed in the Bahrain context, particularly regarding the effectiveness of Continuous Professional Development, teachers' readiness, and self-efficacy for online pedagogy.

3.5.4. Cultural dynamics

Cultural dynamics represent an increasingly critical area of inquiry within online pedagogy, embodying a spectrum of challenges that pertain to cross-cultural communication, educational engagement, and the efficacy of teacher-student interactions. The intricacy of these dynamics is pronounced in cultures that are traditionally oriented towards strong interpersonal relationships and direct forms of communication, such as Arab culture ((Al-Mahrooqi & Denman, 2014). The literature of the current study thus far has underscored that while the digital platform of education transcends geographical barriers, it does not automatically bridge cultural distances.

(Al-Mahrooqi & Denman, 2014) observe that the transition to online learning platforms can generate friction within cultures that prioritize personal relationships and immediate

communication. Such friction arises from the impersonal and text-based interaction that is characteristic of many online educational environments. This is not a trivial matter; the nature of teacher-student interaction is a critical factor in student engagement and satisfaction. In this vein, cultures that value social presence and direct teacher engagement may find the asynchronous and remote interactions of online learning to be a barrier to effective learning.

Delving into cultural dynamics further, it becomes apparent that the dissonance between the expectations of personal interaction and the reality of online learning environments can lead to a perceived loss of the teacher's immediacy and availability. This perception is not merely an issue of preference but is tied to the learning process itself, where the presence of the teacher is instrumental in navigating the students' path to knowledge acquisition (Richardson, 2001). In an online context, this is often substituted with virtual immediacy, which, while functional, does not always satisfy the cultural expectations for personal contact.

Another aspect of cultural consideration is the interplay between cultural norms and the adoption and implementation of technological tools within the educational process. Where there is a misalignment, the gap is not just in the technical skills but also in the pedagogical assumptions underpinning the use of technology in education (Gunawardena et al., 2003). For instance, the perceived impersonality of online discussions may inhibit students from cultures with high-context communication styles from participating fully, given their preference for subtlety, nuance, and context over explicit text-based communication.

Critically examining the research, one notes that there remains a significant gap in culturally responsive online pedagogy. Efforts to design culturally sensitive online courses are frequently discussed but less frequently observed in practice (Edmundson, 2006). The overarching narrative suggests a call for nuanced, culture-specific instructional designs that integrate the technological proficiency demanded of online education with cultural sensitivity. Such integration must be proactive, where the curriculum and technology are both tailored to serve the educational needs of diverse cultural cohorts.

Furthermore, teachers' technical competency and emotional labor are interwoven with cultural expectations. The technical aspect requires teachers to not only utilize online platforms but to also convey cultural awareness through these mediums. Emotional labor extends to understanding and

nurturing the cultural identities and needs of students, which can be an arduous task amidst the pressures of adapting to new technologies and pedagogical shifts (Aparicio et al., 2016).

The literature also reveals that the cultural dynamics of online learning extend beyond the relationship between teachers and students. Cultural considerations affect peer interactions within online forums, collaborative work, and the interpretation of content (Rogers et al., 2007). In courses where collaboration is key, the lack of nonverbal cues and the dependence on written communication can create challenges for students and require instructors to develop new strategies for fostering interaction and understanding (Rogers et al., 2007).

There is a recognized need for research that moves beyond the recognition of cultural differences towards the development of practical strategies and instructional design principles that are culturally accommodating. Such work is critical to enhancing the engagement and learning experiences of students from diverse cultural backgrounds in online settings (Farley & Burbules, 2022; Yamo et al., 2022). The challenge for online pedagogy is thus to create a balance between the global reach of technology and the local specificity of cultural practices. It demands a level of cultural literacy from teachers that is currently underrepresented in the discourse of online teaching competencies. Without this balance, the risk is not just a loss of engagement or satisfaction, but the potential marginalization of students whose learning styles and preferences are deeply rooted in their cultural context.

In conclusion, while online pedagogy offers the potential for innovative and flexible teaching and learning, it also presents a host of challenges that teachers must navigate. These challenges include technical proficiency, pedagogical adaptation, teacher presence, assessment integrity, and the need for professional development. These considerations highlight the importance of further research in the Bahrain context, particularly focusing on the effectiveness of Continuous Professional Development, teachers' readiness, and self-efficacy for online pedagogy. As this review transitions to the topic of teachers' self-efficacy for online pedagogy, the ability of teachers to feel confident and capable in online environments is paramount to the success of higher education's digital future.

3.6. Teachers' Self-efficacy for online pedagogy

Self-efficacy, or the belief in one's capabilities to execute actions necessary to produce designated levels of performance (Bandura, 1997), is a potent determinant of teachers' willingness to engage

with and success in online pedagogy. In synthesizing the extant literature on the self-efficacy of teachers for online pedagogy (Compeau & Higgins, 1995) (Anderson, 2008) (Mueller et al., 2008) (H.-M. Huang & Liaw, 2005) (Tschannen-Moran & Hoy, 2001), it is vital to note how this intersects with the need for technical competency, adherence to instructional designs, the emotional and cognitive load on teachers, and the navigation of cultural dynamics previously discussed.

The burgeoning demand for online education necessitates that teachers not only develop technical skills but also foster the belief that they can effectively apply these skills. As such, teachers' self-efficacy has emerged as a significant focus within educational research, highlighting the extent to which it impacts both the adoption of online teaching practices and the quality of instructional delivery (Compeau & Higgins, 1995). High levels of self-efficacy among teachers are associated with a greater willingness to experiment with new technologies and pedagogical strategies, a key component in successful online instruction (Anderson, 2008).

The criticality of self-efficacy becomes even more pronounced when considering the rapid evolution of digital learning environments. Researchers have noted that self-efficacy influences not only teachers' ability to integrate technology but also their persistence when facing technological challenges (Mueller et al., 2008). Inadequate self-efficacy can be linked to suboptimal outcomes in online teaching, with teachers either underutilizing available resources or eschewing innovative practices altogether (H.-M. Huang & Liaw, 2005).

A closer examination of the literature reveals several factors that contribute to teachers' self-efficacy in online environments. Training and professional development play pivotal roles, offering teachers the support needed to develop both their technical skills and their confidence in using these tools (Tschannen-Moran & Hoy, 2001). Studies have indicated that targeted training can alleviate the emotional and cognitive loads that teachers experience during the transition to online pedagogy, ultimately improving self-efficacy (Skaalvik & Skaalvik, 2007).

However, self-efficacy's influence extends beyond training to encompass individual teachers' technological attitudes, prior online teaching experiences, and the perceived intricacies of digital instructional designs. Cultural aspects within online courses inject an additional layer of complexity, challenging teachers' self-efficacy as they endeavor to navigate the nuances that

influence student communication and engagement (Reeves & Reeves, 1997). Therefore, investigating the interplay of these factors within the Bahrain context is imperative as these issues have not been explored in this context before, thus highlighting the urgency of the current study.

Research has also illustrated the consequential link between self-efficacy and the dynamics of teacher-student interaction in virtual learning contexts. (Gibson & Dembo, 1984) found that high self-efficacy among teachers fosters educational behaviors conducive to student satisfaction and improved learning outcomes. Hence, teacher self-efficacy is a multidimensional factor with broad implications for online education quality. Despite the acknowledgment of its importance, research shows that teacher self-efficacy in online pedagogy is still an underdeveloped area, with studies often limited to self-report surveys that may not fully capture the complexity of this construct (Pajares, 1996). Critical analysis of these studies calls for more rigorous, longitudinal research designs that can better determine causality and the long-term effects of self-efficacy on teacher performance in online settings (Hodges & Kim, 2013).

Another critical aspect emerging from literature is the need for institutional support in nurturing teacher self-efficacy. The culture of an educational institution, including its value systems, resources, policies, and leadership, can significantly influence the development of self-efficacy beliefs among its staff (Cayirdag, 2017; Georgiou et al., 2020; Zee & Koomen, 2016). This institutional culture includes not only professional development opportunities but also recognition, incentives, and a supportive community that values innovation and risk-taking in online teaching practices. Therefore, it is particularly relevant to explore this topic within the Gulf university context, where higher education institutes in Bahrain strive to develop support systems aimed at enhancing teachers' self-efficacy in both online and face-to-face pedagogy.

3.7. Teachers' Readiness for online pedagogy

Readiness for online pedagogy encapsulates the preparedness of teachers to transition from traditional classroom settings to digital teaching environments. This readiness is multifaceted, hinging on a variety of factors that span technical proficiency, instructional design acumen, emotional and cognitive fortitude, and the adept navigation of cultural variances. Central to these considerations is the teachers' self-efficacy, which fundamentally equips them with the confidence to implement online teaching modalities effectively.

The reciprocal relationship between self-efficacy and online pedagogical readiness has been well-documented, with findings consistently demonstrating that higher self-efficacy correlates with a teacher's adaptability and proactive engagement with digital teaching platforms (BRown & Munger, 2010; Harasim, 1993; Moore, 2013; Tompkins & Weinreich, 2007). (Holden & Rada, 2011) underscore this by identifying a link between teachers' beliefs in their technical capabilities and their subsequent adoption of digital teaching tools, an aspect integral to readiness.

However, the progression towards readiness transcends the domain of self-efficacy to encompass external factors, including institutional backing and resource availability, as argued by (Ertmer & Ottenbreit-Leftwich, 2010). These elements collectively influence the extent to which teachers can integrate technology into their teaching practices, irrespective of their self-belief in doing so.

Professional development is crucial in this ecosystem, serving to enhance both self-efficacy and readiness. (Canning, 1999; Gillies, 2008; Vandenberg & Magnuson, 2021) highlighted that targeted training sessions are instrumental in improving teachers' willingness to utilize online tools, thereby bolstering their readiness for online pedagogy. Moreover, (Klassen et al., 2010) demonstrated that the emotional and cognitive demands on teachers significantly dictate their preparedness for online teaching, advocating for supportive structures that alleviate associated burdens.

Addressing the alignment with cultural dynamics, it is essential to acknowledge the findings by (Duncan & Young, 2009) that highlighted the cultural challenges faced by teachers in online environments. Teachers' readiness is often taxed when required to adjust their communication styles and instructional materials to cater to diverse cultural expectations and learning styles in the online realm.

Therefore, readiness encompasses a broad spectrum of competencies and beliefs. The existing literature firmly establishes that teacher self-efficacy is an influential predictor of their readiness for online pedagogy, and this relationship is modulated by experiences, support, and continuous learning opportunities (Duncan & Young, 2009) (BRown & Munger, 2010; Harasim, 1993; Moore, 2013; Tompkins & Weinreich, 2007) Ottenbreit-Leftwich, 2010; (Klassen et al., 2010).

However, it is critical to note that while much of the research points to positive correlations between self-efficacy and readiness, there is a need for caution in assuming causality. The existing research predominantly employs cross-sectional study designs, which are limited in their ability to establish directionality in the self-efficacy-readiness relationship (Allinder, 1994). Longitudinal studies would contribute significantly to understanding how self-efficacy develops over time with online teaching experiences and how it predicts readiness in the long term.

In brief, teachers' readiness for online pedagogy is a complex construction influenced by a myriad of factors, including technical, instructional, emotional, cognitive, and cultural competencies. It is inextricably linked to self-efficacy, with both requiring attention from research and practice perspectives to facilitate effective online pedagogical experiences. The literature reviewed here attests to the value of continued research in this field, urging for the exploration of self-efficacy's role in promoting adaptive, resilient, and culturally sensitive online teaching practices and Continuous Professional Development design and implementation in the context of Bahrain.

3.8. Professional Development of Teachers for Online Pedagogy

The landscape of education has seen a seismic shift towards online pedagogy, necessitating a parallel change in the professional development of teachers. As teachers grapple with the multifaceted challenges of technical competencies, instructional design, emotional and cognitive loads, and cultural dynamics, their readiness and self-efficacy in online teaching environments emerge as critical determinants of their effectiveness. Professional development plays a cardinal role in fortifying these competencies.

Professional development is increasingly recognized as pivotal in preparing teachers for the demands of online pedagogy, with a direct impact on enhancing teacher self-efficacy and readiness (Desimone, 2009). Self-efficacy, as discussed earlier, reflects the belief in one's capacity to execute necessary actions effectively, a belief that underpins teachers' adaptability and willingness to embrace online teaching ((Guskey, 2002). Professional development activities that foster teacher efficacy must, therefore, be as varied and multifaceted as the online teaching context itself.

Professional development for online teaching spans a diverse array of developmental activities, from workshops and seminars to mentoring and collaborative learning opportunities. (Desimone, 2009) suggests that effective professional development should fundamentally alter teachers'

knowledge, skill sets, and overall instructional perspectives, ultimately influencing their teaching practices and student learning outcomes. (Guskey, 2002) delineates five critical levels at which professional development outcomes should be assessed to confirm their effectiveness, ranging from the immediate reactions of participants to the long-term learning gains of students.

However, a discrepancy often exists between the theoretical benefits of professional development and its practical impact. (Dede et al., 2009) argue that, despite the considerable resources devoted to professional development, there is an observable deficiency in its ability to alter teaching practices substantially. This shortfall is attributed to professional development programs that are often piecemeal, lack contextual relevance, or are detached from the concrete needs of teachers and students (Garet et al., 2001). Moreover, the design of professional development frequently lacks the sustained duration and intensity necessary for it to be transformative.

The literature thus calls for professional development programs that are not only continuous and intensive but also strategically integrated into teachers' professional lives. Such programs should be tailored to the real-world challenges and experiences of teachers, ensuring relevance and applicability. As online education continues to grow, the role of well-structured professional development in promoting teacher efficacy and readiness becomes crucial, necessitating a committed response from educational institutions to bridge the gap between potential and actualized benefits of professional growth initiatives activities (Garet et al., 2001).

Additionally, there is criticism of professional development offerings that fail to accommodate the emotional and cognitive demands placed on teachers transitioning to online environments. As pointed out by (Smylie, 1995), professional development often neglects the affective domain, which includes addressing teachers' stress, anxiety, and resistance to change. Professional development must, therefore, be holistic, catering not just to the acquisition of technical skills but also to the cultivation of a supportive professional culture that acknowledges the emotional and cognitive workload of teachers (Schlager & Fusco, 2003).

Regarding the design and delivery of professional development, a significant body of research recommends that professional development for online teaching should be modeled on best practices in online instruction itself (Fishman et al., 2013). This includes creating opportunities for collaboration, reflection, and engagement in meaningful, job-embedded tasks that mirror online

teaching's challenges and opportunities. Professional development must be iterative, allowing for the progressive refinement of teaching practices as teachers' familiarity with the online medium grows (Darling-Hammond et al., 2017)

3.8.1. Continuous Professional Development

Among the diverse types of professional development, Continuous Professional Development is considered pivotal. Continuous Professional Development is an ongoing process that encourages teachers to manage and record the skills, knowledge, and experience that they gain both formally and informally as they work, beyond any initial training (Desimone, 2009) (Singh et al., 2021). It's a holistic approach that encompasses various facets of a teacher's growth, not just isolated training sessions (Craft, 2002). It reflects a commitment to being professional, keeping up to date, and continuously seeking to improve. It is also part of a sector-wide shift in paradigms that views learning as a lifelong endeavor crucial for teachers.

Keeping these merits reviewed in literature, this study recognizes the need of exploring Continuous Professional Development as professional development intervention at the Gulf University to develop teachers' self-efficacy and readiness for online pedagogy. Various studies have dubbed Continuous Professional Development as playing a pivotal role in enhancing the skills and competencies of teachers transitioning to online pedagogy (Desimone, 2009) (Singh et al., 2021). Grounded in principles that emphasize renewal and expansion of knowledge, Continuous Professional Development initiatives seek to ensure teachers not only keep pace with the evolving educational landscape but also excel in it. As previously elucidated, the alignment of Continuous Professional Development with teachers' needs is fundamental to its success (Desimone, 2009). This literature review extends the discussion on the intricacies and empirical evidence surrounding the impact of Continuous Professional Development on teachers' proficiency in online education (Singh et al., 2021).

The cyclical model of Continuous Professional Development (see figure 3) is particularly commendable for its integration of learning, implementation, and reflection—affording teachers continuous growth opportunities. The efficacy of such a model is evident when compared to traditional professional development efforts, which often feature as episodic and disconnected from actual classroom practice. As per (Avalos, 2011; De Farias & De Araujo, 2018), genuine

professional growth is achieved when Continuous Professional Development is sustained over time, tailored to the teachers' needs, and rigorously evaluated against predefined benchmarks.

Research underlines the effectiveness of Continuous Professional Development that intertwines with actual classroom scenarios, thereby facilitating immediate application and reflective practice (Bessant et al., 2001; Bessant & Caffyn, 1997; Opfer & Pedder, 2011). Continuous Professional Development programs that lack this linkage often result in knowledge retention that is superficial at best and inapplicable at worst. The transformative potential of Continuous Professional Development lies in its iterative design, a notion that was operationalized in the context of this study by conducting a Need Analysis Survey (See Annex-1) that functions as the cornerstone of the tailored Continuous Professional Development process.

The development and refinement of Continuous Professional Development, involving experts and utilizing feedback mechanisms, are essential for its success. For example, a study by (Darling-Hammond & McLaughlin, 1995) emphasized the need for teachers to engage in active learning processes that promote the exploration and refinement of new teaching methods. Similarly, in developing the Continuous Professional Development model for this study, expert collaboration and a robust needs assessment were instrumental. The involvement of international experts from the United Kingdom in developing a four-week Continuous Professional Development model illustrates a global collaboration effort for educational innovation in this study (Brown & Green, 2019; J. D. Thompson, 2017).

Each of the four Continuous Professional Development cycles outlined in Annex-4 is a step towards mastering the domain of online pedagogy. Beginning with an initiation into digital teaching tools, moving towards participant engagement, advancing through classroom management in a virtual environment, and ending with a reflective phase, the Continuous Professional Development's structure exemplifies a comprehensive approach to teacher development (Borg, 2018; Guskey, 2000; Shaha et al., 2004). The inclusion of technological platforms such as Zoom, Moodle, and Flipgrid serves as an interactive medium that simulates and enriches the online teaching experience.

However, while the described Continuous Professional Development model has its merits, one must critically assess its universal applicability and scalability. It is imperative to question whether

such models, despite their rigorous design and expert backing, are accessible and adaptable across diverse educational contexts. Variability in technological infrastructure, institutional support, and teacher readiness could potentially limit the impact of well-conceived Continuous Professional Development programs.

Furthermore, a potential area of critique arises from the assessment of Continuous Professional Development efficacy. While pre- and post-data comparison offers insight into the progression of teachers' skills and confidence, the long-term sustainability of such development remains underexplored. Studies such as those by (Hasha & Newman, 2021; Jackson et al., 2015; Timperley et al., 2007) have called for longitudinal research to substantiate the claims of Continuous Professional Development's impact on teacher effectiveness and student outcomes.

Moreover, Continuous Professional Development's ability to address the emotional and cognitive loads of online teaching, which have become even more pronounced in the digital shift, warrants closer examination. Although these aspects are acknowledged in the design of Continuous Professional Development, the empirical evidence reflecting these specific outcomes remains sparse. Continuous Professional Development models need to incorporate strategies that can mitigate the stress and anxiety associated with technological pedagogy (Dasoo & van der Merwe-Muller, 2022; Hu & McGrath, 2011; Schlager & Fusco, 2003).

The literature suggests that for Continuous Professional Development to truly resonate with the ethos of professional learning, it must also engage with the cultural dynamics that shape educational practices. An intercultural understanding is indispensable, given the global reach of online education (Avalos, 2011). It is here that Continuous Professional Development programs can potentially foster a global pedagogical discourse and practice, particularly in the higher education institutes of Bahrain, that is inclusive and reflective of cultural diversity.

In essence, while the established Continuous Professional Development programs present a robust framework for advancing online pedagogy, a critical stance must be maintained regarding their execution and evaluation. Continuous Professional Development is not a panacea but a powerful tool in the advancement of teacher education, subject to the intricacies of implementation and the veracity of impact measures. Literature, thus, conveys a critical and evolving dialogue on the

nature and efficacy of Continuous Professional Development in the realm of online teaching. In this study, it is used to enhance teachers' self-efficacy and readiness for online pedagogy.

3.9. Summary

In synthesizing the body of research concerning the various dimensions of online education, the professional development of teachers holds significant implications for the quality of teaching and learning in virtual environments. Technical competency is not merely about familiarity with digital tools, but about the integration of these tools in a manner that enhances learning. The challenges of instructional design in online contexts demand a nuanced understanding of content delivery that is engaging and accessible to learners across diverse settings.

Emotional and cognitive load is central to teachers' ability to perform efficiently in online modalities. Teachers grappling with the adjustment to online platforms may experience heightened stress, which can impede their teaching effectiveness. Cultural dynamics further complicate this transition, as teachers must navigate the intricacies of a global classroom where learners bring varied cultural expectations to their educational experience.

To address these multifaceted demands, Continuous Professional Development emerges as a critical strategy for empowering teachers with the skills and confidence necessary for successful online pedagogy. Effective Continuous Professional Development, characterized by its cyclical and reflective nature, reinforces teachers' self-efficacy and readiness, as illustrated by the empirically backed models of professional growth (Avalos, 2011; Opfer & Pedder, 2011). However, this assertion is tempered by recognition of the gaps in accessibility and applicability of Continuous Professional Development programs across different educational contexts.

Universities worldwide, including those in Bahrain, are transitioning to online pedagogy, yet research on this shift remains limited. In Bahrain, prioritizing teachers' professional development has emerged as a crucial response to the challenges posed by the COVID-19 pandemic. While the immediate impact of COVID-19 may have subsided, its enduring effects underscore the necessity for university leadership to remain prepared for future eventualities. Furthermore, the imperative to integrate ICT, distance learning, and online components into teaching pedagogies has prompted universities to establish Continuous Professional Development programs, thereby institutionalizing them as integral components of their management strategies.

The present study's focus on Continuous Professional Development's role in cultivating teacher self-efficacy and readiness for online pedagogy is timely and pertinent at Gulf University. It contributes to the scant literature by delineating how teachers engage with Continuous Professional Development and the subsequent impact on their professional capabilities. As the educational landscape evolves, well-informed policy decisions, underpinned by robust research findings, are necessary to foster an environment where teachers can thrive, and students can achieve optimal outcomes. This study not only reflects on the necessary conditions for successful Continuous Professional Development but also evaluates its practical implementation, providing a cornerstone for future educational policy and practice.

CHAPTER 4: METHODOLOGY

4.1. Introduction

This chapter presents the methodology of this study. However, before moving to methodology, readers are reminded that the primary research inquiry guiding this study delves into the impact of Continuous Professional Development on teachers' preparedness and belief in their ability to effectively engage in online pedagogy. Supporting this overarching question are several sub-inquiries aimed at providing a comprehensive examination of the subject matter. These include exploring the perceived challenges and opportunities educators face in online pedagogy, evaluating the extent of teachers' confidence and readiness in this domain, analyzing whether teachers' belief in their capabilities influences their readiness for online teaching, and investigating the effectiveness of Continuous Professional Development in enhancing both teachers' confidence and readiness for online pedagogy. Furthermore, the study aims to discern potential variations in confidence and readiness among teachers of different age groups following Continuous Professional Development interventions. Additionally, the study seeks to understand teachers' personal experiences with Continuous Professional Development to enhance their confidence and preparedness for online pedagogy. By addressing these research questions, the study aims to offer valuable insights into the effectiveness of Continuous Professional Development initiatives in supporting educators' transition to online teaching and their overall professional growth in this realm

4.2. Philosophical stance

The philosophical stance of a research study provides the foundational beliefs about the nature of reality (ontology) and the nature of knowledge (epistemology). These beliefs guide the researcher's approach to understanding and interpreting the world (Creswell & Creswell, 2017).

Ontologically, research can be rooted in either a positive or a constructivist stance. Positivists believe that there is a single, objective reality that exists independent of human perception, which can be measured and quantified (D. A. Greenwood, 2013; Reyes et al., 2018; L. T. Smith, 2021). However, this stance often overlooks the subjective experiences and interpretations of individuals, which can be crucial in understanding complex social phenomena.

On the other hand, constructivists argue that reality is socially constructed and subjective, varying across individuals based on their experiences and interpretation (A. Caro, 2012; Chau, 2010; Dusst & Winthrop, 2019). While this stance values individual experiences, it can sometimes lack the objective rigor required to generalize findings.

Given the limitations of both positive and constructivist stances, this research adopts a pragmatic approach. Pragmatism allows the researcher to use a combination of both objective and subjective methods, focusing on what is most suitable for the research question (Morgan, 2007). In this study, for example, the first three questions including question 1, i.e., What are the challenges and opportunities that teachers perceive in online pedagogy? question 2, i.e., What is the level of teachers' self-efficacy and their readiness for online pedagogy? Does teachers' self-efficacy predict their readiness for online teaching? And question 3, i.e., Does Continuous Professional Development improve teachers' self-efficacy and readiness of online pedagogy, and is there any difference in the self-efficacy and readiness of teachers of different age group post Continuous Professional Development? require a more objective approach to answer. Whereas, to answer question 4, i.e., How do teachers experience Continuous Professional Development as intervention for their self-efficacy and readiness of online pedagogy? it is important to give voices to the teachers and capture their understanding from their perspective within their context. This requires a subjective understanding of the issues in hand. With this understanding, a pragmatic approach informs the overall methodology of this study.

4.3.Methodological Orientation

The methodological framework of a study delineates the systematic strategies researchers employ to collect, scrutinize, and interpret data. This framework is inherently shaped by the research aims and the philosophical underpinnings embraced by the researcher. At a macro level, research methodologies can be divided into qualitative and quantitative methodology.

Qualitative inquiry ventures into the complex realm of human experiences, judgments, and driving forces. It endeavors to explain the 'why' and 'how' behind observed phenomena, predominantly utilizing techniques such as in-depth interviews, focus group discussions, and ethnographic observations. The strength of qualitative research lies in its ability to provide profound, context-rich insights, emphasizing depth over sheer volume (Denzin & Lincoln, 2011). Nonetheless, it

grapples with challenges like limited generalizability due to its inherent contextual specificity. Moreover, the prolonged nature of qualitative studies and potential researcher subjectivity can be seen as limitations.

In contrast, quantitative research is anchored in the quantification of phenomena through mathematical, statistical, or computational modalities. It predominantly harnesses structured instruments like structured questionnaires and controlled experiments to amass data, which subsequently undergoes rigorous statistical analysis. The merits of this approach encompass its potential for generalizability and its objective nature (Creswell, 2014). Yet, it might inadvertently bypass the intricate, subjective nuances of human experiences, occasionally being critiqued for its perceived rigidity.

Recognizing the merits and demerits intrinsic to both paradigms, this study opts for a mixed-methods design. This design amalgamates the profound insights of qualitative inquiry with the expansive and objective nature of quantitative research. The espousal of a mixed-methods design resonates with the researcher's pragmatic philosophical orientation, underscoring the tangible ramifications of research and the prerogative of harnessing the most apt methodologies for the research query (Morgan, 2007).

The primary aim of this study is to empirically evaluate the effectiveness of the intervention, i.e., Continuous Professional Development, in cultivating teachers' online pedagogical competencies, as well as enhancing their readiness and self-efficacy. To objectively appraise this effectiveness, pre- and post-evaluative measures are instituted. A blend of descriptive and inferential statistical methodologies is used to determine the intervention's tangible impact, ensuring a methodologically robust, quantitative appraisal (Gough, 2021; Reyes et al., 2018).

On the other hand, this study is also oriented towards capturing the narratives of the teachers, thereby decoding their experiential journey through the intervention. This inherently demands a qualitative lens, which illuminates the multifaceted dynamics and interplays experienced by participants in the realm of online pedagogical practices. By amplifying the voices of the participants, the investigation furnishes a panoramic comprehension of the intervention's influence, transcending mere statistical representations (A. Caro, 2012; Chau, 2010). In conclusion, the methodological framework of this study meticulously navigates the complex

landscape of research methodologies, recognizing the inherent strengths and limitations of both qualitative and quantitative paradigms. By embracing a mixed-methods approach, the study harmoniously synthesizes the profound insights of qualitative inquiry with the rigorous objectivity of quantitative analysis. This pragmatic stance reflects the researcher's commitment to comprehensive understanding and robust evaluation, ultimately enhancing the validity and depth of the study's findings. Through this balanced integration of methodologies, the study endeavors to provide a holistic and nuanced exploration of the intervention's impact on teachers' online pedagogical competencies, ensuring a multifaceted comprehension that transcends mere statistical representation

4.4. Research Participants

The study's foundation was built upon the insights and experiences of 46 teachers (Female=32%) from Gulf University representing five disciplines Accounting and Finance (26%), Human Resource Management (13%), Mass Communication (11%), Interior Design Engineering (24%), and General Sciences (26%).

The selection of Gulf University as the focal point for this study was underpinned by several compelling reasons. Firstly, the campus had not previously seen the implementation of a similar Continuous Professional Development program. Secondly, there was a pronounced institutional emphasis on integrating online pedagogy. Lastly, the accessibility to the desired sample was deemed convenient, given the university's inclination towards the adoption of online pedagogy (Creswell, 2014).

A closer examination of the participants' demographics revealed a gender distribution where males (68%) outnumbered females (32%). Age-wise, the largest cohort was those under 40 years, accounting for 43% of the sample. This was followed by the 40-50 age bracket (33%) and those aged above 51 years (24%). When it came to professional experience, the lecturers were almost evenly distributed across the spectrum. About 31.1% had less than 5 years of experience, 35.6% had between 5 and 15 years, and 33.3% boasted more than 15 years in the field.

Educationally, two-thirds of the participants (66.7%) held a Ph.D., while the remaining one-third (33.3%) earned an MSc. Interestingly, more than half of the lecturers (57.8%) had a teaching

certificate, while 42.2% did not. This dichotomy extended to academic development training as well, with 52% having undergone such training and 48% not having done so. In terms of academic ranking, the majority were Assistant Professors (48.9%), followed by Lecturers (35.6%). Associate Professors and Full Professors made up 13.3% and 2.2% of the sample, respectively.

A critical aspect of this study was the participants' exposure to training development and online pedagogy. Only 33.3% had prior experience in training development, and a mere 8.9% had received online pedagogy training. This underscored the relevance and timeliness of the Continuous Professional Development program in the context of Gulf University's objectives. Classroom dynamics, another facet explored, revealed that many lecturers either taught classes with 20-40 students or those with more than 60 students, both groups representing 33.3% of the sample.

In conclusion, the diverse background of the participants, spanning different age groups, academic qualifications, and teaching experiences, promises to offer a comprehensive and multi-faceted perspective on the research topic. Their collective insights and experiences are poised to enrich the study's findings, ensuring they are both robust and representative (Gough, 2021; Reyes et al., 2018).

4.5. Action Research as Research Design

Research design can be conceptualized as the blueprint or roadmap that guides researchers in the collection, analysis, and interpretation of data. It provides the structure and strategy for a study, ensuring that the research question is addressed systematically and coherently (Creswell, 2014). A well-constructed research design is pivotal in ensuring the validity and reliability of the study's findings.

For the purposes of this study, the researcher has chosen Action Research as the guiding research design. Action Research is a participatory, democratic approach that seeks to bring about change in practices, understanding, and the environment in which these practices operate (Kemmis & McTaggart, 2007). Unlike traditional research, which often prioritizes theoretical contributions, Action Research is geared towards producing actionable insights. It is deeply rooted in solving

real-world problems and enhancing individual and community-based knowledge, particularly in the realms of teaching, learning, and related processes (Reason & Bradbury, 2001).

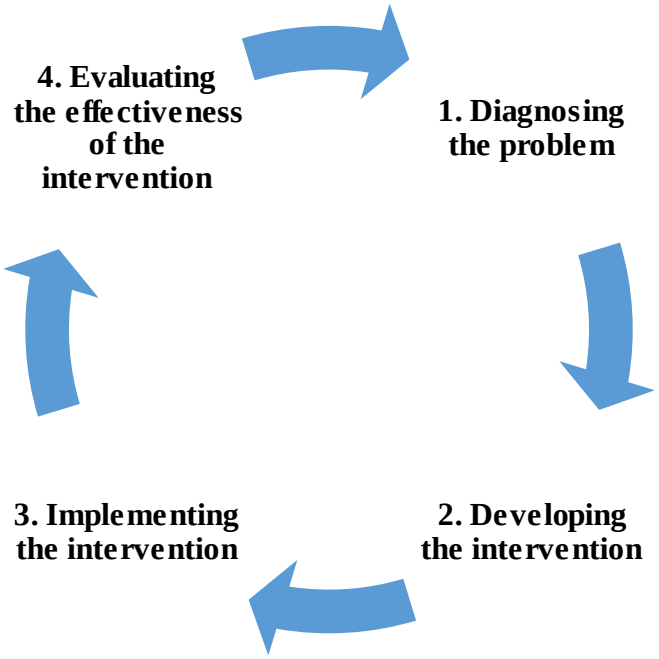

Figure 2 Stages of Action Research (Coghlan, 2019)

The choice of Action Research as the research design for this study aligns seamlessly with its objective and research questions. The main research objective of this study aims to evaluate the effectiveness of the intervention, specifically the Continuous Professional Development, in enhancing teachers' online pedagogical competencies and bolstering their readiness and self-efficacy. At the same time, this study also seeks to capture the narratives of teachers, offering a window into their experiential journey through the intervention. Action Research, with its emphasis on actionable insights and real-world problem-solving, is aptly suited to address these objectives as well as the research questions outlined earlier (Hine & Lavery, 2014; E. Stringer et al., 2019; E. T. Stringer & Aragón, 2020).

This study was conducted in four phases. At the first phase, the researcher gathered baseline data on participants' skills in online pedagogy, gauging their readiness and self-efficacy in employing online pedagogical strategies. Based on the insights gleaned from the diagnostic phase, an

intervention in the form of Continuous Professional Development was meticulously designed, at the second phase, to address the identified gaps and challenges. In the third phase, the Continuous Professional Development intervention was then rolled out over an entire semester, offering teachers the tools, strategies, and insights to enhance their online pedagogical prowess. At the final phase, a post-test was conducted to assess participants' skills in online pedagogy, their readiness, and self-efficacy. This quantitative assessment was complemented by in-depth interviews, which sought to capture the teachers' experiences, challenges, and insights during the intervention (Herr & Anderson, 2014).

The advantages of adopting an Action Research approach are manifold. It fosters a deep engagement with the research context, ensuring that interventions are tailored to the unique challenges and needs of the participants. Furthermore, its iterative nature allows for continuous refinement and adaptation, ensuring that the interventions remain relevant and effective (McNiff, 2009).

However, like all research designs, Action Research is not without its limitations. Its context-specific nature can sometimes challenge the generalizability of the findings. Additionally, the deep involvement of the researcher can potentially introduce biases, impacting the objectivity of the findings (D. J. Greenwood & Levin, 2006).

In conclusion, the choice of Action Research as the research design for this study offers a robust framework to address the research objectives. By intertwining quantitative assessments with qualitative insights, the study promises a holistic understanding of the transition to online pedagogy, especially in the context of intervention.

4.5.1. Phase 1: Diagnosing the problem.

At this stage of the research, three types of data were collected. First a need analysis (Need Analysis Survey) was conducted by the participants to understand their knowledge and understanding of the online pedagogy. Using a self-developed tool containing different aspects of online pedagogy was used to measure teachers' various needs for online pedagogy. At the same time, teachers' readiness and self-efficacy of using online pedagogy was measured as pre-test.

Teacher's readiness and self-efficacy was measured in pretest for the baseline data and later in the posttest for comparative purposes to assess the effectiveness of the intervention.

4.5.1.1. Need Analysis Survey

The Need Analysis Survey is an intricate tool designed to explore teachers' perceptions, competencies, challenges, and needs in the domain of online teaching (Hodges et al., 2020; Moore, 2013). Each section of the questionnaire focuses on a unique facet of online pedagogy, providing a comprehensive overview of the teachers' experience and needs (See Annex-1 for formatted tool which was presented to the participants).

The first section, "Self-Evaluation of Online Teaching Skills," consisting of three items, gauges teachers' confidence in using online teaching tools and their proficiency in implementing online teaching strategies. This self-assessment is crucial as it reflects the teacher's perceived readiness to engage in online teaching, a factor that can significantly influence their effectiveness in virtual classrooms (Bandura, 1997).

The second section, "Challenges in Online Instruction," comprising two items, seeks to understand the primary obstacles teachers face in the virtual classroom and their strategies for student engagement. Engaging students in online environments presents unique challenges, and understanding these can guide professional development efforts (Hodges et al., 2020; Moore, 2013). The third section "Students' engagement", with three items, delves into teachers' comfort in seeking students' feedback on their own teaching, students learning and engaging students in online learning.

The fourth section "Self-Assessment of Online Pedagogical Knowledge" section, with three items, delves into teachers' confidence of using online pedagogy for designing online curriculum, students' engagement, and assessment of students. The fifth section, "Learning Preferences for Professional Development," with four items offering multiple choices and open-ended questionnaires, discerns teachers' preferred formats for professional development. This reflects the importance of tailoring professional development to teachers' preferences to ensure effective learning (Knowles, 1984).

The sixth section, “Goals to participate in Continuous Professional Development” with three items, assess teachers’ expectation from Continuous Professional Development. Particularly, this section assesses whether teachers are expecting to enhance their online engagement techniques, or to improve their assessment methods or to improve their curriculum implementation. The final section “Prevailing Support Systems” with three items assess various ICT related supports they have that may help them in implementing online pedagogy. In summation, this questionnaire offered an opportunity to elicit a panoramic view of teachers' experiences, challenges, and needs in online teaching.

4.5.1.2. Teachers’ Readiness for Online Pedagogy Questionnaire

The Teachers’ Readiness for Online Pedagogy Questionnaire is a self-constructed Likert type questionnaire to measure teachers’ readiness for online pedagogy. It was applied in phase 1 for the post-test and later in phase 4 for the post-test. The questionnaire delves into the multifaceted dimensions of online teaching, capturing teachers' self-perceptions, competencies, and beliefs. It is structured around five primary constructs, each encompassing a set of items that shed light on specific aspects of the broader theme (See Annex-2 for formatted tool presented to the participants).

The first construction, "Self-Discipline and Motivation," comprises five items (i.e., item No 1, 6, 11, 16, and 21). Each item has five options from Strongly Disagree having one score to Strongly Agree having five scores. This section of Teachers’ Readiness for Online Pedagogy Questionnaire gauges teachers' commitment to their teaching schedules, their motivation to adapt to online environments, their punctuality in course preparations and grading, their resilience in facing online teaching challenges, and their time management skills. These items resonate with the literature emphasizing the importance of self-discipline and intrinsic motivation in online teaching environments (Deci et al., 1991).

The second construction, "Teaching Styles and Collaboration," encompasses six items (i.e., item No. 2, 7, 12, 17, 22, and 26). It probes into teachers' adaptability in teaching styles, comfort with multimedia, beliefs about the efficacy of online teaching, inclination for feedback, comfort in virtual collaborations, and willingness to engage in online discussions. This reflects the broader

discourse on the need for diverse teaching styles and collaborative approaches in online education (Anderson, 2008).

The third construction, "Course Management and Engagement," which consists of five items, (i.e., item No. 3, 8, 13, 18, and 23) explores teachers' proactiveness in updating course materials, creating engaging content, reaching out to struggling students, assessing student performance, and willingness to hold virtual sessions. This aligns with research that underscores the significance of active engagement and effective course management in online learning (Garrison et al., 1999).

The fourth construct, "Technical Skills and Resources," has five items (i.e., item No. 4, 9, 14, 19 and 24) and it assesses teachers' proficiency in online platforms, troubleshooting abilities, practices in backing up materials, comfort in guiding students technically, and their efforts to stay updated with technological advancements. This echoes the literature that emphasizes the importance of technical proficiency and resource management in online teaching (Goodyear et al., 2001).

Lastly, the "Perceptions and Expectations of Online Teaching" construct, with five items (i.e., item No. 5, 10, 15, 20, and 25), delves into teachers' beliefs about the effort required in online teaching, the flexibility it offers, its role in community building, understanding of student challenges, and feelings about the lack of personal interactions. This section mirrors the ongoing discourse about the perceptions and realities of online teaching (Moore, 2013).

The Teachers' Readiness for Online Pedagogy Questionnaire offers a comprehensive insight into the mindset, skills, and beliefs of teachers in the realm of online pedagogy. It serves as a valuable tool for understanding and enhancing the online pedagogical experience.

4.5.1.3. Teachers' Self-efficacy for Online Pedagogy Questionnaire

The Teachers' Self-efficacy for Online Pedagogy Questionnaire is a modified version of the original instrument developed by (Tschannen-Moran & Hoy, 2001) to gauge teachers' self-efficacy in traditional classroom settings. Within this study the current adaptation seeks to capture teachers' self-efficacy within the realm of online teaching, a context that has gained prominence in recent years due to the proliferation of digital learning platforms and the changing dynamics of education. Teachers' Self-efficacy for Online Pedagogy Questionnaire was used in phase 1 for pretest and in Phase 4 for posttest.

The questionnaire is structured around three primary constructs, each encompassing of nine Likert type items each with options ranging from 1= "Nothing" to 9= "A Great Deal" (See Annex-3 for formatted tool presented to the participants). The first construction, "Efficacy in Student Engagement," consists of eight items (i.e., item No. 1, 2, 4, 6, 9, 12, 14, 22). This section assesses teachers' confidence and capability in engaging students, fostering critical thinking, motivating those with low interest, influencing students' self-belief, inspiring value in learning, promoting creativity, aiding struggling students, and guiding families in the online learning context. Engaging students in a virtual environment poses unique challenges, and this construction echoes the importance of student engagement as a cornerstone of effective online teaching (Fredricks et al., 2004).

The second construct, "Efficacy in Instructional Strategies," also comprises eight items, (i.e., item No. 7, 10, 11, 17, 18, 20, 23, 24). It evaluates teachers' confidence in addressing inquiries, discerning students' understanding, formulating questions, tailoring content, employing diverse evaluation methods, offering fresh perspectives, integrating varied instructional techniques, and curating tasks for advanced learners in an online environment. The ability to adapt and implement effective instructional strategies is crucial in online teaching, given the absence of physical cues and direct interactions (Darling-Hammond et al., 2020).

The third and final construction, "Efficacy in Classroom Management," contains eight items (i.e., item No.3, 5, 8, 13, 15, 16, 19, 21). It probes into teachers' capabilities in managing disturbances, communicating expectations, instituting seamless transitions, guiding students to adhere to norms, pacifying disruptive students, designing tailored management frameworks, ensuring minimal disruptions, and handling student resistance in a virtual classroom. Classroom management, even in a digital setting, remains pivotal to ensuring a conducive learning environment (Emmer & Stough, 2003).

In essence, this modified questionnaire offers a comprehensive lens into the self-efficacy of teachers navigating the challenges and nuances of online teaching. It serves as a valuable tool for educational institutions and stakeholders aiming to understand and bolster the capabilities of teachers in the digital age.

4.5.2. Phase 2: Developing Continuous Professional Development as Intervention

Continuous Professional Development has emerged as a cornerstone in the professional growth of teachers. It is a systematic approach that focuses on renewing and expanding the knowledge and skills of professionals, ensuring they remain updated and effective in their roles (Guskey, 2000). The development of a Continuous Professional Development program is a meticulous process, often involving a blend of research, collaboration, and iterative design.

Research has shown that for Continuous Professional Development to be effective, it needs to be ongoing, embedded in practice, and aligned with the needs of the teachers (Desimone, 2009; Kang et al., 2013). The development process often starts with a need assessment, identifying the gaps in knowledge or skills among the target audience. This is followed by the design phase, where the content, delivery methods, and assessment strategies are determined. Collaboration is key during this phase, with experts, stakeholders, and potential participants often providing valuable insights (Avalos, 2011; De Farias & De Araujo, 2018). In the context of this study, the first move in shaping Continuous Professional Development was to roll out the Need Analysis Survey, which is elaborated upon in Chapter 4.5.1.1. Given that the objective of this study is to not only develop Continuous Professional Development but also to boost teachers' readiness and self-efficacy in employing online teaching methods, data on these aspects were also gathered. This information played a dual role. Firstly, it informed the design of Continuous Professional Development, ensuring it addressed the areas teachers felt less confident in. Secondly, it gave this study a starting point, a baseline, which was invaluable when it came to evaluate Continuous Professional Development's effectiveness by comparing pre and post data on the same areas.

The Continuous Professional Development program's structure is crucial. Many effective Continuous Professional Development programs are designed in cycles, allowing for continuous reflection, feedback, and improvement. Each cycle typically consists of a learning phase, an implementation phase, and a reflection phase (see Figure 3). However, for this study each cycle of Continuous Professional Development has been designed in a way that learning, implementation and reflection go parallel (see Figure 4). This cyclical approach ensures that learning is embedded in practice and that there's an opportunity for continuous improvement (Bessant et al., 2001; Bessant & Caffyn, 1997; Opfer & Pedder, 2011). This approach informed us of the objectives of each activity, the teaching instructions and assessment strategies for each activity.

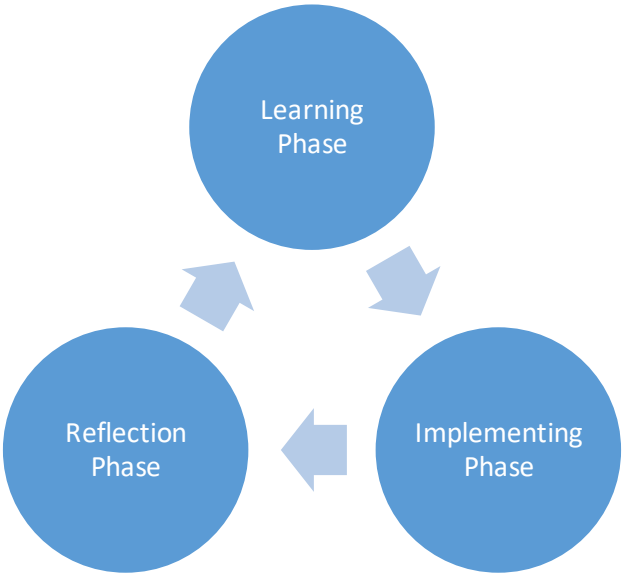

Figure 3. Stages of Traditional Continuous Professional Development Cycle

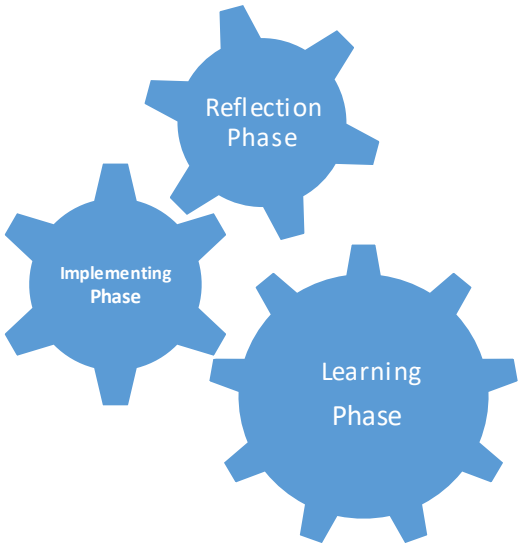

Figure 4. Stages of a Cycle in Continuous Professional Development of this Study

With these principles, a four-week Continuous Professional Development model was developed in collaboration with international experts from the UK stands as a testament to effective Continuous Professional Development design (see Figure 4). This model, tailored for enhancing online pedagogical skills, was developed post a comprehensive needs assessment, identifying the pressing need for teachers to be adept in online teaching methodologies.

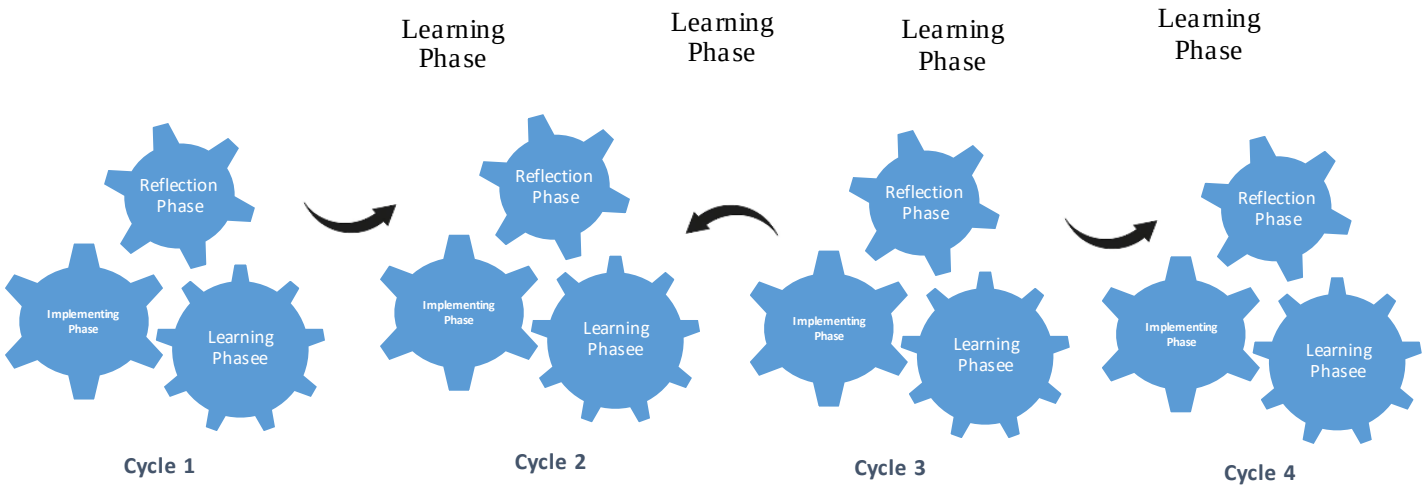

Figure 5. Four Cycles of Continuous Professional Development

The above model is structured into four cycles, each lasting a week, aligning with the academic calendar (see Annex-4 for detailed plan of Continuous Professional Development). Each cycle is meticulously designed, starting with introducing teachers to online teaching, moving on to enhancing engagement, then focusing on class management and continuous learning, and culminating with reflection and forward planning. The use of platforms like Zoom, Moodle, and Flipgrid ensures that the learning is interactive, collaborative, and hands-on, resonating with the principles of effective Continuous Professional Development design (Almeida, 2012; Brown & Green, 2018; Kilgore & Weaver, 2020).

4.5.3. Phase 3: Implementing Continuous Professional Development as Intervention.

To integrate Continuous Professional Development as an essential facet of teacher professional development, discussions were initiated with the university's Human Resources (HR) department. The objective was to discern the most effective method to introduce this Continuous Professional Development to the faculty. Historically, the university has organized faculty training sessions sporadically, with a focus on various teaching aspects. Concurrently, individual departments occasionally host subject-specific training for their teachers. However, the introduction of comprehensive online training, structured in four cycles, for teachers across all departments was unprecedented. Given this novelty, the insights from the HR department were deemed crucial.

Following two collaborative sessions with HR, a consensus emerged: the training would be mandatory and tied to an incentive, ensuring maximum participation. Additionally, a representative from HR, in collaboration with the researcher, would oversee the delivery of training. This strategic approach positioned Continuous Professional Development as a seamless progression in the university's commitment to faculty professional development.

The first cycle (i.e. week-1 of month-1) of Continuous Professional Development commenced at the outset of the Fall 2021 Semester. On the initial day, the university's training hall served as the venue. Teachers were advised to bring along their personal laptops, ensuring beforehand that essential applications such as Zoom, Moodle, and Padlet were installed. The HR representative began the session by elucidating the intricacies of Continuous Professional Development and its modalities. Subsequently, the researcher introduced the first lesson. Given the online nature of the day's activities, teachers were predominantly engrossed in their laptops. The researcher, seizing intermittent opportunities, observed the participants' engagement. Although the activities were slated for a 2-hour duration, they spanned an average of 2 hours and 25 minutes. Concluding the online tasks, teachers reflected on their training experiences. These reflections were precisely documented and later informed refinements to Continuous Professional Development.

The subsequent four days of the first Continuous Professional Development cycle transitioned to a fully online format, scheduled between 2:30 pm and 5:00 pm. Teachers had the flexibility to participate from their offices or any conducive environment, utilizing their laptops or desktops. Given the Continuous Professional Development's design, which necessitated simultaneous active participation from all attendees and the researcher as trainer, adhering to a fixed schedule was imperative.

Throughout this first cycle, teachers embarked on a journey into the realm of online pedagogy. They navigated its advantages, conceptualized their premier online lessons, immersed themselves in content creation, and grasped the subtleties of online assessment. Digital tools, notably Zoom, Moodle, and Padlet, were instrumental, fostering dynamic interactions and joint endeavors (Brown & Green, 2018).

As we moved into the second month, the second cycle began. This time the week was all about enhancing engagement and interactivity in online lessons. Teachers learned to infuse fun into their

lessons, conducted live sessions effectively, fostered a sense of community among students, designed inclusive lessons, and ensured respect and understanding in a diverse online classroom. Platforms such as Flipgrid and Kahoot! became instrumental in this phase.

The third cycle, starting in the third month, emphasized class management, continuous learning, and well-being. Teachers were equipped with strategies to manage their online classes seamlessly, saved time, handled challenges, and ensured they remain updated with the latest in online pedagogy. Moreover, they were introduced to techniques to maintain a balance and ensure their well-being while teaching online, a topic that has gained significant attention in recent research (André et al., 2011; Soini et al., 2010).

The final cycle in the fourth month consolidated all the learning. It emphasized the importance of data privacy, the power of reflection, drawing inspiration from successful online teachers, and the application of all the acquired knowledge. This cycle culminated with teachers charting out their future path in online teaching, setting goals, and identifying potential challenges.

4.5.4. Phase 4: Evaluation of Continuous Professional Development

In this phase, the effectiveness of the Continuous Professional Development intervention was measured through a two-pronged approach, encompassing both quantitative and qualitative methodologies. In the first stage of phase 4, a post test was administered, employing the Teachers' Readiness for Online Pedagogy Questionnaire and the Teachers' Self-efficacy for Online Pedagogy Questionnaire. As discussed earlier, these instruments were also used for the pretest prior to the intervention's commencement. The posttest's primary objective was to capture data post-intervention on participants' readiness and self-efficacy of using online pedagogy, which would subsequently facilitate inferential statistical analyses to objectively discern the intervention's impact. A comprehensive breakdown of the data analysis process is delineated in subsequent chapters.

The second stage of phase 4 pivoted towards a qualitative approach, encompassing in-depth, semi-structured interviews with a select cohort of participants. This phase aims to explore participants' experiences and interactions with Continuous Professional Development. It sought to unravel the intricate dynamics between technological tools and teachers' beliefs and practices, shedding light

on their journey through Continuous Professional Development. This qualitative exploration was geared towards amplifying participants' voices, offering insights into their challenges and triumphs as they engaged with Continuous Professional Development. A detailed account of the interview process, encompassing participant selection, the interview guide, challenges encountered during interviews, and the subsequent data analysis, is elaborated upon in the sections that follow.

4.6. Pilot Study

A pilot study, often referred to as a "feasibility study," is a preliminary investigation conducted before the main research to test the viability of the study's tools, methods, and processes (Leon et al., 2011; Vogel & Draper-Rodi, 2017). It serves as a "trial run" and is crucial in identifying potential problems, allowing researchers to make necessary adjustments before embarking on the larger, more definitive study. By conducting a pilot study, researchers can ensure that their instruments are valid and reliable, that their procedures are feasible and efficient, and that participants' responses align with expectations (Van Teijlingen & Hundley, 2002).

In the context of this research, three qualitative tools, namely the Need Analysis Survey, Teachers' Readiness for Online Pedagogy Questionnaire, and Teachers' Self-efficacy for Online Pedagogy Questionnaire, underwent a pilot phase. This was essential to ascertain their effectiveness in capturing the desired data and to refine any ambiguities or complexities that might hinder the main study. Additionally, the first cycle of Continuous Professional Development was also piloted. This was a strategic move to ensure that the content, delivery, and assessment strategies were effective and resonated with the participants. By piloting the first cycle, the research team aimed to preemptively identify and rectify any challenges or gaps before rolling out the Continuous Professional Development to the broader audience (Van Teijlingen & Hundley, 2001, 2002; Vogel & Draper-Rodi, 2017). Various crucial decisions were made at this stage, for example, the decision that the researcher, who is the president of the university, will not serve as the trainers or directly involved in collected the Need Analysis Survey or Pretests. The details of these are presented at the chapter 4.11 that narrates the researcher's positionality in relation to this study.

In essence, piloting is a proactive step in research, ensuring that the main study is robust, efficient, and free from unforeseen challenges. By piloting both the qualitative tools and the initial Continuous Professional Development cycle, this study positioned itself for success, ensuring that

the subsequent phases were grounded in evidence-based practices and were tailored to the needs and expectations of the participants. Then explain that for this study the three qualitative tools, i.e., Need Analysis Survey, Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire were piloted, as well as the first cycle of Continuous Professional Development was piloted to check before implementing it to the targeted participants.

4.6.1. Piloting Quantitative Tools for Validity and Reliability

In the realm of research, ensuring the validity of instruments is paramount. Validity, as defined by (Creswell, 2014), refers to the degree to which an instrument truly measures the construct it purports to measure. Before instruments can be deemed suitable for a study, their validity must be rigorously assessed.

For the present study, the initial step was to evaluate the face and content validity of the instruments, i.e., Need Analysis Survey, Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire. This process involved seeking the expertise of two seasoned professionals in the field. Their insights were invaluable in ensuring that the instruments were not only relevant but also appropriately structured to capture the desired data.

Following this, a comprehensive pilot test of the three instruments was undertaken, involving 96 teachers from various degree-awarding colleges and two universities of Bahrain. This pilot test was meticulously structured in three phases. Initially, a group of 10 teachers, predominantly from degree-awarding colleges, provided feedback on the instruments' readability and the perceived relevance of the items. Subsequently, a group of five teachers was asked to rephrase each item into Arabic. This step was pivotal in ensuring that the essence of each item was clearly understood by the participants. After some refinements, the revised instruments were administered to a larger group of 96 teachers. Using the Cronbach alpha coefficient, the internal consistency of each subscale of the Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire was measured. Using SPSS Amos 20.0, the Confirmatory Factor Analysis (CFA) was conducted for the construction validity of the Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy

Questionnaire both at pilot phase and later the targeted 46 teachers from Gulf University, and the results where CFA were consistent during both pilot and real study.

The results of the CFA showed that the Teachers' Readiness for Online Pedagogy Questionnaire consisted of 26 items and five sub-dimensions ($\chi 2$ difference=918.12; df=102, $p < 0.0$) ─ Self-Discipline and Motivation with 5 items, Teaching Styles and Collaboration with 6 items, Course Management and Engagement with 5 items, Technical Skills and Resources with 5 items, and Perceptions and Expectations of Online Teaching with 5 items (See Annex 5 for complete Principal Component Analysis of Teachers' Readiness for Online Pedagogy Questionnaire). Whereas the CFA for Teachers' Self-efficacy for Online Pedagogy Questionnaire shows that it consisted of 24 items and three sub-dimensions ($\chi 2$ difference=518.65; df=202, $p < 0.03$) ─ Efficacy in Student Engagement with 8 items, Efficacy in Instructional Strategies with 8 items, and Efficacy in Classroom Management with 8 items (See Annex 6 for complete Principal Component Analysis of Teachers' Self-efficacy for Online Pedagogy Questionnaire). The examples of items from each subscale of Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire are presented in Table 1, which also presents the item-rest correlation for each example item and the Cronbach alpha coefficient of each sub-scale.

Table 1.Examples of items of each subscale of the Teachers' Self-efficacy for Online Pedagogy Questionnaire and Teachers' Readiness for Online Pedagogy Questionnaire, the item-rest correlation for each example item, and the Cronbach alpha coefficient of each subscale

Teachers' Self-efficacy for Online Pedagogy Questionnaire	**Examples**	**Item-rest correlation**	**Cronbach's alpha coefficient**
Efficacy in Student Engagement	Q9. Online, how sure are you in addressing complex questions from your students?	.721	.91
Efficacy in Instructional Strategies	Q7. How adeptly can you clarify concepts for a student facing difficulties in online lessons?	.732	.88
Efficacy in Classroom Management	Q3. How equipped do you feel to spark interest in disengaged students in online lessons?	.832	.94

achers' Readiness Online Pedagogy Questionnaire	Examples	Item-rest correlation	Cronbach's alpha coefficient
Self-Discipline & Motivation	Q11. I complete my course preparations and grading in a timely manner.	.622	.94
Teaching Styles & Collaboration	Q22. I am comfortable collaborating with colleagues and students in a virtual environment.	.523	.93
Course Management & Engagement	Q3. I regularly update my online course materials to keep them relevant.	.527	.83
Technical Skills & Resources	Q4. I am proficient in using online teaching platforms and tools.	.611	.78
Perceptions and Expectations of Online Teaching	Q15. I believe that online teaching goes beyond just delivering content; it's about fostering a virtual community.	.532	.71

The test-retest reliability of the Self-Discipline & Motivation, Teaching Styles & Collaboration, Course Management & Engagement, Technical Skills & Resources and Perceptions and Expectations of Online Teaching of the Teachers' Readiness for Online Pedagogy Questionnaire were 0.91, 0.73, 0.82, 0.89, and 0.76, respectively, and for the whole tool it was 0.76. Considering that it was a self-developed tool, there was no means to compare it with other studies. However, Teachers' Self-efficacy for Online Pedagogy Questionnaire was adopted from Tschannen-Moran & Hoy (2001), thus data on reliability was available. The test-retest reliability of the Efficacy in Student Engagement, Efficacy in Instructional Strategies, and Efficacy in Classroom Management in the original Teachers' Self-efficacy for Online Pedagogy Questionnaire were 0.87, 0.91, and 0.90, respectively, and for the whole tool was 0.94 (Tschannen-Moran & Hoy, 2001,(Schommer, 1990)Schommer, 1990). In this study the test-retest reliability of Efficacy in Student Engagement, Efficacy in Instructional Strategies and Efficacy in Classroom Management were 0.74, 0.81, and 0.73, respectively, and for the whole tool was 0.86.

Using five fit indices i.e., Chi-Squared difference test (χ^2/pdf), Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Root Mean Square Error of Approximation (RMSEA), with the recommended values .i.e., χ^2/pdf < 2., GFI > 0.90., CFI > 0.90, IFI > 0.90., and RMSEA ≤ 0.08., our CFA results of Teachers' Readiness for Online Pedagogy Questionnaire confirmed the five dimensions of Teachers' Readiness for Online Pedagogy Questionnaire with the fit indices showing a good fit between the five-dimensional model and the data (see Table 2). Using the same values, the CFA results of Teachers' Self-efficacy

for Online Pedagogy Questionnaire also show a good fit between the five-dimensional model and the data (see Table 2).

Table 2.Values of selected fit measures of CFA on 24 items of the Teachers' Self-efficacy for Online Pedagogy Questionnaire, and 26 items of the Teachers' Readiness for Online Pedagogy Questionnaire

Teachers' Self-efficacy for Online Pedagogy Questionnaire	**χ^2/df**	**GFI***	**CFI****	**IFI*****	**RMSEA******
Efficacy in Student Engagement	2.46	.95	.95	.94	.03
Efficacy in Instructional Strategies	2.12	.96	.92	.95	.07
Efficacy in Classroom Management	1.76	.91	.95	.93	.02
Teachers' Readiness for Online Pedagogy Questionnaire	**χ^2/df**	**GFI***	**CFI****	**IFI*****	**RMSEA******
Self-Discipline & Motivation	2.18	.91	.91	.92	.04
Teaching Styles & Collaboration	2.14	.93	.98	.91	.02
Course Management & Engagement	2.8	.95	.92	.92	.07
Technical Skills & Resources	1.18	.97	.92	.98	.06
Perceptions and Expectations of Online Teaching	2.01	.92	.90	.91	.03

χ^2/df: $\chi^2/\leq 2.5$

* Comparative Fit Index ≥ .90; ** Goodness of Fit Index ≥ .90

*** Incremental Fit Index ≥ .90; ****Root Mean Square Error of Approximation ≤ .08

In summation, the meticulous process of establishing both the validity and reliability of the Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire underscores the robustness of these instruments. Such rigorous validation and reliability testing ensure that the data derived from these tools can be trusted, providing a solid foundation upon which the study's findings and conclusions are built.

4.6.2. Piloting of the Intervention (Continuous Professional Development)

Like tools, Continuous Professional Development was also piloted. For piloting only first cycle of Continuous Professional Development was focused. Thirteen teachers from two degree-awarding

colleges in Bahrain were purposefully selected to mirror the demographics and credentials of the main study's participants. Their diversity spans across age groups, qualifications, and experiences in online pedagogy and training. The Secretariat General of the Higher Education Council, Bahrain, played a pivotal role in ensuring their participation, resulting in 20 nominations from two colleges. After a meticulous analysis of the Need Analysis Survey responses from these nominees, 13 teachers were finalized, representing a demographic similar to the main study's participants (Creswell, 2014).

The first day of the Continuous Professional Development cycle, though online, was convened at Gulf University. This arrangement was intentional, aiming to familiarize participants with the activities and preemptively identify potential challenges. Their reflections at the day's end, communicated predominantly in Arabic for comfort, provided invaluable insights. These reflections, audio-recorded and later transcribed, informed the subsequent days of the Continuous Professional Development cycle, which were conducted remotely, allowing participants the flexibility of location (Merriam & Tisdell, 2015).

Given the external nature of the pilot study's participants, I took the lead as the facilitator. I documented my reflections throughout the process. A subsequent meeting with the 13 participants facilitated a deeper dive into their experiences, with six volunteering for in-depth interviews. The collective feedback from participants, coupled with my reflections, was thoroughly reviewed. This collaborative reflection led to refinements in the Continuous Professional Development's structure and instructional activities, ensuring its robustness for the main study, and led to the final design of the intervention used on Phase 3 (Bryman, 2016; Clark et al., 2021).

4.7. Sampling for Qualitative Phase

The purpose of qualitative phase was two-fold in this study. First, the four stages of action research, i.e., evaluation of the intervention, recovery to record and analyze participants' experiences in depth, which is most effectively possible using qualitative approach. Secondly, the sub-research question 4 of this study required exploration of the intricate dynamics of teachers' interactions with the Continuous Professional Development for online pedagogy. Interactions, especially in educational settings, are multifaceted and often influenced by a myriad of factors, both internal and external to the participants. Given this complexity, a qualitative approach is particularly apt

for capturing the depth and nuances of such interactions. As (Patton et al., 2015) posits, qualitative research allows for a deeper understanding of experiences, attitudes, and underlying motivations, making it an invaluable tool for studies that aim to unravel intricate human behaviors and perceptions.

The richness of qualitative data, especially in the context of interactions, lies in its ability to capture the subtleties and intricacies often missed by quantitative methods. As highlighted by (Denzin & Lincoln, 2011), qualitative research provides a lens through which the multifaceted layers of human experiences can be explored, offering insights that are both profound and contextually relevant.

To ensure a comprehensive understanding of teachers' interactions with Continuous Professional Development, we sampled nine teachers. These teachers were not just a random subset; they were meticulously chosen to represent the broader characteristics of the 46 teachers in terms of gender, age, and experience. More specifically, 3 teachers (2 males and 1 female) represented the under 40-year age group, 3 teachers (1 male and 2 female) presented the 40–50-year age group and 3 teachers (2 males and 1 female) presented the 50 plus age group. Moreover, they embodied the spectrum of outcomes post-intervention, representing those whose readiness and self-efficacy for online pedagogy had significantly increased, those with moderate increases, and those who observed no change.

In terms of validity and trustworthiness, the researcher documented each step of the study to ensure the credibility of qualitative data. The researcher conducted Interviews conducted several interviews in the language preferred by the interviewees, whether Arabic or English at their convenience to ensure more authentic responses(Fryer et al., 2012). In this respect and after converting the Arabic interviews, data was sent back to the participants for member checking which allowed participants to review their responses and confirm accuracy, thus enhancing the reliability of data(Zhou et al., 2021).

Moreover, the researcher used a back-to-back translation; a widely used technique in cross-cultural research, to ensure translation accuracy and cultural relevance. This process involved translating the text from Arabic into English and then back into Arabic by a different translator to identify any inconsistencies between the original and back-translated versions and discrepancies were corrected to preserve the original meaning(Ozolins et al., 2020). In this context, the researcher used the

English version for data analysis. Additionally, triangulation was applied to further enhance the validity of the findings, as it contributes to reveal contradictions or inconsistencies in the data (Jackson, 2015).

Approaching participants for qualitative insights requires careful timing. In this study, participants were approached for interviews for three weeks' post-intervention. This delay was strategic. It allowed ample time to analyze the data from the Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire pre- and post-intervention assessments. This analysis was pivotal in determining the categories of teachers based on the magnitude of change in their readiness and self-efficacy for online pedagogy.

In essence, the qualitative phase of this study was meticulously designed to capture the depth and breadth of teachers' interactions with Continuous Professional Development. By focusing on a diverse subset of teachers and timing the interviews strategically, this study ensured that the insights gleaned were both comprehensive and contextually relevant.

4.8. Data Collection for Qualitative Phase

Data for qualitative phase was collected using two tools including semi-structured interviews and focus groups.

4.8.1. Semi-structured interviews

In the realm of qualitative research, interviews stand as a cornerstone, offering a window into the intricate perceptions and experiences of participants. (Bryman, 2016; Clark et al., 2021), underscores that interview, particularly the semi-structured variety, are perhaps the most frequently utilized qualitative research method. This format, nestled between the fluidity of unstructured interviews and the rigidity of structured ones, offers a balance that ensures both depth and direction in data collection.

Unstructured interviews, while mirroring everyday conversations (R. G. Burgess, 2002; Rossman & Rallis, 2011), can sometimes meander away from the core research themes, making them less suitable for studies constrained by time or resources. On the other hand, semi-structured interviews, guided by an interview schedule, ensure that pertinent topics are covered while still allowing participants the freedom to introduce new, unforeseen perspectives. This flexibility is

invaluable, especially in a study like ours, where understanding participants' views on Continuous Professional Development for online pedagogy are paramount.

Several benefits of semi-structured interviews align perfectly with the objectives of this study. First, semi-structured interviews allow for in-depth exploration of participants' experiences and perceptions, vital for understanding teachers' interactions with Continuous Professional Development. Second, the researcher can probe further into interesting or unexpected avenues that emerge during the conversation, which was essential given the multifaceted nature of online pedagogy. Third, while each interview can vary, having a set list of questions ensures that certain topics are consistently covered across interviews. This list of questions is commonly referred to as "Interview Guide" in semi-structured interviews, which cover a range of topics. For this study, the interview guide (see Annex 7 for interview guide) touched upon pivotal areas like work organization, time management in the sudden shift to online teaching, technological challenges, data privacy concerns, adaptation of curriculum, and on-screen presentation skills, among others. Yet, the structure was not rigid. Participants had the liberty to discuss other pertinent topics related to online pedagogy or the Continuous Professional Development's format.

Spanning between 45 to 150 minutes, each interview was a deep dive into the participants' experiences. Conducted by a bilingual support team member, the interviews catered to the linguistic preferences of the participants, with five opting for Arabic and the remaining four for English. A unique iterative approach was adopted for these interviews. After each session, a thorough transcription and preliminary analysis were conducted, leading to slight modifications in the subsequent interview's guide. This cyclical process, repeated after every interview, ensured that emerging themes were probed deeper in subsequent sessions.

However, like any research method, semi-structured interviews are not without challenges. One potential issue is the interviewer's influence on the participant's responses, known as interviewer bias (Dean Brown, 2004; Riazi, 2016; Spilioti & Tagg, 2017). To mitigate this, our interviewer was trained to maintain neutrality and avoid leading questions. Another challenge is ensuring accurate translation and transcription, especially when switching between languages. Collaborative review sessions post each interview ensured fidelity in translation and transcription.

In conclusion, the semi-structured interviews, with their balance of structure and flexibility, served as an ideal tool for capturing the nuanced experiences of teachers in this study. Their insights, combined with the iterative approach to data collection, promise a rich and comprehensive understanding of the research themes.

4.8.2. Focus Group

After gathering insights from semi-structured interviews, the next crucial step of data collection was to conduct a focus group. Consistent with the nature of this study, the focus group was carried out after the intervention. The timing of this event was pivotal, as it provided an opportunity for the five teachers, who represented three distinct age groups, to contemplate their experiences and transformations following the Continuous Professional Development intervention. The focus group was conducted to further explore the teachers' perceptions, utilizing a group setting, like semi-structured interviews.

The topic organization of the focus group adhered to the ideas highlighted by Jackson (2015) and Dwivedi (2015), wherein participant interaction served not just as a means of gathering data, but also as a means of creating more comprehensive and nuanced insights. Creswell and Poth (2016) emphasize that focus groups are especially efficient when the exchange of ideas among participants is anticipated to produce the most valuable insights. This is in perfect harmony with the essence of this research, where comprehending the collective experiences and viewpoints of teachers in a group context was just as important as individual observations.

The focus group was designed to further explore teachers' experiences of Continuous Professional Development and the way it shapes their readiness and self-efficacy for online pedagogy. The purpose of choosing the focus group was mainly influenced by the idea that teachers of different age groups can express their views to what other teachers of different age groups share, thereby facilitating a richer understanding of how age may impact perspectives on online pedagogy among educators. This helped in getting the deeper thoughts and teachers' beliefs which others were not highlighted in one-to-one interviews. Moreover, focus groups also help in getting counterarguments on various aspects of Continuous Professional Development as well as online pedagogy. The counterarguments and rebuttals generated by the focus group added depth to this study analysis.

The focus group consisted of five teachers representing all three age groups including 1 teacher (1 male) represented the under 40-year age group, 2 teachers (1 male and 1 female) presented the 40–50-year age group and 2 teachers (1 male and 1 female) presented the 50 plus age group. These teachers approached at the end of their one-to-one interviews to show their willingness to participate in the focus group. On their agreement, they were shared with a list of tentative topics to be covered in the focus group one day in advance. The focus group was conducted in a meeting room, where all five teachers sat around a round table. The researcher started the focus group by introducing its purpose followed by the first question, i.e. What do you think is the effectiveness of online pedagogy and to what extent does it serve your teachers' purpose? Initially, each teacher expressed their opinion in order from first to last. The researcher identified the difference of opinion and floated the questions to teachers who gave different answers to counter. In this way, a debate was generated which generated interesting responses.

4.9. Data Analysis

Both quantitative and qualitative data was analyzed at phase-4 of this study. The following sub sections present details on how quantitative and qualitative data were analyzed.

4.9.1. Analysis of Quantitative Data

The quantitative data was generated using Need Analysis Survey, Teachers' Readiness for Online Pedagogy Questionnaire, and Teachers' Self-efficacy for Online Pedagogy Questionnaire. The data from Need Analysis Survey was mainly analyzed using descriptive statistical analysis. Smith et al. (2020) explains descriptive statistical data analysis to summarize and present data in a meaningful way, such as through measures of central tendency and variability.

Participants' responses on questions 1 to 14, as well as questions 18 and 21 were analyzed using Mean and percentages. The data is presented in the graphs and tables to show participants various needs for Continuous Professional Development on online pedagogy. Whereas questions 15, 16, 17, 19 and 20, which were open-ended questions, generated qualitative data, which is again sorted and quantified for the brevity of presentation, and it is interpreted to further explain the data generated quantitatively and presented in the tables and graphs.

To analyze the data of Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire, both descriptive and inferential statistical— the

process of using data analysis to infer properties of an underlying distribution of probability analysis was conducted. The initial step in the analytical process was to ensure the accuracy and completeness of the data, a foundational practice emphasized by (Thompson, 2017). With the assurance that there were no missing values and that all 46 participants had responded to every item, the data was deemed ready for a deeper dive.

Descriptive statistics, as highlighted by (Nimon et al., 2019), offer a preliminary insight into the data's landscape. For the Teachers' Readiness for Online Pedagogy Questionnaire, the average scores were categorized into three distinct readiness levels, i.e., not ready at all, partially ready and fully ready, providing a clear picture of where each teacher stood in their online teaching readiness both before and after the intervention. This categorization process, as detailed by (Lee et al., 2020), allows for a more nuanced understanding of the data, beyond mere averages. Similarly, for the Teachers' Self-efficacy for Online Pedagogy Questionnaire, the mean scores for each construct—Efficacy in Student Engagement, Efficacy in Instructional Strategies, and Efficacy in Classroom Management—were calculated for both pretest and posttest phases.

However, to truly gauge the impact of the intervention, inferential statistics were deemed necessary. For that data normality test was using Kolmogorov-Smirnov test. The analysis revealed the *p*-value of less than 0.05; therefore, Mann-Whitney U-test was employed to find a significant difference in the scores of Teachers' Readiness for Online Pedagogy Questionnaire and Teachers' Self-efficacy for Online Pedagogy Questionnaire pre and post intervention tests. This test was chosen due to its ability to compare two means from the same group at different times, making it apt for pretest-posttest designs. For each significant result, the effect size was calculated, echoing(Cohen, 1988) assertion that understanding the magnitude of an effect is as crucial as its statistical significance.

Furthermore, considering the potential influence of other categorical variables like gender or years of teaching experience. This test, as described by (Green & Salkind, 2010), can discern differences in pre-post changes across various groups.

4.9.2. Analysis of Qualitative Data

In the intricate journey of qualitative research, data analysis stands as a pivotal phase, transforming raw data into meaningful insights. For this study, the data emanated from two primary sources:

semi-structured interviews and focus group. The challenge lay not just in analyzing this data but in weaving together insights from both sources to present a cohesive narrative.

The analysis of data from semi-structured interviews and focus group began with transcription. Each interview, rich with insights, was meticulously transcribed, ensuring that the essence of the conversation was captured in its entirety. Following transcription, thematic analysis was employed, a method championed by (Braun & Clarke, 2006) for its flexibility and robustness. This involved a systematic process of coding the data, identifying patterns, and grouping these patterns into themes. The iterative nature of this method, where the researcher moves back and forth between the data set, codes, and identified themes, ensured a comprehensive analysis.

However, every analytical strategy comes with its strengths and weaknesses. Thematic analysis, while flexible, is also interpretative in nature. The themes identified are heavily influenced by the researcher's perspective, which can introduce bias (Braun & Clarke, 2006). On the other hand, narrative analysis, while rich in detail, can sometimes overlook broader patterns, focusing too intently on individual stories (Riessman, 2008). To mitigate these potential pitfalls, the study employed a method of triangulation. Insights from both semi-structured interviews and focus group were juxtaposed, ensuring that the findings were robust and well-rounded. This method, as posited by (E. W. Burgess, 1945; Kalof & Dan, 2008; Sharma, 1997), not only enhances the validity of the research but also offers a multi-dimensional view of the phenomenon under study.

In conclusion, the qualitative analytical strategies employed in this study, while not without challenges, were chosen for their capacity to offer depth, nuance, and authenticity. The insights gleaned from this analysis stand as a testament to the richness of qualitative research and its capacity to capture the complexities of teachers' interactions with Continuous Professional Development for online pedagogy.

4.10. Research Ethics

In the realm of social science research, the importance of a code of conduct cannot be overstated. It serves as a compass, guiding researchers through the intricate maze of ethical dilemmas, ensuring that the rights, dignity, and well-being of participants are prioritized (L. T. Smith, 2021). The very essence of research in the social sciences hinges on the trust and credibility established

with participants, stakeholders, and the academic community. This trust is built and maintained through adherence to ethical principles and guidelines (Aguinis & Henle, 2004; Resnik, 2015).

This study was meticulously guided by Brunel University's Research Integrity Code of Practice (Brunel University, 2019). This code, grounded in principles of honesty, integrity, and professionalism, provided a robust framework ensuring that every step of the research was ethically sound.

One of the foundational principles emphasized by Brunel University is that of Integrity and Honesty. Throughout this research, every effort was made to uphold these principles, fostering a culture where honesty was paramount. This was evident in the transparent documentation of results, the unbiased interpretation of findings, and the acknowledgment of contributions from other scholars and participants.

Professional standards, another cornerstone of the Brunel code, were rigorously maintained. The research was approached with a commitment to high standards of professional conduct. This was particularly evident in the design and methodology phase, where the research was crafted to address pertinent questions, adding value to existing knowledge. A comprehensive risk assessment was undertaken, ensuring that ethical considerations, potential risks, and legal requirements were addressed (Denzin & Lincoln, 2011).

Potential conflicts of interest were diligently avoided, and any that arose were declared transparently. This transparency extended to the declaration of funding sources and other potential conflicts, ensuring that the research remained unbiased and credible. Given that this research involved human participants, their dignity, rights, safety, and well-being were of paramount importance. All legal and ethical requirements were strictly adhered to, and research ethics approval was obtained before the commencement of the study (Creswell & Poth, 2016).

Training and mentoring were integral to the research process. Regular professional development was undertaken by the researcher to ensure that the research was grounded in the latest methodologies and ethical considerations. Leadership and supervision played a pivotal role in creating a conducive research environment. An environment that encouraged the open exchange of ideas, ensuring that researchers received appropriate direction and supervision.

Transparency was maintained throughout the research process. The research activities and findings were shared openly, promoting a culture of transparency and accountability. Finally, accountability was maintained to the University, supervisors and the research participants. The conduct of research results was transparent, ensuring that the research remained credible and trustworthy.

In conclusion, Brunel University's Research Integrity Code of Practice provided a robust framework, ensuring that this research was ethically sound, credible, and trustworthy. Adherence to this code ensured that the research added value to the academic community, stakeholders, and society at large.

4.11. Researcher's Positionality

The role of a researcher's position in social science research cannot be understated. It is a lens through which the research is viewed, influencing every facet from data collection to interpretation. The relationship between the researcher and the participants, especially when intertwined with power dynamics, can significantly shape the research process (Alfalah, A. A, 2023).

In the context of this study, my positionality was particularly nuanced. As the president of the university where the research was conducted, and with the participants being faculty members of the same institution, the dynamics were layered with complexities. This dual role, both as a leader and a researcher, brought forth unique challenges and opportunities. The inherent power dynamics of being the university's president could have influenced the responses and interactions of the faculty members. They might have been more reserved or cautious in their responses, fearing potential repercussions or simply aiming to provide answers they believed I might want to hear (L. T. Smith, 2021).

Recognizing the potential influence and bias that my position as the president of the university could introduce, I was compelled to make strategic decisions from the outset. The pilot phase was particularly revelatory in this regard, highlighting the need for a more nuanced approach to data collection and participant interaction.

Drawing from the insights of scholars like (Dwyer & Buckle, 2009), who emphasize the importance of recognizing one's positionality and its potential impact on research, I realized the need for a supportive structure. I opened new channels of communication with my research participants. I provided them with my personal cell number so that they may share any of their observations. I also kept a suggestion box for the participants to share their opinion or suggestions anonymously. In addition, my bilingual proficiency, being fluent in both Arabic and English, was an asset, ensuring that interactions with all participants, irrespective of their linguistic backgrounds, were seamless and authentic. Such linguistic versatility is crucial in qualitative research, as it captures the nuances and subtleties of participants' experiences and perspectives (Temple & Young, 2004).

My unique position offered unparalleled insights. Being deeply embedded within the institution, I had a profound understanding of its culture, values, and challenges. This insider perspective, while potentially biasing, also provided a depth of understanding that an external researcher might not have achieved (Dwyer & Buckle, 2009).

To navigate these complexities, it was crucial to maintain a reflective stance throughout the research process. By continuously questioning and examining my biases, assumptions, and influences, I aimed to ensure the research's integrity.

Yet, it's essential to acknowledge that no research is entirely free from the influence of positionality. What's crucial is the awareness of its impact and the continuous effort to mitigate its potential downsides while leveraging the unique insights it offers (Haraway, 2013).

In conclusion, while my unique positionality brought forth challenges, it was through rigorous self-reflection, strategic decisions, and leveraging the insights of my dual role that the research aimed to maintain its credibility and authenticity. The strategic decisions made during the research process were driven by a commitment to uphold the research's integrity and authenticity. By carefully navigating the challenges posed by my positionality, I endeavored to ensure that the research outcomes were both credible and reflective of the participants' genuine experiences.

4.12. Limitation of the Methodology

The research methodology of this study, while comprehensive and robust, is not without its limitations. One of the primary constraints is the philosophical stance of pragmatism. While pragmatism allows for a combination of both objective and subjective methods, it can sometimes lead to a lack of depth in either approach. For instance, (Creswell & Creswell, 2017), noted that pragmatic research might sometimes sacrifice depth for breadth, potentially overlooking nuanced insights that a purely qualitative or quantitative approach might offer.

Another limitation is inherent in the mixed-methods design. While this design amalgamates the profound insights of qualitative inquiry with the expansive and objective nature of quantitative research, it also brings challenges. (Denzin & Lincoln, 2011), highlighted that qualitative research, with its emphasis on depth, can sometimes grapple with challenges like limited generalizability due to its inherent contextual specificity. On the other hand, quantitative research, as (Creswell, 2014), pointed out, might inadvertently bypass the intricate, subjective nuances of human experiences. Thus, while the mixed-methods approach offers a balanced view, it also carries the limitations of both paradigms.

The choice of Action Research as the guiding research design, while participatory and democratic, has its constraints. (D. J. Greenwood & Levin, 2006), noted that the context-specific nature of Action Research can sometimes challenge the generalizability of the findings. Additionally, the deep involvement of the researcher can potentially introduce biases, impacting the objectivity of the findings.

The data collection tools, while meticulously designed, are not without their limitations. Self-constructed tools, such as the Teachers' Readiness for Online Pedagogy Questionnaire, might not have undergone rigorous validation processes that standardized instruments have. This could potentially affect the reliability and validity of the data collected. (Tschannen-Moran & Hoy, 2001), in their seminal work on teacher self-efficacy, emphasized the importance of using validated instruments to ensure the accuracy of the findings.

The sampling, focusing on 46 teachers from Gulf University, might not be representative of the broader teacher population in Bahrain or the Gulf region. This could limit the generalizability of

the findings. (Gough, 2021), highlighted the importance of diverse and representative sampling to ensure the robustness of research findings.

To minimize the effects of these limitations, several strategies were employed. Drawing from (Morgan, 2007), the research ensured a clear delineation between the qualitative and quantitative components, ensuring that each method's strengths were maximized. For the potential biases introduced by Action Research, the study incorporated peer reviews and member checks, as suggested by (Herr & Anderson, 2014), to enhance the validity of the findings.

Regarding the data collection tools, the study conducted preliminary pilot tests, a strategy recommended by (Creswell, 2014), to ensure the reliability and validity of the instruments. Feedback from these pilot tests was used to refine the tools further. For the sampling limitation, while the study acknowledges the constraint, it also emphasizes the depth and richness of insights gained from the chosen sample. Future research could expand the sample size or diversify the institutions involved, as suggested by (J. Al-Ammary, 2021; Mirza & Lawrence, n.d.).

In conclusion, while the methodology employed in this research offers a comprehensive approach to understanding the transition to online pedagogy in Bahrain, it is essential to acknowledge its limitations. By recognizing these constraints and employing strategies to mitigate their impact, the research aims to provide findings that are both theoretically sound and practically relevant.

CHAPTER 5: QUANTITATIVE FINDING

5.1 Introduction

This chapter is mainly divided into three main sections. The first section presents the findings on the Need Analysis Survey. The second section presents the findings on teachers' readiness and self-efficacy for online pedagogy before and after intervention. This section first presents the descriptive statistical analysis followed by inferential statistical analysis to measure the effectiveness of the intervention, thus answering the first research question. The next chapter presents findings collected through interviews and focus group narrating teachers' experiences of Continuous Professional Development, thus addressing the second question of this study. Just to reiterate, the focus of this study revolves around understanding the influence of Continuous Professional Development on teachers' self-efficacy and readiness in navigating online pedagogy. This central investigation is complemented by several subsidiary inquiries aimed at providing a thorough exploration of the subject matter. These include examining the perceived obstacles and opportunities educators encounter in online teaching, assessing the level of self-efficacy and readiness among teachers in this domain, probing into whether teachers' self-efficacy in their abilities correlates with their readiness for online pedagogy, and scrutinizing the effectiveness of Continuous Professional Development programs in bolstering teachers' self-efficacy and readiness for online pedagogy. Additionally, the study aims to uncover any disparities in self-efficacy and readiness levels among teachers belonging to different age groups after participating in Continuous Professional Development activities. Furthermore, the research aims to capture teachers' individual perspectives on how Continuous Professional Development interventions contribute to enhancing their self-efficacy and readiness for online pedagogy. By addressing these research inquiries, the study endeavors to provide valuable insights into the efficacy of Continuous Professional Development initiatives in facilitating educators' transition to online teaching and fostering their overall professional development in this domain.

5.2. Findings of Need Analysis Survey

Pertaining to the first research question of this study, i.e., what are the challenges and opportunities that teachers perceive in online pedagogy? The Need Analysis Survey was conducted. The findings of the Need Analysis Survey provided insights into the experiences and needs of teachers in the realm of online pedagogy. With a total of 21 questions, the survey was meticulously divided into

seven distinct sections. These sections encompassed various facets of online teaching, from self-evaluation to understanding the prevailing support systems. This chapter delves deep into the data, critically analyzing the responses to provide a comprehensive understanding of the current landscape.

5.2.1. Self-Evaluation of Online Teaching Skills

The initial section of the Need Analysis Survey focused on teachers' self-evaluation of online teaching skills. Many of the participants displayed a varied range of responses, indicating a diverse skill set among the teachers. While some teachers rated themselves highly, suggesting confidence in their online teaching abilities, a significant portion seemed to have reservations.

Specifically, when asked how comfortable they were initializing online teaching tools, 27 percent of the respondents (i.e., 11 percent very comfortable and 16 percent comfortable) expressed their comfort in using online teaching tools; whereas 22 percent remain neutral; and 51 percent respondents expressed their discomfort (i.e., 28 percent very uncomfortable and 23 percent uncomfortable) (see Figure 6).

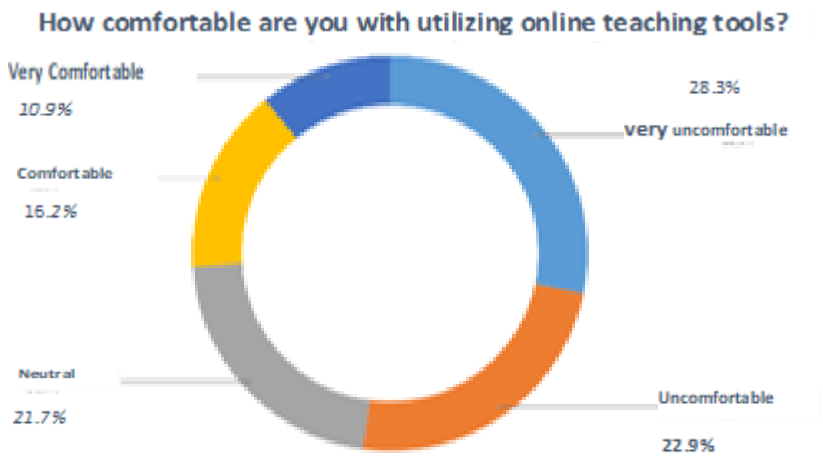

Figure 6. Illustrating how comfortable initializing online teaching tools

Llikewise, when asked how they would rate their ability to implement online teaching, only 28 percent of the respondents rate themselves as good (i.e., 11 percent very good and 17 percent good); whereas 21 percent remained neutral; and 51 percent respondents rated themselves as poor (i.e., 28 percent very poor and 23 percent poor) in implementing online teaching (See Figure 7).

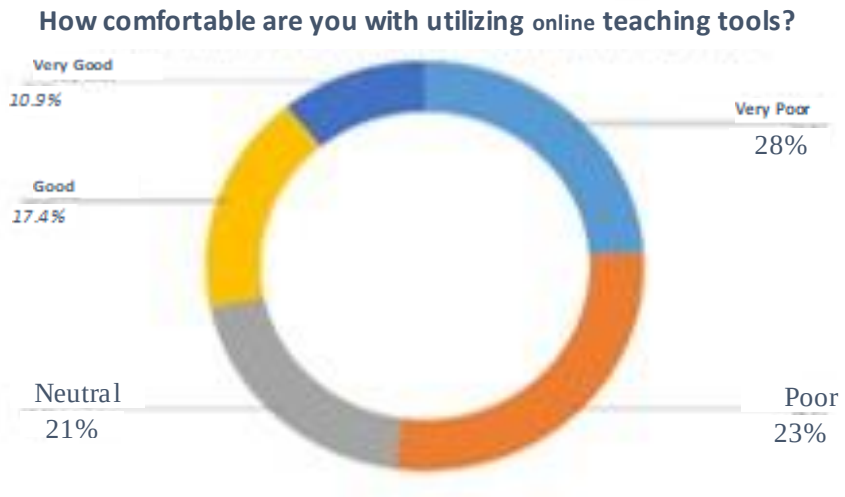

Figure 7. Illustrating the ability to implement the Online Teaching Skills

In the same way, when asked how frequently they would use online teaching if it was not mandatory, only 11 percent of the respondents says "always", whereas 15 percent responded with "often", and 22 percent responded with "sometimes", whereas 28 percent responded with "never" and 24 percent responded with "rarely" (See Figure 8). In summary, this disparity underscores the need for consistent training and support for teachers to ensure a uniform quality of online instruction.

Figure 8 . Illustrating how frequently using the Online Teaching Skills

5.2.2. Challenges in Online Instruction

One of the most telling sections of the Need Analysis Survey was the challenges faced by teachers in online instruction. When asked how frequently they face challenges of various type in implementing online pedagogy, around 30 percent replied with an "always", whereas 28 percent replied with an "often", 22 percent replied with "sometimes", and only 15 percent replied with "rarely" and 11 percent replied with "never" (see Figure 9).

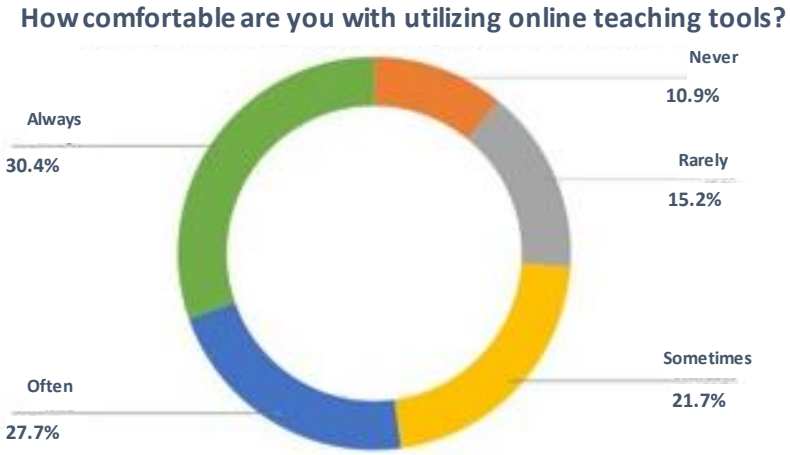

Figure 9. Illustrating the distribution of teachers' responses challenges faced in implementing online pedagogy

When asked that type of problems they face, around 35 percent participants considered work organization and time management as the biggest challenge in implementing online pedagogy; about 30 percent participants considered data privacy and insecurity as the biggest challenge in implementing online pedagogy; 14 percent of participants considered teaching without training as the biggest challenge in implementing online pedagogy, 11 percent participants considered institutional culture as the biggest challenge in implementing online pedagogy, 5 percent participants considered hard to hear students as a challenge in implementing online pedagogy, whereas, 5 percent participants considered lack of computer literacy as the biggest challenge in implementing online pedagogy (Figure 10).

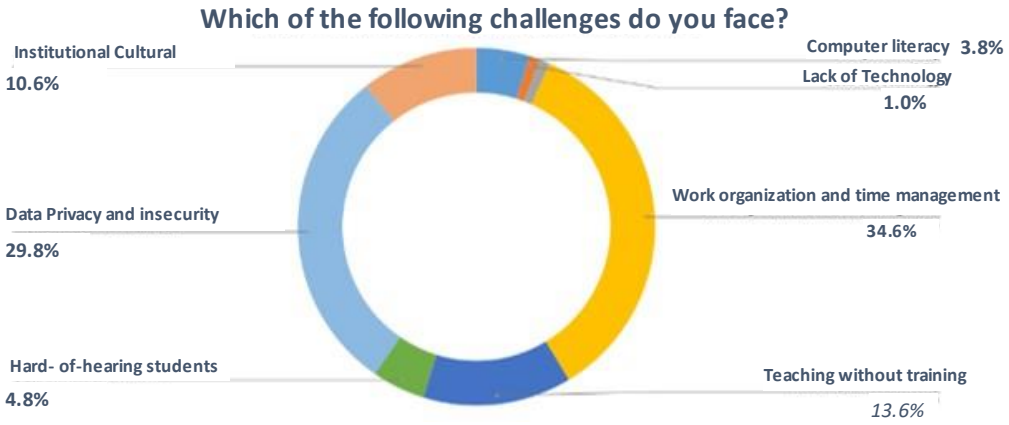

Figure 10 . Illustrating the distribution of teachers' responses on Challenges of Online Teaching

5.2.3. Students' Engagement

Ensuring student engagement in a virtual environment is a concern that resonated with many participants. The data revealed that while some teachers have found effective strategies to keep students engaged, a significant number still struggle. Specifically, when asked how often they gather feedback from their students. When asked how often they gather feedback from their students-on-students own learning experiences during online mode, only 13 percent replied with an "always", whereas 13 percent replied with an "often", 65 percent replied with "sometimes", and only 4 percent replied with "rarely" and 4 percent replied with "never" (Figure 11).

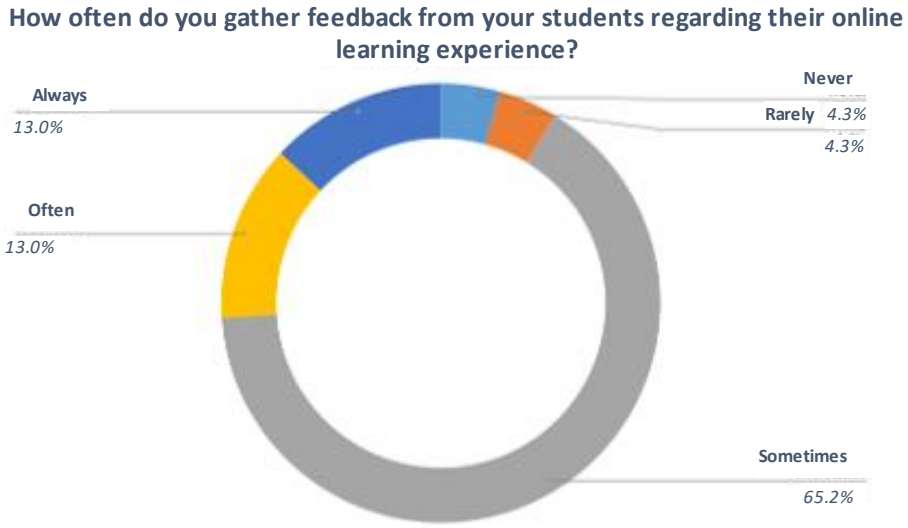

Figure 11 . Illustrating how gathering feedback from the students

When asked to how often they modify their teaching based on students' feedback, only 26 percent replied with an "always", whereas 13 percent replied with an "often", 52 percent replied with "sometimes", and only 4 percent replied with "rarely" and 4 percent replied with "never" (Figure 12). This emphasizes the need for sharing best practices and strategies among teachers to foster a more engaging online learning environment.

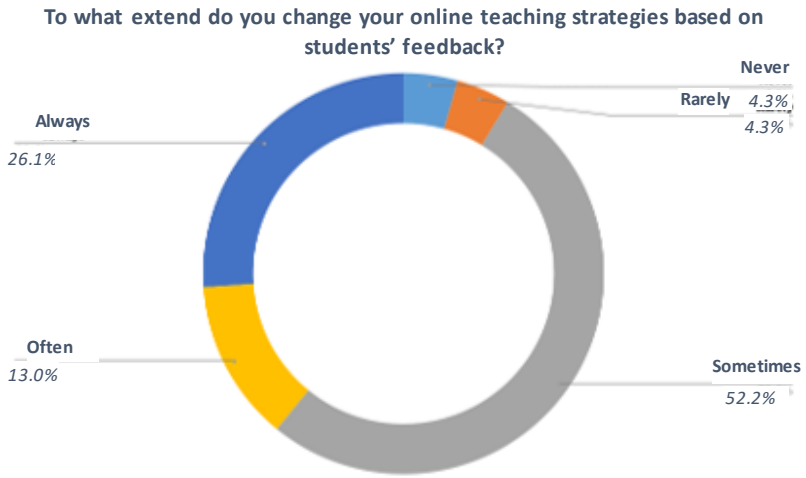

Figure 12 . Illustrating how Modifying the teaching based on students' feedback

5.2.4. Self-Assessment of Online Pedagogical Knowledge

The Need Analysis Survey data on self-assessment of online pedagogical knowledge painted a mixed picture. While some teachers felt well-versed with online pedagogical strategies, others expressed a need for further training. This section underscores the importance of continuous professional development in the ever-evolving domain of online education. Specifically, when asked how teachers would rate their confidence in designing online curriculum, 11 percent of the teachers rated themselves as very confident in designing online curriculum, 15 percent of the teachers rated themselves as confident in designing online curriculum, 22 percent of the teachers remained neutral; 24 percent of the teachers rated themselves as unconfident in designing online curriculum; and 28 percent of the teachers rated themselves as very unconfident in designing online curriculum (see Figure 13)

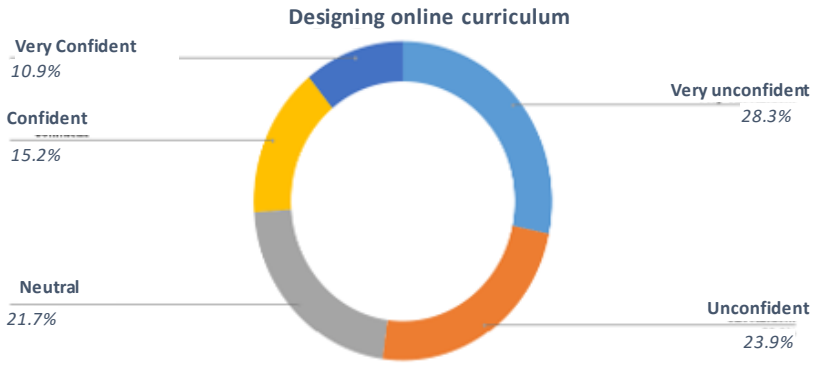

Figure 13 . Illustrating how teachers would rate their confidence in designing online curriculum

Likewise, when asked how teachers would rate their confidence in engaging students online, 11 percent of the teachers rated themselves as very confident in engaging students online, 15 percent of the teachers rated themselves as confident in engaging students online, 22 percent of the teachers remained neutral; 24 percent of the teachers rated themselves as unconfident in engaging students online; and 28 percent of the teachers rated themselves as very unconfident in engaging students online (see Figure 14).

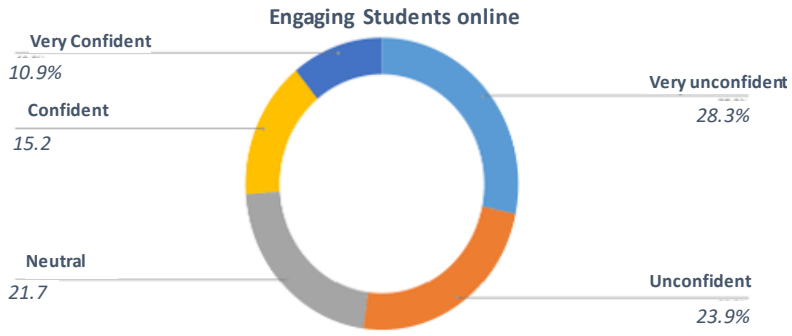

Figure 14. Illustrating how teachers would rate their confidence in engaging students online

In the same way, when asked how teachers would rate their confidence in assessing students online, 11 percent of the teachers rated themselves as very confident in assessing students online, 15 percent of the teachers rated themselves as confident in assessing students online, 22 percent of the teachers remained neutral; 24 percent of the teachers rated themselves as unconfident in assessing students online; and 28 percent of the teachers rated themselves as very unconfident in assessing students online (see Figure 15).

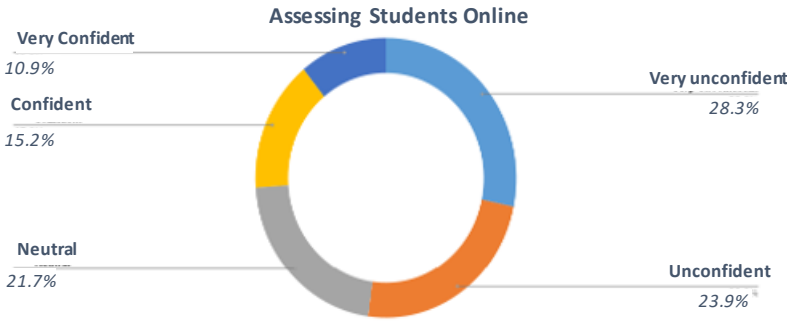

Figure 15 . Illustrating how teachers would rate their confidence in assessing students online

5.2.5. Learning Preferences for Professional Development

When it came to preferences for professional development, the data indicated a clear inclination towards hands-on and interactive sessions. Specifically, when asked if teachers have ever taken any professional development training, around 50 percent replied affirmatively and 18 percent replied with a "No". Others skipped this question. Likewise, when asked if they ever engaged in any Continuous Professional Development related to online pedagogy, a whopping 83 percent of

the respondents replied with a "No" and only 17 percent were engaged in Continuous Professional Development for online pedagogy (see Figure 16)

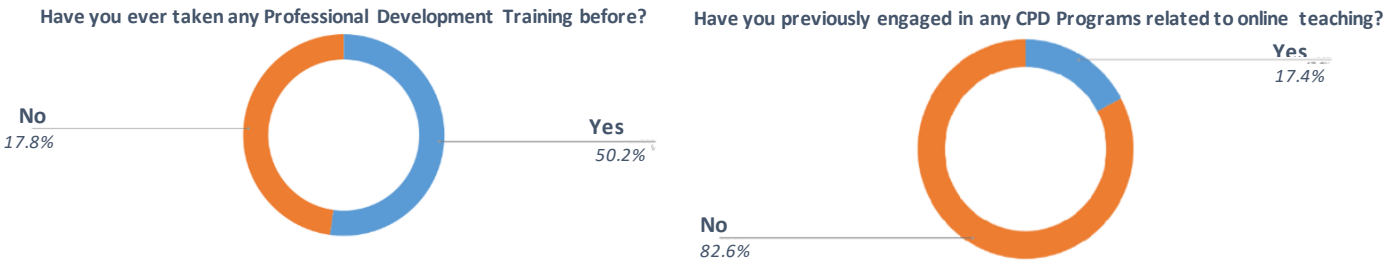

Figure 16. Illustrating Professional Development related to online pedagogy

When teachers were asked if they prefer webinars for professional development, only 11 percent replied with "very much", whereas 15 percent replied with "moderately", 22 percent remained neutral, 24 percent replied "slightly", and 28 percent replied with a "not at all". Teachers seem to value practical experience over theoretical knowledge, emphasizing the need for training programs that offer real-world applications (see figure 17).

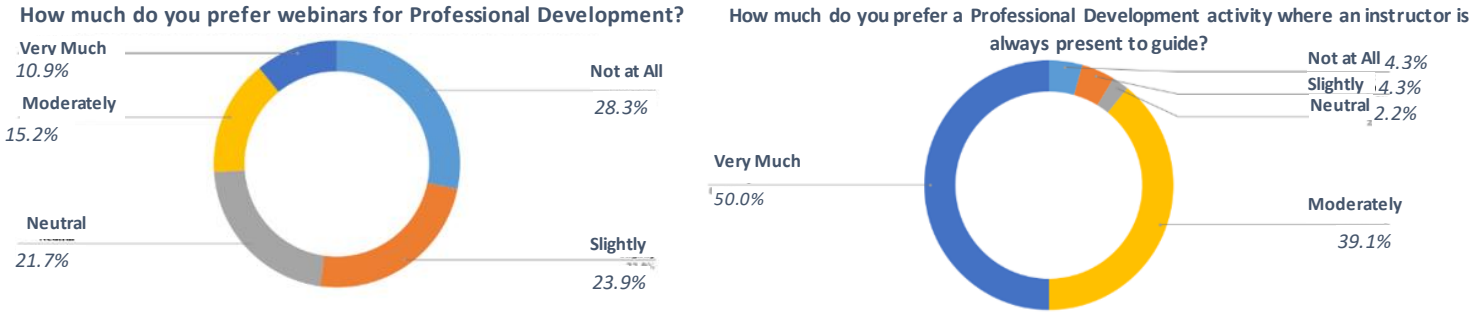

Figure 17. Illustrating the distribution of teachers' responses on learning preferences for professional development.

5.2.6. Goals to Participate in Continuous Professional Development

The goals behind participating in Continuous Professional Development varied among educators. While some sought to enhance their online teaching techniques, others aimed to balance their

responsibilities better. This diversity in goals suggests that one-size-fits-all Continuous Professional Development programs might not be the most effective approach. Specifically, when asked how much importance they would give to "enhancing online engagement techniques" as part of the Continuous Professional Development for online pedagogy, around 50 percent responded as very important, 39 percent considered it as important, 2 percent remained neutral, 4 percent considered it as slightly important, and 4 percent considered it as not important (see Figure 18)

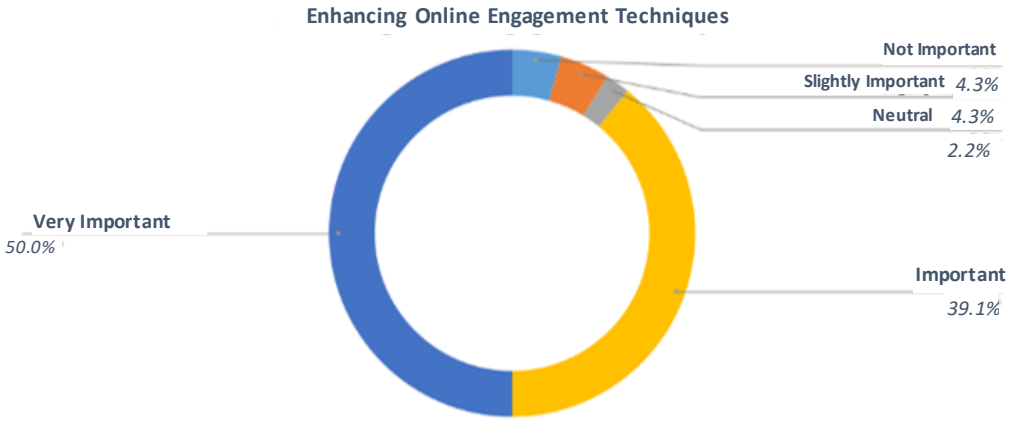

Figure 18. Illustrating how much importance "enhancing online engagement techniques" as part of the Continuous Professional Development for online pedagogy

When asked how much importance they would give to "improving assessment methods" as part of the Continuous Professional Development for online pedagogy, around 50 percent responded as very important, 39 percent considered it as important, 2 percent remained neutral, 4 percent considered it as slightly important, and 4 percent considered it as not important (see Figure 19)

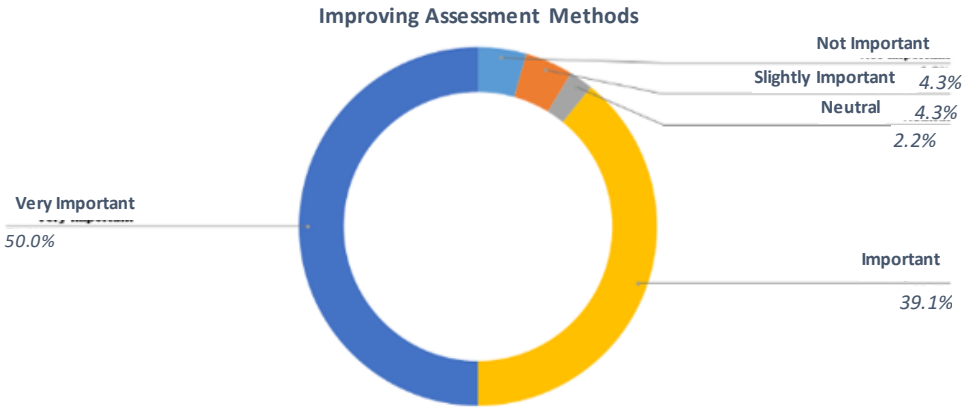

Figure 19 . Illustrating the improving assessment methods of the CPD for online pedagogy

When asked how much importance they would give to "improve curriculum implementation" as part of the Continuous Professional Development for online pedagogy, around 49 percent responded as very important, 31 percent considered it as important, 9 percent remained neutral, 6 percent considered it as slightly important, and 4 percent considered it as not important (see Figure 20)

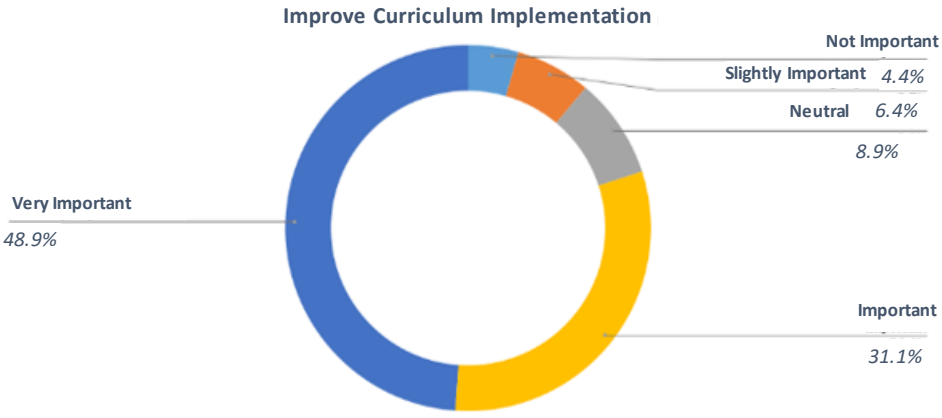

Figure 20. Illustrating the improving curriculum implementation of the CPD for online pedagogy

5.2.7. Prevailing Support Systems

The final section of the Need Analysis Survey explored the prevailing support systems available to teachers at Gulf University. The data suggests that while certain support mechanisms are in place, there is room for improvement. Ensuring robust support systems will be crucial in bolstering the confidence and effectiveness of online teachers. Specifically, when asked about support services these teachers were using at their university for their online teaching, around 50 percent were using technical support, 39 percent were using online teaching resources like lessons plans and software, 9 percent got pedagogical guidance from various sources and 7 percent got peer support (see Figure 21).

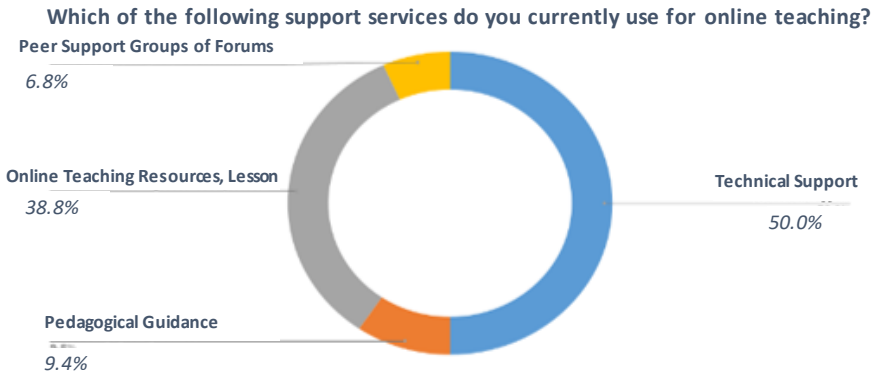

Figure 21 . Illustrating the support services teachers were using at their university for their online teaching

When asked about what support services they consider important in enhancing their online teaching, around 50 percent were using technical support, 39 percent wanted various types of support in their teaching, 31 percent wanted flexible working hours, 22 percent wanted financial benefits, and 5 percent wanted certificates of recognition (see Figure 22).

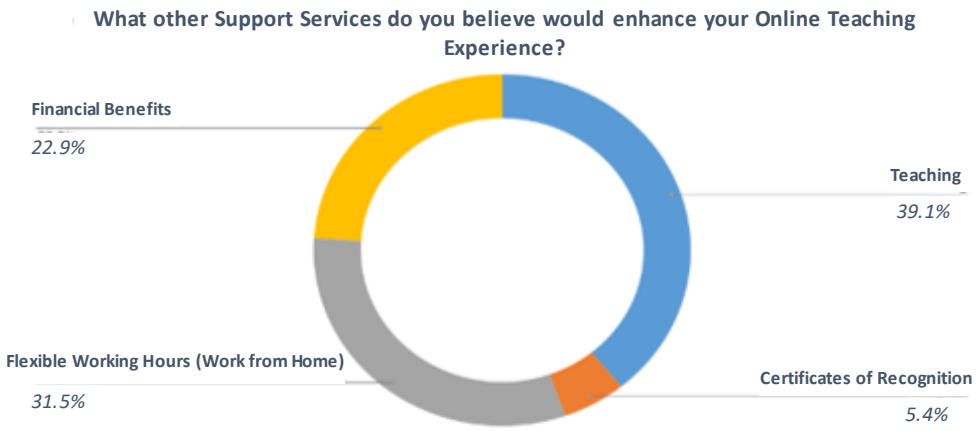

Figure 22 . Illustrating the support services considered as important in enhancing their online teaching

When asked if they know some specific online tools or platforms that they want to use to enhance their online teaching experiences, around 48 percent considered virtual reality and augmented reality as useful tools to enhance their online teaching. Likewise, 22 percent considered social learning platforms as effective tools for online pedagogy; 17 percent considered adaptive learning a way forward and 12 percent considered gamification as a new way to enhance online teaching and learning experiences. (see Figure 23).

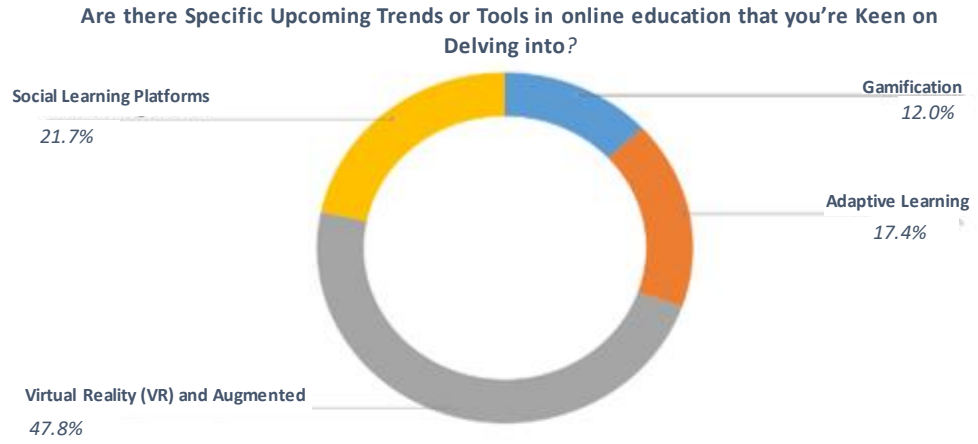

Figure 23. Illustrating specific online tools or platforms that enhanced online teaching experiences

5.4. Findings on Pre & Posttest on Self-efficacy and Readiness

Pertaining to second research question of this study, i.e., Is there any difference in the self-efficacy and readiness of teachers of different age groups post Continuous Professional Development?" Teachers' Self-efficacy for Online Pedagogy Questionnaire and Teachers' Readiness for Online Pedagogy Questionnaire were used to measure teachers' self-efficacy and readiness of online pedagogy respectively. Table 3 presents the findings on the teachers' self-efficacy and readiness of online pedagogy before intervention. As discussed, teachers' self-efficacy was measured using Teachers' Self-efficacy for Online Pedagogy Questionnaire, a 9-point Likert-type questionnaire, which is structured around three pivotal variables: Efficacy in Student Engagement, Efficacy in Instructional Strategies, and Efficacy in Classroom Management. These variables were meticulously chosen to provide a comprehensive measure of teachers' self-efficacy in the context of online teaching. The scoring mechanism was designed such that an average score ranging from 1 to 3 indicated low self-efficacy, scores from 3.1 to 6 denoted moderate self-efficacy, and scores from 6.1 to 9 signified high self-efficacy. The participants' responses painted an intriguing picture. They scored averages of 4.2 (SD = 0.96; Shapiro-Wilk Test > 0.05) in Efficacy in Student Engagement, 4.3 (SD = 0.97; Shapiro-Wilk Test > 0.05) Efficacy in Instructional Strategies, and 4.4 (SD = 1.02; Shapiro-Wilk Test > 0.05) in Efficacy in Classroom Management, respectively. This culminated in an overall average score of 4.3 (SD = 0.97; Shapiro-Wilk Test > 0.05). Delving deeper into these scores, it was observed that 43.5% of the teachers exhibited low self-efficacy, 21.7% showcased moderate self-efficacy, while 34.8% demonstrated high self-efficacy.

On the other hand, the Teachers' Readiness for Online Pedagogy Questionnaire, a 5-point Likert-type questionnaire, was employed to assess teachers' readiness for online pedagogy. It encompassed five critical variables: Self-Discipline & Motivation, Teaching Styles & Collaboration, Course Management & Engagement, Technical Skills & Resources, and Perceptions & Expectations of Online Teaching. The scoring criteria were delineated such that scores between 1 to 1.6 were indicative of teachers being "not ready", scores between 1.7 to 3.3 suggested they were "partially ready", and scores between 3.4 to 5 affirmed they were "fully ready" for online pedagogy. The participants' scores in these domains were 2.4 (SD = 0.87; Shapiro-Wilk Test > 0.05) in Self-Discipline & Motivation , 2.7 (SD = 0.67; Shapiro-Wilk Test > 0.05) in Teaching Styles & Collaboration , 2.7 (SD = 0.78; Shapiro-Wilk Test > 0.05) in Course

Management & Engagement , 2.8 (SD = 0.81; Shapiro-Wilk Test > 0.05) in Technical Skills & Resources and 2.5 (SD = 0.67; Shapiro-Wilk Test > 0.05) in Perceptions and Expectations of Online Teaching, respectively. This led to an overall average score of 2.6 (SD = 0.84; Shapiro-Wilk Test > 0.05). A closer examination of these scores revealed that 28.3% of the participants were not ready for online pedagogy, 34.8% were partially ready, and 37% were fully ready.

Table 3. Statistic for three dimensions of self-efficacy and five dimensions of Readiness of teachers for online pedagogy during Pretest.

SELF-EFFICACY	**N**	**Min**	**Max**	**M**	**SD**	**Skewness (SE)**	**Kurtosis (SE)**	**Low Self efficacy %**	**Moderate Self efficacy %**	**High Self efficacy %**
Efficacy in Student Engagement	46	1.5	9.0	4.2	.96	.42(.35)	-1.5(.68)			
Efficacy in Instructional Strategies		1.4	9.0	4.3	.97	.45(.35)	-1.4(.68)			
Efficacy in Classroom Management		1.6	9.0	4.4	1.02	.3(.35)	-1.6(.68)			
OVERALL SCORE		**1.7**	**8.0**	**4.3**	**.97**	**.3(.35)**	**-1.7(.68)**	**43.5**	**21.7**	**34.8**
READINESS	**N**	**Min**	**Max**	**M**	**SD**	**Skewness (SE)**	**Kurtosis (SE)**	**Not Ready %**	**Partially Ready %**	**Fully Ready %**
Self-Discipline & Motivation	46	1.4	5.0	2.4	.87	1.4(.35)	-.76(.68)			
Teaching Styles & Collaboration		1.0	5.0	2.7	.67	1.0(.35)	-.38(.68)			
Course Management & Engagement		1.4	5.0	2.7	.78	1.4(.35)	-1.3(.68)			
Technical Skills & Resources		1.4	5.0	2.8	.81	1.4(.35)	-1.3(.68)			
Perceptions & Expectations of Online Teaching		1.4	5.0	2.5	.67	1.4(.35)	-.89(.68)			
OVERALL SCORE		**1.4**	**4.9**	**2.6**	**.84**	**0.7(.35)**	**0.4(.68)**	**28.3**	**34.8**	**37.0**

Note. SE refers to Standard Error

Table 4 sheds light on the post-test findings concerning teachers' self-efficacy and readiness. The results indicated a marked improvement in teachers' self-efficacy and readiness for online teaching. Specifically, participants recorded average scores of 4.8 (SD = 0.46; Shapiro-Wilk Test > 0.05) in Efficacy in Student Engagement, 5.3 (SD = 0.87; Shapiro-Wilk Test > 0.05) in Efficacy in Instructional Strategies, and 5.5 (SD = 0.92; Shapiro-Wilk Test > 0.05) in Efficacy in Classroom Management, respectively. This culminated in an overall average score of 5.2 (SD = 0.83; Shapiro-Wilk Test > 0.05).

The test of normality using the Shapiro-Wilk test yielded a value more than 0.05, thus paired sample t-test was conducted to compare the effect of the intervention on the teachers' self-efficacy

and readiness for online pedagogy. A comparison with the pre-test scores, as illustrated in Table 5, revealed a significant difference (t= -5.62, $p < .00$). Delving deeper, 21.7% of the teachers exhibited low self-efficacy, 39.1% showcased moderate self-efficacy, and 39.8% demonstrated high self-efficacy post-intervention. This shift suggests that a substantial portion of teachers transitioned from low to moderate self-efficacy, with a smaller yet notable fraction moving from moderate to high self-efficacy.

Table 4. Statistics for three dimensions of self-efficacy and five dimensions of readiness of teachers for online pedagogy during Posttest

SELF-EFFICACY	**N**	**Min**	**Max**	**M**	**SD**	**Skewness (SE)**	**Kurtosis (SE)**	**Low Self efficacy %**	**Moderate Self efficacy %**	**High Self efficacy %**
Efficacy in Student Engagement	46	1.4	7.8	4.8	.46	-0.2(.4)	-1.6(.7)			
Efficacy in Instructional Strategies		3.0	7.6	5.3	.87	0.2(.4)	-1.7(.7)			
Efficacy in Classroom Management		3.5	7.6	5.5	.92	0.3(.4)	-1.8(.7)			
OVERALL SCORE		**2.6**	**7.7**	**5.2**	**.83**	**0.1(.4)**	**0.4(.7)**	**21.7**	**39.1**	**39.1**

READINESS	**N**	**Min**	**Max**	**M**	**SD**	**Skewness (SE)**	**Kurtosis (SE)**	**Not Ready %**	**Partially Ready %**	**Fully Ready %**
Self-Discipline & Motivation	46	1.4	5.0	3.6	.72	-0.6(.4)	-0.8(.7)			
Teaching Styles & Collaboration		1.0	5.0	3.5	.07	-0.3(.4)	-1.4(.7)			
Course Management & Engagement		1.2	5.0	3.5	.28	-0.7(.4)	-0.9(.7)			
Technical Skills & Resources		1.4	5.0	3.6	.31	-0.6(.4)	-1.0(.7)			
Perceptions & Expectations of Online Teaching		1.2	5.0	3.5	.47	-0.6(.4)	-1.0(.7)			
OVERALL SCORE		**1.3**	**5.0**	**3.5**	**.44**	**-0.5(.4)**	**0.4(.7)**	**8.7**	**30.4**	**60.9**

Note. SE refers to Standard Error

In terms of readiness for online pedagogy, participants scored averages of 3.6 (SD = 0.72; Shapiro-Wilk Test > 0.05) in Self-Discipline & Motivation , 3.5 (SD = 0.07; Shapiro-Wilk Test > 0.05) in Teaching Styles & Collaboration , 3.5 (SD = 0.28; Shapiro-Wilk Test > 0.05) in Course Management & Engagement , 3.6 (SD = 0.31; Shapiro-Wilk Test > 0.05) in Technical Skills & Resources , and 3.5 (SD = 0.47; Shapiro-Wilk Test > 0.05) in Perceptions and Expectations of Online Teaching. The overall average readiness score stood at 3.5 (SD = 0.44; Shapiro-Wilk Test > 0.05), marking a significant difference from the pre-test scores, as highlighted in Table 5 (t= -8.14, $p < .00$). A closer examination revealed that post-intervention, 8.7% of participants felt not

ready for online pedagogy, 30.4% felt partially ready, and a commendable 60.9% felt fully ready. This shift underscores the positive impact of the intervention, with a significant number of participants transitioning from a state of unpreparedness to either partial or full readiness for online pedagogy.

Table 5. Paired Sample t-test on pre and post test of teachers' self-efficacy and readiness.

SELF-EFFICACY	**M**	**SD**	**t**	**df**	***P***
Efficacy in Student Engagement	-0.57	1.37	-2.80	45	0.01
Efficacy in Instructional Strategies	-1.01	1.28	-5.32	45	0.00
Efficacy in Classroom Management	-1.11	1.29	-5.84	45	0.00
OVERALL SCORE	-0.89	1.08	-5.62	45	0.00
READINESS	**M**	**SD**	**t**	**df**	***P***
Self-Discipline & Motivation	-1.18	1.00	-8.03	45	0.00
Teaching Styles & Collaboration	-0.81	0.92	-6.00	45	0.00
Course Management & Engagement	-0.80	0.94	-5.77	45	0.00
Technical Skills & Resources	-0.75	0.92	-5.50	45	0.00
Perceptions & Expectations of Online Teaching	-1.00	0.97	-6.99	45	0.00
OVERALL SCORE	-0.91	0.76	-8.14	45	0.00

Note. Sig. (2-tailed)

Table 6 offers a comprehensive age-wise breakdown of teachers' self-efficacy and readiness for online pedagogy. The cohort of 46 teachers was distinctly categorized into three age brackets: those under 40 years, those between 40-50 years, and those above 50 years.

The younger cohort, those under 40, demonstrated a significant improvement in their self-efficacy scores. They recorded an average score of 6.2 (SD = 0.72; Shapiro-Wilk Test > 0.05) in the pre-test, which surged to 7.8 (SD = 0.98; Shapiro-Wilk Test > 0.05) in the post-test. This marked a significant difference (t= -3.23, $p < .05$) underscores the positive impact of the intervention on this age group. Their readiness scores also mirrored this trend, moving from an average of 3.3 (SD = 0.65; Shapiro-Wilk Test > 0.05) in the pre-test to 3.9 (SD = 0.93; Shapiro-Wilk Test > 0.05) in the post-test, which is significantly different (t= -3.98, $p < .05$). Delving deeper into the distribution of scores, it was observed that while 20% of these teachers exhibited low self-efficacy in the pre-test, this percentage astonishingly dropped to zero in the post-test. The percentage of teachers with moderate self-efficacy decreased from 50% to 25%, while those with high self-efficacy increased

from 30% to 75%. In terms of readiness, the shift was equally commendable, with the percentage of fully ready teachers increasing from 40% to 85%.

On the other end of the spectrum, the cohort aged above 50 presented a different narrative. Their self-efficacy scores witnessed a marginal increase, moving from 3.2 (SD = 0.73; Shapiro-Wilk Test > 0.05) in the pre-test to 3.4 (SD = 0.87; Shapiro-Wilk Test > 0.05) in the post-test, with no significant difference (t= -1.09, *p* = .89). Similarly, their readiness scores saw a slight uptick from 1.4 (SD = 0.12; Shapiro-Wilk Test > 0.05) in the pre-test to 1.6 (SD = 0.28; Shapiro-Wilk Test > 0.05) in the post-test, no significant difference (t= -1.76, *p* = .76). The distribution of scores for this age group post-intervention indicated a more nuanced picture. While 54% of these teachers had low self-efficacy in the pre-test, this percentage decreased to 45% in the post-test. The percentage of teachers with moderate self-efficacy remained constant at 45%, and those with high self-efficacy saw a minimal increase from 10% to 15%. In terms of readiness, the distribution shifted slightly, with the percentage of fully ready teachers increasing from 10% to 15%.

In essence, while the intervention seemed to have a pronounced positive impact on the younger cohort of teachers, the older group, particularly those above 50, exhibited only marginal improvements. This underscores the need for tailored interventions and support mechanisms, considering the diverse needs and challenges faced by teachers across different age groups.

Table 6. Age-wise teachers' self-efficacy and readiness of online pedagogy before and after intervention.

			N	**M**	**SD**	**t**	***P***	Low Self efficacy %	Moderate Self efficacy %	High Self efficacy %
	SELF-EFFICACY	Pretest		6.2	0.72	-3.23	.00	20	50	30
		Posttest		7.8	0.98			0	25	75
UNDER 40			20							
								Not Ready %	Partially Ready %	Fully Ready %
	READINESS	Pretest		3.3	0.65	-3.98	.01	15	45	40
		Posttest		3.9	0.93			0	15	85
			N	**M**	**SD**	**t**	***P***	Low Self efficacy %	Moderate Self efficacy %	High Self efficacy %
	SELF-EFFICACY	Pretest		6.1	0.78	-2.12	.00	25	45	25
		Posttest		6.8	0.81			13	40	47
40-50			15							
								Not Ready %	Partially Ready %	Fully Ready %
	READINESS	Pretest		2.9	0.83	-2.9	.02	20	54	26
		Posttest		3.4	0.56			6	34	60
			N	**M**	**SD**			Low Self efficacy %	Moderate Self efficacy %	High Self efficacy %

	SELF-EFFICACY	Pretest	3.2	0.73	-1.09	.89	54	36	10
		Posttest	3.4	0.87			36	54	10
ABOVE 50			11						
							Not Ready %	Partially Ready %	Fully Ready %
	READINESS	Pretest	1.4	0.12	-1.76	.76	45	45	5
		Posttest	1.6	0.28			45	45	5

Note. Sig. (2-tailed)

Concerning the research question 3 of this study, i.e., "Does teachers' self-efficacy predict their readiness for online teaching?", the findings are presented in Table 7 and Table 8. Table 7 shows the Pearson correlations between all dimensions of teachers' self-efficacy and readiness of online pedagogy. The data of posttest was used for the correlations. First, the results indicated that all three dimensions of teachers' self-efficacy are statistically correlated with one another (Cohen, 1988b). Efficacy in Student Engagement is strongly positively correlated with Efficacy in Instructional Strategies ($r = .716$, $p < .01$), and Efficacy in Classroom Management ($r = .637$, $p < .01$). Likewise, Efficacy in Instructional Strategies is moderately positively correlated with Efficacy in Classroom Management ($r = .441$, $p < .01$).

Second, the results show that the four dimensions of teachers' readiness are also statistically correlated with one another, except Technical Skills & Resources. Self-Discipline & Motivation is strongly positively correlated with Teaching Styles & Collaboration ($r = .655$, $p < .01$), Perceptions & Expectations of Online Teaching ($r = .613$, $p < .01$), and moderately positively correlated with Course Management & Engagement ($r = 534$, $p < .01$). Similarly, Teaching Styles & Collaboration is strongly positively correlated with Course Management & Engagement ($r = 691$, $p < .01$), and moderately positively correlated with Perceptions & Expectations of Online Teaching ($r = 592$, $p < .01$). Likewise, Course Management & Engagement is strongly positively correlated with the Perceptions & Expectations of Online Teaching ($r = 675$, $p < .01$).

Thirdly, the results show that the dimensions of teachers' self-efficacy are statistically correlated with their readiness. Efficacy in Student Engagement is strongly positively correlated with Self-Discipline & Motivation ($r = .759$, $p < .01$), Teaching Styles & Collaboration ($r = .669$, $p < .01$), and Perceptions & Expectations of Online Teaching ($r = .815$, $p < .01$), and moderately positively correlated with Course Management & Engagement ($r = .472$, $p < .01$). Efficacy in Instructional Strategies is strongly positively correlated with Course Management & Engagement ($r = .720$, p

< .01), Perceptions & Expectations of Online Teaching (r = .814, p < .01), and moderately positively correlated with Self-Discipline & Motivation (r = .569, p < .01), and Teaching Styles & Collaboration (r = .533, p < .01), whereas, Efficacy in Classroom Management is strongly positively correlated with Self-Discipline & Motivation (r = .874, p < .01), Course Management & Engagement (r = .851, p < .01), Perceptions & Expectations of Online Teaching (r = .785, p < .01), and moderately positively correlated with Teaching Styles & Collaboration (r = .474, p < .01).

Table 7. Pearson correlations for all dimensions of teachers' self-efficacy and readiness of online pedagogy (N = 46).

VARIABLES	1	2	3	4	5	6	7	8
SELF-EFFICACY								
1. Efficacy in Student Engagement								
2. Efficacy in Instructional Strategies	.716**							
3. Efficacy in Classroom Management	.637**	.441**						
READINESS								
4. Self-Discipline & Motivation	.759**	.569**	.874**					
5. Teaching Styles & Collaboration	.669**	.533**	.474**	.655**				
6. Course Management & Engagement	.472**	.720**	.851**	.534**	.691**			
7. Technical Skills & Resources	.321	.424	.145	.281	.311	.198		
8. Perceptions & Expectations of Online Teaching	.815**	.814**	.785**	.613**	.592**	.675**	.169	

*Note. **Correction is significant at the 0.01 level (2-tailed)*
Note. The Pearson correlation test was run using the data of the posttest only

Table 8 presents the results of multiple regression for variables (i.e., three dimensions of self-efficacy) predicting teachers' readiness of online pedagogy. Table 8 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β). First, multiple regression was run to predict teachers' Self-Discipline & Motivation from their scores on Efficacy in Student Engagement, Efficacy in Instructional Strategies, and Efficacy in Classroom Management. These variables statistically significantly predicted teachers' Self-Discipline & Motivation, F (44, 1) = 153.9, p < .000, R^2 = 0.778, Adjusted R^2 =.773. The same process was repeated for teachers' Teaching Styles & Collaboration, Course Management & Engagement, Technical Skills & Resources, and Perceptions & Expectations of Online Teaching. The results show that the three dimensions of self-efficacy significantly predicted teachers' readiness particularly their Teaching Styles & Collaboration, F (49.5, 1) =98.4, p < .000, R^2= .691, Adjusted R^2 =. 684, Course Management & Engagement, F (57.8, 1) = 186.9, p < .000, R^2= .809, Adjusted

R^2 = .805, Technical Skills & Resources, F (62.8, 1) = 225.6, p < .000, R^2 = .837, Adjusted R^2 = .833, and their Perceptions & Expectations of Online Teaching, F (62.6, 1) = 191, p < .000, R^2 = .813, Adjusted R^2 = .809.

Table 8. Results of regression analysis for variables predicting teachers' readiness of online pedagogy from their self-efficacy.

Predictors	**Self-Discipline & Motivation**		**Teaching Styles & Collaboration**		**Course Management & Engagement**		**Technical Skills & Resources**		**Perceptions and Expectations of Online Teaching**	
(SELF-EFFICACY)	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Efficacy in Student Engagement	1.49 (.19)	.882***	.518 (.12)	.419	1.37 (.11)	.831***	1.34 (.168)	.915***	1.31 (.182)	.902***
Efficacy in Instructional Strategies	.971 (.17)	.446	.058 (.31)	.831***	.009 (.069)	0.204	.033 (.027)	.206	.317 (.047)	.293
Efficacy in Classroom Management	.526 (.15)	.33	.105 (.06)	-.253	.677 (.056)	.145	.245 (.027)	.169	.421 (.62)	.206

*Note: ***p < .001, **p < .01, two-tailed; *p < .05, two-tailed*

5.4. Summary & Discussion on Quantitative Findings

The exploration into teachers' self-efficacy and readiness for online pedagogy using quantitative approach offers a foundation for a deeper understanding of the dynamics of online teaching in the modern educational landscape. However, as with many studies of this nature, it is imperative to critically evaluate the findings, their implications, and the broader context in which they sit.

The quantitative exploration into teachers' self-efficacy and readiness for online pedagogy offers intriguing insights, albeit with certain limitations. Utilizing the Teachers' Self-efficacy for Online Pedagogy Questionnaire and Teachers' Readiness for Online Pedagogy Questionnaire Likert-type scales, the study aimed to discern the impact of Continuous Professional Development intervention on these two pivotal facets. Initially, teachers' self-efficacy, as measured across three dimensions, presented moderate scores, with an aggregate average of 4.3. Post-intervention, a modest increase was observed, culminating in an overall average of 5.2. While this uptick is commendable, the magnitude of change raises questions about the efficacy of the intervention itself.

Similarly, the readiness for online pedagogy, gauged across five domains, showed an initial aggregate mean of 2.6, which post-intervention rose to 3.5. Again, while the improvement is evident, the scores still hover around the mid-range, suggesting that a significant portion of the

cohort may still be inadequately prepared for online teaching. This brings to the fore the need for more intensive or tailored interventions.

A particularly noteworthy observation was the differential impact of the intervention across age groups. Younger teachers, those below 40, exhibited pronounced improvements, whereas their senior counterparts, those above 50, showed only marginal gains. This stark contrast underscores the potential pitfalls of a one-size-fits-all approach and highlights the necessity for age-specific strategies.

These issues may also reflect the limitation of the methodology of this section. For example, the reliance of this section of the study on the Teachers' Self-efficacy for Online Pedagogy Questionnaire and Teachers' Readiness for Online Pedagogy Questionnaire Likert-type scales to measure self-efficacy and readiness, respectively, is a methodological choice that warrants scrutiny. While Likert scales are widely used in educational research due to their simplicity and ease of administration (Dawes, 2008), they are not without limitations. For instance, the scales can be susceptible to response bias, where participants may choose a neutral or agreeable response rather than providing a genuine reflection of their feelings (Sullivan & Artino Jr, 2013). This could potentially explain the moderate scores observed both pre- and post-intervention.

The post-intervention increases in self-efficacy and readiness scores, though statistically significant, raises questions about the real-world implications of these findings. A shift from an average of 4.3 to 5.2 in self-efficacy, while mathematically notable, may not translate to a substantial change in actual teaching practices or outcomes. As (Bandura, 1997), posited, self-efficacy is a crucial determinant of how people think, feel, and behave. However, a slight increase in a Likert scale might not necessarily equate to a meaningful change in a teacher's classroom behavior or their ability to effectively engage with students online.

Furthermore, the study's observation regarding the differential impact of the intervention based on age is both intriguing and concerning. The pronounced improvements among younger teachers compared to their older counterparts could be indicative of a broader generational divide in the adoption and integration of technology in pedagogical practices. (Prensky, 2001), introduced the notion of "digital natives" and "digital immigrants" to describe younger individuals who have grown up with technology versus older individuals who have had to adapt to it. While this

dichotomy has been critiqued for its oversimplification by (Bennett et al., 2008), the study's findings do seem to echo the challenges faced by "digital immigrants" in adapting to online teaching platforms and methodologies.

Furthermore, the strong correlations identified between self-efficacy and readiness for online pedagogy are consistent with previous research. (Tschannen-Moran et al., 1998), found that teachers' beliefs in their capabilities significantly influenced their planning, decision-making, and willingness to implement new teaching strategies. However, correlation does not imply causation. The regression analysis, which indicated that self-efficacy dimensions were potent predictors of teachers' readiness, is a valuable contribution to the literature. However, the study has to take benefit from a more granular exploration of these dimensions using qualitative research. For instance, understanding the specific aspects of "Efficacy in Instructional Strategies" that most strongly predict online teaching readiness can provide actionable insights for teacher training programs.

In conclusion, while this section of study offers a valuable snapshot of the current state of teachers' self-efficacy and readiness for online pedagogy, it also underscores the multifaceted nature of these constructs and the challenges inherent in their measurement and interpretation. Thus, a follow up qualitative research was conducted aiming to build on these findings to provide a more holistic understanding of the factors that influence teachers' effectiveness in online teaching environments. The next chapter presented the qualitative findings.

CHAPTER 6: QUALITATIVE FINDINGS

6.1. Introduction

Aligned with quantitative findings where the generational gap determines the readiness and self-efficacy of using online pedagogy, the qualitative data analysis also centralized the generational gap to understand in depth teachers' readiness and self-efficacy of online pedagogy and their interaction with Continuous Professional Development. Three main themes emerged during qualitative data analysis including generational perspectives on technological adaptation in education, interactions of teachers of different age groups with Continuous Professional Development, and the influence of Continuous Professional Development on the readiness and self-efficacy of teachers of different age groups. Before delving into the findings, it is essential to remind readers that this study involved nine purposively sampled teachers who participated in semi-structured interviews, categorized into three distinct age groups: the under 40-year age group consisting of three teachers, the 40–50-year age group comprising three teachers, and the 50 plus age group also including three teachers. Furthermore, among these nine teachers, five volunteered to participate in a focus group discussion. Among these five participants, one teacher represented the under 40-year age group, two teachers represented the 40–50-year age group, and the remaining two teachers represented the 50 plus age group. It is important to note that quotations utilized in the following chapters are drawn from both semi-structured interviews and focus group discussions. No distinction is made in the subsequent discussion for the sake of maintaining the spontaneity of ideas.

6.2. Generational Perspectives on Technological Adaptation in Education

The qualitative data analysis suggests that almost all teachers are of the opinion that the integration of technology into pedagogical practices in the rapidly evolving landscape of education is paramount. However, the ease with which teachers adapt to this integration varies, often influenced by generational differences. This section delves into the experiences and perspectives of Gulf university teachers across three distinct age groups highlighted in chapter 5, shedding light on their journeys of technological adaptation.

The eldest group of teachers, those above 50, often expressed sentiments of trepidation and unfamiliarity with technology. As one teacher in this age bracket remarked during the interview, "I remember when the first computers came into our staff room. It was a novelty, something we didn't think would become a mainstay in education." This sentiment is echoed in literature, with (Prensky, 2001) noting that individuals who did not grow up in the digital age often find themselves playing catch-up, trying to adapt to tools and platforms that are not intuitive to them. Another teacher above 50 shared, "Every time there's a new update or a new platform, I feel like I'm starting from scratch. It's not like how it is for the younger teachers."

Contrastingly, the middle age bracket, those between 40 to 50, have had some exposure to technology, especially during their advanced academic pursuits. One teacher from this group shared during focus group, "During my PhD studies, I had to use certain software and online research tools. It was challenging, but it gave me a foundation." This foundational knowledge, while beneficial, does not necessarily translate to seamless adaptation for online teaching. As (Al-Senaidi et al., 2009) found in their study on Bahraini teachers, while there's an acknowledgment of the importance of technology, there's also a recognition of the challenges it presents. Another teacher in this age group mentioned, "I'm comfortable using technology for research, but using it to engage students online? That's a different ball game."

The youngest group, those under 40, have had the advantage of growing up in a more technologically advanced era. For them, many technological tools are intuitive. A teacher in this age bracket stated, "I've always used technology, be it for socializing, studying, or now, teaching. It feels like a natural extension." This sentiment is supported by literature, with (Bennett et al., 2008) noting that younger teachers often exhibit a 'digital native' mindset, making the integration of technology into their teaching practices more fluid. Another young teacher added in focus group, "It's not just about knowing the tools; it's about understanding how our students use them. That's where I feel we have an edge."

However, some recurring themes emerged that represent the sentiments of teachers of all ages while experiencing online pedagogy before and during intervention. These include technical difficulties, stress associated while using technology for pedagogy, and challenges to deal with the evolving technological changes.

6.2.1. Technical Difficulties

In the realm of online education, technical difficulties are not uncommon. However, the extent to which these challenges affect teachers' readiness and self-efficacy for online pedagogy can vary based on several factors, including their age, familiarity with technology, and cultural context. This section delves deeper into the technical challenges faced by Gulf university teachers across different age groups.

For the eldest group of teachers, those above 50, technical obstacles are often more pronounced. One teacher in this age bracket shared during an interview, "I often find myself struggling with internet connectivity. Sometimes, I'm in the middle of a lecture, and suddenly everything goes blank. This shrinks my confidence. Instead of worrying about the effective delivery of content knowledge, I worry about these technical issues" This sentiment is not isolated. (J. H. Al-Ammary, 2021; Al Musawi et al., 2016; Dutta, 2016) found that in many Arab countries, including Bahrain, older teachers often grapple with the basic technicalities of online platforms, hindering their ability to deliver lessons effectively. Another teacher above 50 added during focus group, "It's not just the internet. Sometimes, I can't figure out where to click or how to share my screen. It's all so overwhelming. And this was so common in the initial days when we had to shift to online teaching"

The middle age bracket, those between 40 to 50, while more familiar with technology, are not immune to technical challenges. One teacher from this group mentioned, "I've had instances where my audio suddenly stops working, or the platform crashes. It's frustrating because I feel I should know better." Another added, "In our culture, we value face-to-face interactions. So, when there's a technical glitch, it feels like a barrier, not just to teaching, but to connecting with my students."

Interestingly, even the youngest group of teachers, those under 40, face their own set of technical challenges, albeit of a different nature. One young teacher shared, "I'm comfortable with most platforms, but sometimes the sheer number of tools and updates can be overwhelming. Just when I've mastered one tool, there's a new one to learn." This sentiment aligns with (Al-Senaidi et al., 2009) findings, which suggest that while younger teachers in Bahrain are more tech-savvy, they also face the challenge of keeping up with the rapid pace of technological advancements.

Despite these challenges, the resilience and adaptability of Bahraini teachers' shine through. As one teacher poignantly remarked, "In our culture, we have a saying, 'Where there's a will, there's a way.' I might struggle with technology, but my commitment to my students keeps me going." These sentiments were comparatively low among older teachers, yet they kept showing their willingness and optimism and sought Continuous Professional Development as way to overcome the technical challenges.

6.2.2. Technostress

Under the theme of generational perspective, another sub-theme emerged that revolved around what (D. H. J. Caro & Sethi, 1985; Mahboob & Khan, 2016; Nisafani et al., 2020) termed as 'technostress'. While the previous chapters delved into the adaptation of technology and the technical difficulties faced by teachers of different age groups, this section focuses on a more subtle yet pervasive challenge: technostress'—an adaptation disease caused by an inability to cope with new technologies in a healthy manner. It's the negative link between individuals and technologies, often resulting from rapid changes in the workplace due to the introduction and use of ICTs (Atanasoff & Venable, 2017; Ayyagari, 2007; Ayyagari et al., 2011). For the teachers of this study, this stress manifests in various ways, influenced by age, gender, and cultural nuances and influencing their self-efficacy for online pedagogy.

A female teacher above 50 of this study shared, "Every time there's an update or a new tool introduced, I feel a sense of dread. It's not just about learning how to use it, but the fear of making mistakes in front of my students." This sentiment echoes the findings of (Ayyagari et al., 2011), who identified workload and job role uncertainty as dominant reasons for technostress. The rapid pace of technological advancements can be overwhelming, especially for those who didn't grow up in the digital age.

However, it's not just the older generation that feels the pressure. A male teacher in his 40s remarked, "I took my PhD when technology was just starting to make its mark in education. While I'm not completely alien to it, the constant need to adapt and update is exhausting." This is in line with the study by (Salanova et al., 2013), which highlighted the difference in technostress levels between intensive and occasional users of technology.

The younger teachers, while more tech-savvy, are not entirely immune. A female teacher under 40 noted, "There's an unspoken expectation that because we're young, we should know it all. But sometimes, it's just as overwhelming for us." (Brandtweiner et al., 2010) found that while familiarity with technology might reduce technostress, the constant evolution and introduction of new tools can still pose challenges.

In the context of Arab culture, where traditions and values play a significant role, the rapid integration of technology can sometimes feel jarring. A male teacher from the 40-50 age bracket shared, "In our culture, we value personal connections. The shift to online teaching, while necessary, sometimes feels impersonal. And when technology fails, it adds to the stress."

6.2.3. Empathy for teachers in the continuous technological changes

The previous sections have delved into the adaptation of technology, technical difficulties, and the pervasive challenge of technostress among teachers of all ages, this section highlights the relentless pace of technological changes and its implications on teachers' readiness and self-efficacy for online pedagogy, especially for the teachers who have not grown up in the digital age. A 53-year-old male teacher of this study shared, "Every time there's a new update or a new platform to learn, it feels like I'm starting from scratch. It's not just about mastering the tool, but about reimagining my entire teaching approach."

This sentiment is not isolated. The rapid shift to online learning, exacerbated by the global pandemic, has thrown teachers worldwide into uncharted waters. The challenges are manifold – from mastering the technology itself to redefining pedagogical methods suitable for virtual classrooms. A female teacher in her 50s remarked, "In our days, the classroom was about personal connections, about reading the room. Now, it's about navigating internet glitches and hoping students are as engaged behind those muted microphones and switched-off cameras." This is particularly more challenging for those teachers who value personal connections and face-to-face interactions as part of their pedagogy. Shifting to online teaching for these teachers can feel particularly stark (Salanova et al. 2013; Brandtweiner et al. 2010). A male teacher in his 50s noted, "In our traditions, learning is a communal activity. The virtual space, while necessary now, sometimes feels cold and distant. This is not teaching. Teaching is all about human interaction. I sometimes feel confused".

The data from younger teachers also suggests that they also face similar challenges. A younger female teacher under 40 highlighted, “while I might be more tech-savvy, the challenge is more than just technology. It’s about adapting my teaching style, ensuring students remain engaged, and dealing with the constant changes in platforms and tools.” Another younger teachers’ laments, “My teaching requires a human connection with my students which I try to create in face-to-face interactions. My dressing, the way I stand in the class or stroll around or even small jokes that I make during my lectures are only effective if I see the reaction of my students. I can’t get this reaction in online teaching and thus I am kind of losing my spirit of teaching. […] Saying that I still work hard to maintain the same during online teaching, but it is painful and requires a lot of energy. I hope my students appreciate my efforts by heart and not just appreciate us to make us happy”.

This cry for empathy and patience from students is a global phenomenon. The viral tweet by Nyla Danae (Urlocalnyguy, 2020) underscores a global sentiment – the need for empathy and patience. The overwhelming response to her tweet is a testament to the collective challenges faced by teachers worldwide. The rapid technological changes, coupled with the pressing demands of the pandemic, have made the teaching profession even more challenging.

Yet, amidst these challenges, there are stories of resilience. A 41-year-old male teacher shared, "I've been teaching online for over a decade way before Covid 19. While I had more time to prepare back then, the essence remains the same – adaptability. We need to be flexible, both as teachers and learners."

6.3. Interaction of Teachers in Continuous Professional Development for Online Pedagogy

The second emerging theme from qualitative data was related to teachers’ interactions with one another during Continuous Professional Development. Considering that teachers were visibly divided into three age groups, their interactions with another during Continuous Professional Development offer them both opportunities and challenges. This chapter delves into the power dynamics and challenges faced by teachers during their interactions in Continuous Professional Development sessions. It also offers a glance into synergy of senior and junior teachers

6.3.1. Power dynamics among teachers of different age groups

A recurring theme from the interviews was the role of technological proficiency in shaping power dynamics. As one junior teacher, under the age of 40, remarked, "It's a strange feeling when senior teachers come to me for tech help. I respect their experience, but in these sessions, the tables turn." This sentiment echoes the findings from previous studies, suggesting that junior teachers, having grown up in the digital age, often find themselves in the role of the "expert" during Continuous Professional Development sessions (Forbes, 2016; Savulescu, 2015; M. P. A. Thompson, 2004). This dynamic can lead to feelings of inadequacy among senior teachers. A female teacher in the age bracket of "Above 50" shared, "I've been teaching for over 30 years, but in these tech sessions, I sometimes feel like a novice. It's humbling, but also a bit intimidating."

Access to technological resources emerged as another significant factor influencing power dynamics. Teachers with better access often felt more empowered during training sessions. A teacher in the "40 to 50" age group mentioned, "Having the right tools makes a huge difference. Those of us with better access naturally feel more confident during these sessions." This sentiment aligns with previous findings, suggesting that resource access can significantly impact power dynamics in Continuous Professional Development sessions.

Moreover, influence over decision-making related to ICT use in classrooms was another factor that emerged. Teachers who had a say in the selection or implementation of technological tools felt more empowered. A male teacher from the "40 to 50" age group shared, "When you have a say in the tools you use, you naturally feel more invested and empowered during training sessions."

Despite the challenges posed by technological proficiency, pre-existing hierarchies still played a role in shaping interactions. Senior teachers, even if less technologically proficient, often held more institutional power due to their experience and status. This dynamic was particularly pronounced within the context of Arab culture, which places a high value on respect for elders and experience. A female teacher in the "Above 50" age group reflected, "While I might struggle with the tech aspects, my experience still holds value. My younger colleagues often come to me for pedagogical advice."

Support from the administration also emerged as a crucial factor. Teachers who felt supported in their professional development endeavors felt more empowered. A teacher from the "under 40" age group remarked, "Knowing that the administration has your back makes a world of difference. It's not just about mastering the tools; it's about feeling valued and supported in your growth journey."

In conclusion, the dynamics of Continuous Professional Development sessions for online pedagogy are multifaceted, influenced by a myriad of factors ranging from technological proficiency to pre-existing hierarchies. Within the context of Gulf university, these dynamics are further shaped by cultural nuances. As the educational landscape continues to evolve, it's essential to recognize and address these dynamics, ensuring that all teachers, regardless of their age or tech proficiency, feel valued, empowered, and equipped to navigate the challenges of online pedagogy.

6.3.2. The Synergy of Senior and Junior Teachers in Continuous Professional Development

The interaction between senior and junior teachers in Continuous Professional Development sessions offers a rich tapestry of experiences and insights. This section delves into the dynamics and benefits of such interactions.

One of the most salient points that emerged from the interviews was the concept of mutual learning during Continuous Professional Development. A senior teacher, aged above 50, remarked during focus group, "I've been teaching for decades, but every session with these younger teachers offers a fresh perspective. Their energy and novel approaches are truly enlightening." This sentiment aligns with research suggesting that the exchange of knowledge between senior and junior teachers can be mutually beneficial (Blandin & Lietaer, 2013; Kohlgrüber et al., 2021; Martin & Wyness, 2013). A junior teacher, under 40, echoed this sentiment, saying, "While I might introduce them to new tech tools, the wisdom and practical strategies they share are invaluable."

The rapid integration of technology in education, as previously discussed, has brought about a significant shift in teaching methodologies. Junior teachers, often more technologically adept, play a pivotal role in bridging the tech gap. A female teacher in her early 40s shared, "It's heartwarming to see senior teachers, initially hesitant with technology, gradually become proficient with a little

guidance from us." This mirrors findings that suggest junior teachers can significantly aid their senior counterparts in navigating the digital realm (Kushnir et al., 2013; Saad & Sankaran, 2020; Salkowitz, 2008).

Moreover, the interaction with junior teachers serves as a catalyst for senior teachers to adapt to the ever-evolving educational landscape. As one senior teacher puts it, "Their enthusiasm for new methods and tools is contagious. It pushes me to step out of my comfort zone and embrace change."

Collaborative Continuous Professional Development sessions, where senior and junior teachers interact, have been shown to lead to improved teaching practices. The blend of experience and innovation creates a fertile ground for professional growth. A female teacher, aged above 50, reflected, "These sessions are not just about learning new tools or methods. They're about introspection, reflection, and growth."

The mentorship role that senior teachers often assume is also of paramount importance. While they guide and support junior teachers, this relationship also offers them a chance to reflect on their practices and imbibe new strategies. A junior male teacher mentioned, "The guidance I receive from senior teachers is like a compass, helping me navigate the complexities of our profession."

Within the context of Gulf University, the value of respect for elders and their wisdom is deeply ingrained. This cultural backdrop adds another layer to the interactions between senior and junior teachers. While junior teachers might introduce technological innovations, they do so with deep respect for the experience and knowledge of their senior counterparts. A teacher in her 30s remarked, "In our culture, we're taught to revere the wisdom of our elders. In these sessions, it's a beautiful blend of tradition and modernity."

In conclusion, while challenges exist, the interaction between senior and junior teachers in Continuous Professional Development sessions, especially within the Bahraini context, offers a plethora of benefits. From mutual learning to mentorship, the synergy between these two groups is a testament to the fact that learning and growth are continuous processes, transcending age and experience.

6.4. Teachers' Readiness and Self-Efficacy post Continuous Professional Development

Another emerging theme from qualitative data revolved around teachers' readiness and self-efficacy for online pedagogy after their engagement with Continuous Professional Development. In the evolving educational landscape, particularly within Bahraini universities, the shift towards online pedagogy has been both rapid and demanding. The role of Continuous Professional Development in preparing teachers for this transition cannot be understated. Drawing from the insights of interviews with teachers across different age groups, this section delves into the critical aspects of teacher readiness and self-efficacy for online pedagogy, post their engagement with Continuous Professional Development.

The transition to online teaching, necessitated by various global and local educational trends, has been both rapid and challenging. Continuous Professional Development's role in this transition is critical, particularly in enhancing teachers' readiness and self-efficacy. As one junior teacher, under 40, reflected, "I was overwhelmed at first. The online world seemed like a maze. But after Continuous Professional Development, it's like I've been given a map. It's still a challenge, but now I have a sense of direction". This statement resonates with the findings of (Amzat & Valdez, 2017; Thirumalai et al., n.d.) who emphasized the empowering impact of well-structured Continuous Professional Development programs in facilitating teachers' transition to online environments.

The sentiment of being initially overwhelmed but subsequently empowered through Continuous Professional Development is not unique to younger teachers. A teacher from the 40-50 age group shared, "At my age, adapting to online teaching felt like learning a new language. But Continuous Professional Development sessions made it less alien. It's not just about the tools, it's about understanding the 'why' behind them". This aligns with the observations of (Crouch et al., 2021; Nickerson, 2020; van der Klink & Alexandrou, 2022), who noted that mid-career teachers often face a steeper learning curve in adapting to digital pedagogies yet can greatly benefit from targeted Continuous Professional Development interventions.

Teachers' self-efficacy, or belief in their ability to teach effectively in an online environment, is another critical aspect influenced by Continuous Professional Development. A female teacher in the 'above 50' category insightfully commented, "I've been teaching for over 25 years. Moving

online felt like starting from scratch. But Continuous Professional Development didn't just teach me about online tools; it reignited my confidence in my teaching abilities". This echoes the findings of (Rainie & Anderson, 2017), who argued that self-efficacy is a significant predictor of teachers' success in adopting new technologies and pedagogies.

However, the journey is not without its challenges. A male teacher in his early 40s remarked, "The Continuous Professional Development sessions were good, but sometimes they felt disconnected from our classroom realities. There's a gap between what's taught in Continuous Professional Development and what we face with students online". This critique highlights a gap in the Continuous Professional Development design, a point similarly raised by (Abakah, 2023; Dhungana et al., 2021; Turner, 2023), who suggested that Continuous Professional Development programs often lack contextual relevance, affecting their effectiveness.

These insights from teachers supplement the understanding of Continuous Professional Development's impact, indicating that while Continuous Professional Development significantly aids in enhancing readiness and self-efficacy for online teaching, there is a need for continuous evolution in Continuous Professional Development design. This involves integrating contextual realities, addressing diverse technological competencies across different age groups, and fostering a deeper understanding of the pedagogical shift required for online teaching.

The data analysis further adds to our understanding of how Continuous Professional Development influences the adaptation of teaching styles and the nuances of virtual engagement. The transition to online teaching is multifaceted, involving more than just an understanding of digital platforms; it necessitates a rethinking of pedagogical approaches and teaching dynamics. This complexity is echoed in the words of a female teacher under 40, who stated, "I thought knowing the tools would be enough. But it's more about connecting with students through a screen, which is harder than I expected". This sentiment is in line with research by (Kaufmann & Vallade, 2022; Kehrwald, 2008; Tu & McIsaac, 2002), who highlight the importance of relational aspects in online teaching, an area often overlooked in traditional Continuous Professional Development programs.

Similarly, teachers in the middle age group, 40-50, express concerns about translating their established classroom practices to a virtual environment. A male teacher in this group shared, "In the classroom, I could read the room, adapt on the fly. Online, it feels like I’m teaching in the

dark". This reflects the findings of (Martin & Bolliger, 2018), who note the challenges experienced by seasoned teachers in replicating the interactive and adaptive nature of physical classrooms in online settings.

The experiences of senior teachers, those above 50, provide further insights into the adaptation process. As one senior female teacher noted, "Technology isn't just a tool; it's a different language. The Continuous Professional Development helped, but it's the continuous practice that's making me proficient". This aligns with the arguments presented by (Bowen, 2015; Catalano, 2019; Guri-Rosenblit, 2009) emphasizing the ongoing nature of learning and adaptation required for effective online teaching, particularly for those who have spent a significant part of their careers in traditional settings.

However, it's crucial to address the gaps in Continuous Professional Development. A teacher in his late 50s remarked, "The Continuous Professional Development sessions often felt like they were ticking boxes, rather than truly preparing us for the realities of online teaching". This criticism points to a disconnect between Continuous Professional Development content and the practical needs of teachers, an issue also raised by (Brouwer et al., 2022; Casey et al., 2017; Lander et al., 2022), who argue for more tailored and responsive Continuous Professional Development programs.

Building on the previous arguments regarding the role of Continuous Professional Development in enhancing readiness and self-efficacy, these insights underline the need for Continuous Professional Development to be more holistic, covering not just technical skills but also the subtleties of online engagement and pedagogical adaptability. The transition to online pedagogy requires teachers to rethink their approach to teaching and learning, which Continuous Professional Development programs should adequately address.

Another sub theme emerged from qualitative data is related to the influence of Continuous Professional Development on teachers' self-efficacy. As mentioned earlier, self-efficacy plays a crucial role in how teachers approach and manage the transition to online pedagogy. This belief system is significantly influenced by Continuous Professional Development, as it provides teachers with the skills and confidence needed to navigate the digital landscape effectively. A younger teacher under 40 expressed this sentiment, saying, "After Continuous Professional

Development, I felt like I could really do this. It's not just about knowing the tools; it's about feeling capable of using them effectively". This statement aligns with the findings of (Bandura, 1997), who emphasizes the importance of self-efficacy in adopting new technologies and approaches in education.

The impact of Continuous Professional Development on self-efficacy appears to be equally significant among middle-aged teachers. A female teacher in the 40-50 age group shared, "Initially, I doubted my ability to connect with students online. But the Continuous Professional Development sessions have been a game changer. They've boosted my confidence immensely". This reflects the research by (Klassen & Tze, 2014), which demonstrates how professional development can enhance teachers' self-belief, particularly in adapting to new teaching modalities.

However, the journey to building self-efficacy is not uniform across all age groups. A senior male teacher above 50 noted, "I've been teaching for decades, but online teaching was a new beast. Continuous Professional Development helped, but I still find myself questioning my effectiveness online". This highlights a crucial aspect also identified by (Ertmer & Ottenbreit-Leftwich, 2010) , regarding the ongoing challenges experienced by veteran educators in adapting to online pedagogy, despite Continuous Professional Development intervention.

Another critical observation comes from a teacher in her late 30s, who said, " Continuous Professional Development was helpful, but sometimes it felt like it was more about meeting institutional requirements than truly empowering us". This critique underscores a gap in the design and delivery of Continuous Professional Development programs, a point also raised by (Desimone, 2009), who suggests that for Continuous Professional Development to be truly effective, it needs to be closely aligned with teachers' specific needs and teaching contexts.

Drawing on these insights, it becomes apparent that while Continuous Professional Development is instrumental in enhancing teachers' self-efficacy for online pedagogy, there is a need for more personalized, context-specific, and ongoing support, especially for those who continue to face challenges despite Continuous Professional Development. The impact of Continuous Professional Development on self-efficacy is not just about imparting knowledge and skills; it's also about fostering a continuous learning mindset and addressing the individual concerns and experiences of teachers.

A recurring theme from the interviews is the need for Continuous Professional Development to be more tailored and context specific. A teacher in the under-40 age group pointed out, "The one-size-fits-all approach in Continuous Professional Development doesn't work. Each of us has different challenges and needs". This sentiment echoes the findings of (Guskey, 2003), who argued for the importance of differentiated professional development that recognizes the diverse needs and backgrounds of teachers.

This need for specificity becomes more pronounced among teachers in the 40-50 age group. One female teacher noted, "I found some sessions too basic, while others were too advanced. There needs to be a balance". The lack of differentiated content in Continuous Professional Development is a challenge identified by (Opfer & Pedder, 2011), who suggest that effective professional development must account for the varying levels of teacher experience and expertise.

Among the senior teachers, those above 50, the desire for Continuous Professional Development to address more experienced educators' unique challenges is prominent. A senior male teacher shared, "I felt the Continuous Professional Development was more geared towards younger teachers. We need sessions that acknowledge our experience and build upon it". This perspective aligns with the views of (Day & Gu, 2010), who emphasize the importance of life-long learning and adapting Continuous Professional Development to support experienced teachers' continuous professional growth.

Another critical aspect is the integration of cultural nuances in Continuous Professional Development, particularly in contexts like Bahrain. As a female teacher in her late 40s mentioned, "Continuous Professional Development should reflect our cultural context and teaching environment. It's about more than just importing Western models". This critique is supported by studies like those of (Kennedy, 2016), which highlight the need for culturally relevant professional development that aligns with local educational values and practices.

Building on the previous arguments around the impact of Continuous Professional Development on readiness, adaptation, and self-efficacy, these insights highlight a gap in the current Continuous Professional Development offerings. While Continuous Professional Development is instrumental in preparing teachers for online pedagogy, its efficacy could be significantly enhanced by

incorporating tailored content, recognizing the diverse needs of different age groups, and integrating cultural considerations.

In summary, Continuous Professional Development's role in enhancing teachers' readiness for the transition to online pedagogy is undeniable. The shift is not only about technological proficiency but also encompasses a broader spectrum of adapting teaching styles and understanding the intricacies of virtual engagement (Martin & Bolliger, 2018). This readiness, however, varies across age groups, with younger teachers often adapting more quickly due to their familiarity with digital technologies, whereas older teachers face more significant challenges (Ertmer & Ottenbreit-Leftwich, 2010). Likewise, the impact of Continuous Professional Development on self-efficacy is substantial. Teachers' belief in their capabilities to effectively conduct online classes markedly improves post-Continuous Professional Development. This self-efficacy is crucial for the dynamic domain of online teaching (Klassen & Tze, 2014). Yet, the journey to achieving this self-belief is not uniform, as experienced teachers often continue to grapple with doubts about their effectiveness in the online environment. Finally, while Continuous Professional Development is beneficial, its one-size-fits-all approach and lack of alignment with specific teaching contexts and cultural nuances limit its effectiveness. Teachers across different age groups expressed a need for more tailored Continuous Professional Development content that acknowledges their unique challenges and builds upon their existing experiences (Kennedy, 2016; Opfer & Pedder, 2011).

6.5. Summary of Qualitative Findings

In the dynamic landscape of education, the integration of technology has emerged as both a boon and a challenge. This chapter provides a deep dive into the experiences of Gulf university teachers, revealing a multifaceted narrative that intertwines age, cultural context, and technological adaptation. The age-based digital divide is evident, with younger teachers, often termed 'digital natives' where (Bennett et al., 2008), demonstrated higher levels of self-efficacy for using online pedagogy thus finding the transition to online teaching more intuitive. In stark contrast, older teachers, especially those above 50, grapple with not just the tools but a fundamental shift in teaching approach. This divide is not merely technological but deeply cultural, especially in Bahrain, where traditional teaching methods emphasize personal interactions and communal learning.

The concept of 'technostress', as explored in this chapter, highlights the emotional and psychological challenges of this rapid technological shift. Older teachers, particularly females, experience techno-exhaustion, which (Asad et al., 2023; Awang Kader et al., 2022; Booker et al., 2014), identified as having detrimental impacts on job satisfaction and overall performance. This aligns with (Ragu-Nathan et al., 2008) findings on the negative association between technostress and job satisfaction. The rapid pace of technological advancements, while promising, has its set of challenges, necessitating continuous adaptation.

The role of Continuous Professional Development emerges as pivotal in this narrative. Continuous Professional Development sessions become arenas of collective empowerment, reminiscent of traditional gatherings where knowledge is shared. However, while the advantages of Continuous Professional Development are manifold, it's essential to recognize its limitations. Tailored sessions addressing specific challenges, especially for senior teachers, can enhance the impact of Continuous Professional Development.

The interaction dynamics between senior and junior teachers in Continuous Professional Development sessions underscore the continuous nature of learning and growth, transcending age and experience. The synergy between these groups, especially within the Bahraini cultural context, offers mutual learning and mentorship opportunities. However, the rapid integration of technology in the educational sector, coupled with cultural nuances, especially within the Bahrain context, presents challenges. As teachers navigate this evolving landscape, continuous support, training, and empathy become paramount.

In conclusion, this chapter underscore the complexities of technological adaptation in education, especially within the Bahraini context. While technology offers numerous benefits, its rapid integration, coupled with cultural nuances, presents challenges. The need for empathy, patience, and continuous support is evident. As teachers navigate this evolving landscape, it's crucial to remember that at the heart of every technological tool is the age-old goal of imparting knowledge.

CHAPTER 7: SUMMARY AND CONCLUSIONS

7.1 Introduction

This chapter presents a comprehensive discussion based on quantitative and qualitative data analysis findings. It sheds light on different dynamics that played a part in Bahraini teachers' self-efficacy and readiness for online pedagogy and the limitations and strength of Continuous Professional Development as an intervention used in this study. The essence of this study lies in assessing the influence of Continuous Professional Development programs on the enhancement of self-efficacy and readiness for online pedagogy among teachers at Gulf University, Bahrain. This study was propelled by a keen interest in understanding how tailored Continuous Professional Development initiatives could potentially elevate teachers' self-efficacy and readiness to navigate the digital teaching landscape, a growing importance in the contemporary educational sphere. Through a meticulously structured research framework, the study examined the nuanced dynamics between Continuous Professional Development interventions and their impact on teachers across various demographic strata.

The overarching question that guides this study is: **How does Continuous Professional Development influence teachers' readiness and self-efficacy for online pedagogy?** A set of sub-questions were developed to provide a comprehensive answer to this question. The first sub-question that guides this study is **Q1. What are the challenges and opportunities that teachers perceive in online pedagogy? Q2. Is there any difference in the self-efficacy and readiness of teachers of different age groups post-continuous Professional Development? Q3. Does teachers' self-efficacy predict their readiness for online teaching? Q4. How do teachers experience Continuous Professional Development as an intervention for their self-efficacy and readiness for online pedagogy?**

7.2 Challenges and Opportunities of Online Pedagogy

The Need Analysis Survey was conducted, to answer research Question No1: what are the challenges and opportunities that teachers perceive in online pedagogy? Which is discussed in detail in chapter 5. The findings of the Need Analysis Survey provided insights into the experiences and needs of teachers in the realm of online pedagogy. With a total of 21 questions, the survey was meticulously divided into seven distinct sections. These sections encompassed various facets of

online teaching, from self-evaluation to understanding the prevailing support systems. This chapter delves deep into the data, critically analyzing the responses to provide a comprehensive understanding of the current landscape. The findings suggested that while specific support mechanisms are in place at Gulf University for the teachers for online pedagogy, there is room for improvement. Ensuring robust support systems will be crucial in bolstering the confidence and effectiveness of online pedagogy. In addition, the pre-test showed that teachers' self-efficacy and readiness for online pedagogy were relatively low, which slightly improved after the intervention. Findings showed that younger teachers' self-efficacy and readiness for online pedagogy improved post-intervention compared to older teachers demonstrated through the analyzis of quantitative data. The qualitative findings further shed light on the age-based digital divide, with younger teachers, often termed 'digital natives' (Bennett et al., 2008), demonstrating higher levels of self-efficacy for using online pedagogy, thus finding the transition to online teaching more intuitive. In stark contrast, older teachers, especially those above 50, grapple with not just the tools but a fundamental shift in teaching approach. The findings suggest that this divide was not merely technological but deeply cultural, especially in Bahrain, where traditional teaching methods emphasise personal interactions and communal learning. The qualitative findings also shed light on the concept of 'technostress' —the emotional and psychological challenges related to technological shift: older teachers, particularly females, experience techno-exhaustion. The findings highlighted the positive role of Continuous Professional Development sessions, which became arenas of collective empowerment, reminiscent of traditional gatherings where knowledge was shared. The findings also highlighted the importance of tailored Continuous Professional Development sessions to address the specific challenges, especially for senior teachers. In addition, the findings emphasised the interaction dynamics between senior and junior teachers in Continuous Professional Development sessions, underscoring the continuous nature of learning and growth, transcending age and experience. The synergy between these groups offers mutual learning and mentorship opportunities. However, the rapid integration of technology in the educational sector and cultural nuances, especially within the Bahrain context, presents challenges. Continuous support, training, and empathy become paramount as teachers navigate this evolving landscape.

7.3 The Self-efficacy and Readiness of Teachers of Different Age Groups

This section sums up the findings of Research Question No 2: Is there any difference in the self-efficacy and readiness of teachers of different age groups post-continuous Professional Development? The primary aim of this study was to empirically evaluate the intervention's effectiveness, i.e., Continuous Professional Development, in cultivating teachers' online pedagogical competencies and enhancing their readiness and self-efficacy. To objectively appraise this effectiveness, pre- and post-evaluative measures were instituted. A blend of descriptive and inferential statistical methodologies determined the intervention's tangible impact, ensuring a methodologically robust, quantitative appraisal (Gough, 2021; Reyes et al., 2018). Evaluation of the Continuous Professional Development's effectiveness employs a two-pronged approach, combining quantitative post-tests with qualitative in-depth interviews. This comprehensive evaluation strategy aims to capture the measurable improvements in teachers' readiness and self-efficacy and the rich, experiential insights into their journey through Continuous Professional Development. By intertwining these methodologies, the study aspires to offer a holistic understanding of the transition to online pedagogy, especially in the intervention context.

Like every research study, there were methodological limitations of this study, which are discussed in detail in the next section; this study makes a significant contribution to our understanding of various dynamics that shape teachers' online pedagogy. For example, the qualitative findings further illuminate the generational gap in technological adaptation in education. While all teachers acknowledge the importance of technology integration, their ease of adaptation varies significantly across age groups. The trepidation and unfamiliarity with technology expressed by teachers above 50 echo Prensky's observations. In contrast, younger teachers find integrating technology more fluid (Bennett et al., 2008). However, even they are not immune to the challenges of rapid technological advancements (Al-Senaidi et al., 2009).

The pervasive challenge of 'technostress', as highlighted in Chapter 6, is a testament to the emotional and psychological toll of rapid technological shifts. (Ayyagari et al., 2011; Mahboob & Khan, 2016), Define technostress as an adaptation disease stemming from an inability to cope with new technologies healthily. This stress, influenced by age, gender, and cultural nuances, significantly impacts teachers' self-efficacy for online pedagogy. While this study acknowledges the influence of age, gender, and cultural nuances on technostress, it does not sufficiently explore these variables as it only emerged as one of many themes. However, the findings of this study show that technostress varies significantly across different age groups, with older teachers often

finding it more challenging to adapt to new technologies resonate with (Al Musawi et al., 2016) findings. Nevertheless, this assertion requires a more nuanced analysis. For instance, studies like (Niu et al., 2022; Tarafdar et al., 2007) have suggested that technostress can also be high among younger teachers who face different pressures, such as the expectation to integrate technology seamlessly into their pedagogy. Thus, a more granular examination of how technostress affects teachers of various ages, genders, and cultural backgrounds is needed.

Moreover, the focus of this study on technostress in the context of the pandemic is relevant. However, as the focus of a PhD thesis, this topic would generate a rich understanding. For example, the rapid shift to online pedagogy necessitated by the pandemic undoubtedly exacerbated technostress among teachers. However, this phenomenon is not limited to pandemic-related circumstances. Research predating the pandemic, such as that by (Jena, 2015; G. Zhao et al., 2022), has shown that technostress has been a persistent issue in educational settings, influenced by factors like institutional support, workload, and personal attitudes towards technology. Therefore, a longitudinal perspective considering technostress in pre-pandemic and pandemic contexts can provide a more comprehensive understanding.

The emphasis on technostress on teachers naturally called for empathy and patience. Although this call is well-intentioned, my reflections on Continuous Professional Development and its design made me rethink. I felt that a concrete framework for action that may address teachers' technostress was absent in my design. Moving beyond acknowledging the need for empathy to implementing systematic strategies that can alleviate technostress is crucial. Continuous Professional Development, mainly designed for online pedagogy, should incorporate modules addressing technostress management, drawing on psychology and organisational behaviour research. For example, incorporating findings from (Weil and Rosen, 1997) on stress management in the digital age can provide practical strategies for teachers. Additionally, there is a need to examine institutional policies that add technostress among teachers. Organisation support argued (Tarafdar et al., 2010) plays a critical role in mitigating technostress. This aspect must be integrated into designing Continuous Professional Developments, which focuses on teachers' improvement and helps create institutional environments that support teachers in adapting to technological changes.

Empathy, as a construction, has gained significant attention in the realm of education, especially in the context of rapid technological advancements. The continuous technological changes, while promising many benefits, present many challenges for teachers. As gleaned from Chapter 6, these

challenges transcend age, experience, and technological prowess, underscoring the need for empathy and understanding toward teachers navigating this evolving landscape. The rapid shift to online teaching can exacerbate this stress for teachers, especially those who have traditionally relied on face-to-face interactions and personal connections as cornerstones of their pedagogical practices. A sentiment echoed by a senior female teacher who dreaded introducing new tools, fearing mistakes in front of her students (Ayyagari et al., 2011). This sentiment is not isolated to senior teachers. Despite being more tech-savvy, young teachers grapple with the challenges of adapting their teaching styles, ensuring student engagement, and navigating the constant flux of platforms and tools. The Bahrain cultural context emphasizes communal learning and personal interactions, further amplifying these challenges. As one male teacher in his 50s poignantly noted, the virtual space, while necessary, can sometimes feel cold and distant, a stark departure from traditional teaching paradigms that value human interaction. This cultural backdrop, coupled with the rapid technological changes, underscores the need for empathy towards teachers. Recognizing the emotional and psychological toll of these changes is paramount.

The role of Continuous Professional Development emerges as a beacon of hope in this narrative. The Continuous Professional Development sessions offer arenas of collective empowerment, reminiscent of traditional gatherings where knowledge is shared. The collaborative nature of these sessions, where senior and junior teachers interact, fosters a sense of community and mutual learning. However, while the advantages of Continuous Professional Development are manifold, it is essential to recognize its limitations. Tailored sessions addressing specific challenges, especially for senior teachers, can enhance the impact of Continuous Professional Development. The synergy between senior and junior teachers, especially within the Bahraini cultural context, offers mutual learning and mentorship opportunities. However, the rapid integration of technology in the educational sector and cultural nuances, especially within the Bahrain context, presents challenges. Continuous support, training, and empathy become paramount as teachers navigate this evolving landscape. In brief, the rapid technological changes in the educational sector, while promising many benefits, also present many challenges for teachers. These challenges, influenced by age, experience, technological prowess, and cultural nuances, underscore the need for empathy and understanding toward teachers. As teachers navigate this evolving landscape, a holistic understanding of these dynamics and continuous support, training, and empathy are paramount.

7.4 Teachers' Self-efficacy and Readiness for Online Teaching

This section summarizes the findings of Research Question No. 3 and Research Question No. 4: In addition, this study highlights the relationship between teachers' self-efficacy and readiness for online pedagogy. Understanding this relationship is a critical area of exploration, especially in the current educational landscape, where technology plays an increasingly pivotal role. Self-efficacy, as defined by (Bandura, 1997), refers to an individual's belief in their capability to execute tasks and achieve goals. In education, teachers' self-efficacy can significantly influence their teaching practices, classroom management, and, most pertinently, their readiness to adopt and integrate new teaching methodologies, including online pedagogy.

A foundational understanding of this relationship can be gleaned from the (Bandura, 1997) assertion that self-efficacy influences how individuals think, feel, and behave. When teachers possess a high sense of self-efficacy, they are more likely to experiment with new teaching strategies, persist in facing challenges, and remain resilient when confronted with setbacks (Tschannen-Moran & Hoy, 2001). In online pedagogy, this translates to a greater willingness to explore digital tools, adapt to technological changes, and persevere despite technical glitches or unfamiliar platforms. However, while the positive implications of high self-efficacy are evident, it is crucial to critically evaluate its role in influencing readiness for online pedagogy. A study by (Wang et al., 2004) found that while teachers with high self-efficacy were more inclined to integrate technology into their teaching, this inclination was also mediated by external factors such as access to resources and institutional support. This suggests that while self-efficacy is a significant predictor of readiness, it is not the sole determinant.

Furthermore, the relationship between self-efficacy and readiness for online pedagogy is not linear. As highlighted in the initial discussion, the quantitative findings from the study indicated a moderate increase in self-efficacy scores post-intervention. However, this slight uptick does not equate to a substantial change in actual teaching practices. This nuanced relationship is supported by the (Ertmer & Ottenbreit-Leftwich 2010) study, which posited that while self-efficacy can influence teachers' intentions to use technology, the actual implementation is influenced by a complex interplay of both internal beliefs and external factors. The generational divide further complicates this relationship. As observed in the study, younger teachers exhibited pronounced improvements in self-efficacy and readiness post-intervention, while their senior counterparts showed only marginal gains. This suggests that while self-efficacy can enhance readiness, other factors, such as prior exposure to technology and inherent beliefs about teaching and learning, also

play a role. (Pajares, 1996) supports this assertion, noting that beliefs formed through a combination of past experiences and external influences can significantly impact behaviour. In brief, while self-efficacy undeniably plays a pivotal role in influencing teachers' readiness for online pedagogy, it is one piece of a multifaceted puzzle. The rapid integration of technology into the educational sector, coupled with individual beliefs, past experiences, and external factors, collectively shapes teachers' readiness. A holistic understanding of these dynamics is paramount as teachers navigate this evolving landscape.

Moreover, this study demonstrated that Continuous Professional Development, as detailed in Annexure 4, represents a comprehensive approach to enhancing teachers' self-efficacy and readiness for online pedagogy. The structured, four-cycle design of the Continuous Professional Development, coupled with its integration into the university's broader professional development framework, underscores its significance in the current educational landscape. Historically, the efficacy of Continuous Professional Development in bolstering teachers' self-efficacy has been well-documented. According to (Avalos, 2011), effective Continuous Professional Development programs can significantly enhance teachers' confidence and competence in their teaching practices. In the context of the provided Continuous Professional Development program, the strategic collaboration with the university's HR department, the mandatory nature of the training, and the alignment of incentives all contribute to creating an environment conducive to meaningful professional growth.

The initial cycle of the Continuous Professional Development, which commenced with a blend of face-to-face and online interactions, set the tone for the subsequent cycles. The emphasis on equipping teachers with essential digital tools such as Zoom, Moodle, and Padlet resonates with (Brown & Green 2019) assertion that familiarity with digital platforms can significantly enhance teachers' self-efficacy in online teaching. Beyond the slated 2-hour mark, the activities' extended duration suggests a high level of engagement, indicative of the program's immediate impact.

The transition to a fully online format in the subsequent days of the first and subsequent cycles reflects the program's commitment to immersing teachers in the online pedagogical environment. The focus on engagement, interactivity, class management, continuous learning, and well-being across the cycles aligns with contemporary research emphasising these facets as pivotal for effective online teaching (André et al., 2011; Soini et al., 2010). Platforms like Flipgrid and

Kahoot, which were instrumental in the second cycle, have been lauded for their potential to foster engagement and interactivity in online settings (Wang, 2015).

However, while Continuous Professional Development's design and content are commendable, critically evaluating its potential long-term impact is crucial. The program's emphasis on reflection, as evidenced in the first cycle, is a step in the right direction. As posited by (Schon, 1983), reflection can significantly enhance professional growth. However, the real test of Continuous Professional Development's efficacy lies in its ability to foster sustained changes in teaching practices. As (Guskey, 2002) notes, the goal of any professional development program should be to enhance students' learning outcomes. Therefore, while Continuous Professional Development equips teachers with tools and strategies, its success should be gauged by its impact on students.

Secondly, (Bandura, 1997) posited that self-efficacy significantly influences individuals' behaviours and actions. However, the slight increase in self-efficacy scores may not necessarily translate to substantial changes in actual teaching practices. This suggests that while Continuous Professional Development interventions may enhance self-efficacy beliefs, rendering these beliefs into actual pedagogical deviations remains a challenge. This gap between belief and practice is a critical area for future research, particularly in understanding how interventions can be designed to enhance self-efficacy and facilitate the translation of these enhanced beliefs into effective teaching practices.

The differential impact of the intervention across age groups further underscores the potential pitfalls of a one-size-fits-all approach. The challenges faced by "digital immigrants" in adapting to online teaching platforms resonate with Prensky's notion of "digital natives" and "digital immigrants." According to (Prensky, 2001), “digital natives,” who have grown up with technology, are more comfortable and adept at using digital platforms compared to “digital immigrants,” who have had to adapt to these technologies later in life. This distinction is particularly relevant in the context of this study, as it suggests that younger teachers may find it easier to adapt to online teaching methods than their older counterparts. However, as (Bennett et al., 2008) argue, this binary categorisation is overly simplistic and does not adequately account for the diversity of experiences and skills among teachers of different ages. It overlooks that many older teachers can successfully adapt to new technologies. Future studies should examine more

complex conceptions of teachers' acceptance of technology considering these criticisms. It is imperative to transcend the dichotomy of digital natives versus immigrants and examine a spectrum of digital proficiency that considers individual variances, experiences with professional growth, and contextual elements affecting technology adoption. With this method, more specialised and efficient Continuous Professional Development programs can be created that cater to the unique requirements and difficulties faced by teachers of diverse ages and digital proficiency levels.

7.5 Conclusions

The quantitative findings of the study, based on the Teachers' Self-efficacy for Online Pedagogy Questionnaire and Teachers' Readiness for Online Pedagogy Questionnaire Likert-type scales, shed light on the impact of the Continuous Professional Development intervention on teachers' self-efficacy and readiness. Notably, while there was an increase in scores post-intervention, the extent of this change prompts questions about the intervention's effectiveness. The moderate scores observed could be influenced by the inherent limitations of Likert scales, which might be prone to response bias. Moreover, the comparison between the pretest and the posttest indicated a very clear difference between teachers' self-efficacy and readiness for online pedagogy and reported relatively low level of self-efficacy and readiness before the intervention, and there was a slight improvement after the intervention. Lastly, the posttest revealed that younger teachers had higher level of self-efficacy and readiness for online pedagogy compared with their more experienced colleagues.

Bandura's theory on self-efficacy suggests that it plays a significant role in influencing individuals' behaviours. However, the study indicates that a slight increase in self-efficacy scores might not directly lead to substantial changes in teaching practices. The varied impact of the intervention across different age groups further highlights the challenges of a generalized approach. The dichotomy between digital natives and digital immigrants is evident, with older teachers facing challenges adapting to online platforms.

Despite these challenges, the study underscores the importance of empathy in the educational realm, especially given the rapid technological advancements. The concept of technostress, which denotes the stress arising from adapting to new technologies, is particularly relevant. This stress, influenced by various factors, significantly impacts teachers' self-efficacy for online pedagogy.

The sentiments of older teachers resonate with the challenges of adapting to the digital age, emphasizing the need for empathy and understanding.

To conclude, the research contributes to the understanding of 'technostress', presented in chapter 6, which suggests that the shift in technologies was met with a form of techno-exhaustion experienced by the older, and particularly the female teachers. However, generally the conclusions speak of the positive experience of Continuous Professional Development sessions, which helped the participants feel empowered together as a community to exercise their energy. There is also an expression for better Continuous Professional Development sessions if they emphatically try to understand and address the challenges faced specifically by the seniors. The conclusion highlights the interaction between the senior and the junior teachers in Continuous Professional Development sessions, and how it gestures a continuous cycle of learning and development, which is not limited by age or experience

The Continuous Professional Development sessions emerge as a potential solution, offering a platform for collective empowerment and mutual learning. While the advantages of Continuous Professional Development are evident, it is crucial to recognize its limitations. The synergy between senior and junior teachers, especially within the Bahraini cultural context, offers mutual learning and mentorship opportunities. However, the rapid integration of technology in the educational sector and cultural nuances present challenges. Continuous support, training, and empathy become paramount as teachers navigate this evolving landscape.

In conclusion, the rapid technological changes in the educational sector, while promising many benefits, also present many challenges for teachers. These challenges, influenced by age, experience, technological prowess, and cultural nuances, underscore the need for empathy and understanding toward teachers. As teachers navigate this evolving landscape, a holistic understanding of these dynamics and continuous support, training, and empathy are paramount. The study also emphasizes the relationship between teachers' self-efficacy and readiness for online pedagogy, highlighting the complex interplay of internal beliefs and external factors in shaping teachers' readiness.

7.6 Implication of Research

This research delves into the transformative impact of the COVID-19 pandemic on the educational sector, emphasizing the shift from traditional face-to-face interactions to digital pedagogy. This

transition, while reactive, has profound implications for the future of education, particularly in the realm of online teaching and the role of teachers in this new landscape.

One of the most salient implications for future researchers is further exploring the pedagogical differences between traditional and online teaching. While the study touches upon the challenges of migrating from physical classrooms to digital interfaces, there is a vast scope for research on the efficacy of various online teaching methodologies. For instance, (Allela, 2021 Shatte Teague, 2020 Tompkins and Weinreich, 2007) highlighted the rise of educational mobile applications like Duolingo and Khan Academy. However, (Oo et al., 2022; Rajasingham, 2011) critically evaluated the depth of learning these platforms offer. Future research could delve deeper into the pedagogical impact of such applications, examining their role in facilitating comprehensive learning experiences.

Another significant methodological implication is the emphasis on teacher readiness for online education. The study underscores the multifaceted nature of this readiness, encompassing technological proficiency, pedagogical adaptability, and psychological preparedness. (Hung et al., 2010) suggested that technologically adept teachers are better positioned to foster engagement in online settings. However, this technological readiness is just one aspect. Future researchers could adopt a more holistic approach, examining the interplay between these facets and their collective impact on online teaching efficacy.

Furthermore, the concept of self-efficacy, as proposed by Bandura (1997) emerges as a pivotal factor in online education. The belief in one's capabilities, particularly in the context of online teaching, has profound implications for the quality of instruction. (Tschannen-Moran & Hoy, 2001) emphasized the role of self-efficacy in influencing teachers' behaviours and actions in a virtual environment. This presents a rich avenue for future research, exploring the nuances of self-efficacy in online pedagogy and its impact on student outcomes.

Lastly, the study touches upon the disparities in access to digital resources, highlighting the potential educational divide. While the research underscores the challenges faced by certain segments of the student population, there is a need for more in-depth studies examining the long-term implications of this divide. (Iranzo-García et al., 2020) Discussed the lack of equal access to mobile applications due to economic constraints or lack of digital infrastructure. Future researchers could delve into the socio-economic factors influencing digital access and propose innovative solutions to bridge this gap.

In conclusion, the research offers a comprehensive overview of the challenges and opportunities the shift to online pedagogy presents. The implications drawn from the study provide a roadmap for future researchers, guiding them in their exploration of the evolving educational landscape. The emphasis on teacher readiness, self-efficacy, and the potential educational divide presents rich avenues for future research, ensuring that online education continues to evolve in a direction that is equitable, effective, and grounded in sound pedagogical principles.

7.7 Recommendations

Continuous Professional Development must follow explicit theoretical models to make it more effective. Continuous Professional Development is recommended to have different phases: the learning phase (Analysis, Design, Development), the Implementation phase, and the Evaluation phase. The analysis phases can use a needs analysis survey to investigate the present situation needs analysis of the Techer, which leads to the design of the materials based on these needs. Then, continuous professional development tools can be developed using PowerPoint slides and delivered face-to-face or online communication tools. The final stage is the evaluation, which is recommended to use quantitative and qualitative tools to evaluate the advantages of continuous professional development. There is a need to identify the online pedagogy factors, then move to identify the needs of the teachers concerning the online pedagogy factors, and the focus needs to be on the present situation needs analysis. Then, the design and development should focus on the previous stage of needs analysis to design the materials that help enhance the teacher's online pedagogy knowledge and skills and the suitable tools for Continuous Professional Development. After implementing continuous professional development, it is essential to allow teachers to practice the knowledge they have gained and evaluate its effectiveness using quantitative and qualitative research tools. Based on this process, recommendations can be provided to improve teachers' online learning further.

7.7.1 Recommendations for Teachers

Based on the findings of this research, there are recommendations for teachers related to enhancing self-efficacy and readiness for online pedagogy. These recommendations are discussed below. To enhance self-efficacy and readiness for online pedagogy, teachers in higher education institutes must use online learning applications and technologies in their teaching, whether online or face-to-face. Online teaching tools are effective in the teaching process since they facilitate it. This also

applies to face-to-face teaching since online pedagogy provides the teacher with tools and applications that make the teaching process more effective. Teachers can use technology in face-to-face teaching to support their teaching, such as making quizzes to which students can respond quickly and get immediate feedback. Teachers are encouraged to follow up-to-date technologies that can be used in the classroom. Technology skills are essential for educators at the current time since technologies can make educators' teaching more effective. Improving teachers' knowledge of online pedagogy is important so educators can keep up with the latest teaching practices. Teachers need to focus on enhancing their knowledge of online pedagogy. This will help them feel more confident using technology. Knowledge of online learning keeps the teachers in touch with the current tools and applications, increasing their readiness and self-efficacy for online pedagogy. Teacher members also need to enhance their skills in using and implementing technologies. This includes using technology in the classroom and the best applications that suit their needs in the teaching process. Teacher members also need to focus on enhancing their abilities using different applications and tools, not just on some. Different applications can be used in teaching, assessment, and feedback, and faculty members need to enhance their skills using various technologies. This step enhances the teacher's self-efficacy and readiness for online pedagogy, making their teaching more effective. Moreover, teachers need to enhance their skills in allocating resources for their teaching. This is important because not all technology tools suit all teaching members. The ability to allocate the resources that suit the needs of the teaching members is important to support their teaching. Besides, allocating effective online pedagogy resources is essential since only some resources are authentic and reliable for teaching. This supports the need for teachers to be able to allocate reliable and effective teaching materials. An essential element of online pedagogy is online feedback, and this research showed that feedback is effective since it provides immediate feedback for the students and helps the teacher communicate with their students remotely. Hence, faculty should use effective feedback tools and technologies to support their teaching. Another point is that teachers need to enhance their skills in making their classes with online pedagogy more participative. This can be achieved by focusing on teaching methods that make learning collaborative and participative and discussing with the students. Such teaching practices are easier with technologies since the students can work together synchronously or asynchronously, and these types of activities make the classes more interesting and beneficial for the students. Also, teachers need to consider the ability to design online learning materials to enhance their self-

efficacy and readiness and online pedagogy. Teachers in all fields must design teaching materials, such as exercises in some applications. This is an important skill because it enables the teacher to be resourceful in providing online pedagogy activities that suit their teaching and their classes. In other words, besides continuous professional development, teachers should practice using technology and expand their knowledge of online pedagogy.

7.7.2 Recommendations for Policymakers

This section provides recommendations for policymakers about enhancing teachers' self-efficacy and readiness for online pedagogy. Policymakers are decision-makers who are supposed to support their teacher teachers in making online pedagogy implementation more effective. Policy and decision-makers should periodically conduct and implement Continuous Professional Development, training, and workshops for online pedagogy since such activities enhance the teacher's self-efficacy and readiness for online pedagogy. The sudden change from conventional to online instruction following the Covid-19 outbreak presented difficulties for teachers in using and putting into practice online pedagogy technology. Hence, continuous professional development in online pedagogy and other educational technologies is needed to enhance Teachers' online pedagogy readiness and self-efficacy. University policymakers and decision-makers need to create policies that support the use of online pedagogy in university to enhance the teaching and learning process. Even though online pedagogy was a must during the outbreak of COVID-19, the whole process has shown that online pedagogy and education technologies help make teaching and learning more effective. Hence, University must focus on policies that support implementing online pedagogy technologies and other technologies in the classroom. HEIs must focus on enhancing teachers' online pedagogy skills since both are bilaterally involved in teaching and learning. This research has shown that teachers and students face technical challenges when using online pedagogy technologies. Therefore, to make online pedagogy more effective, policymakers and decision-makers need to enhance teachers' skills in using online pedagogy in teaching and learning.

7.8 Contribution to Knowledge

This study demonstrates a positive impact of the implemented CPD program on university teachers' self-efficacy and readiness for online pedagogy. While the pre-test scores suggest a

moderate baseline, post-intervention data reveals a significant increase in self-efficacy and readiness levels. This finding reinforces the effectiveness of well-designed CPD programs in equipping teachers with the necessary skills and confidence to navigate online teaching environments.

The quantitative data highlights a crucial aspect – improvement, but not complete mastery. While scores increased post-intervention, they still hover around the mid-range, indicating that many participants may require further support or more intensive CPD programs to achieve optimal readiness for online teaching. This insight underscores the need for ongoing and tailored professional development efforts to ensure all teachers feel fully prepared for online instruction.

The qualitative analysis unveils a critical factor influencing self-efficacy – the age-based digital divide. Younger teachers displayed greater self-efficacy for online pedagogy, suggesting a more intuitive transition due to their existing comfort with technology. Conversely, older teachers, particularly those above 50, face challenges with specific tools and adapt to the fundamental shift in teaching methodology that online environments demand. This result sheds light on the importance of designing CPD programs that cater to varying levels of technological fluency and address the specific needs of older educators who may require more targeted support in embracing online pedagogy.

While the research acknowledges the cultural context of Gulf University Bahrain, future studies can focus on varied and larger contexts in the Middle East. However, future research could build upon this study by looking into how cultural factors influence online pedagogy and how CPD programs can be designed to address them effectively. Investigating the impact of cultural norms on student engagement, communication styles, and assessment practices within online learning environments could provide valuable insights for educators in the Gulf region. This study stands out as one of the pioneering efforts to utilize action research to explore the effectiveness of CPD programs on online pedagogy in the context of Gulf universities. This approach allows for a contextualised understanding of the challenges and opportunities faced by educators in the region. The research contributes to closing the knowledge gap regarding online pedagogy implementation in this under-researched area by generating valuable data and insights specific to the Gulf context. The research underscores the need for designing CPD programs that cater to the varying needs of

educators in terms of age, technological fluency, and subject matter. This could involve offering tiered programs with differentiated content and delivery methods, ensuring that all teachers receive the necessary support to excel in online teaching environments. Integrating cultural sensitivity into online pedagogy training could be crucial for promoting successful online learning experiences in the Arab Gulf region. Future research could explore strategies for adapting online teaching practices to accommodate students' cultural norms and communication styles, thereby enhancing their engagement and learning outcomes. While this study demonstrates the immediate effect of the CPD program, it would be valuable to conduct follow-up research to assess the long-term impact on teachers' online teaching practices and student learning outcomes. This would provide a more comprehensive picture of the program's effectiveness and inform future development.

7.9 Reflection as Researcher

Conducting this PhD degree was a huge decision in my life, especially given my position as the President of Gulf University, Bahrain. Here I am going to narrate my research journey. As president of the university, I was aware of the changing demand of unforeseen circumstances, like COVID-19, to move from the traditional mood of teaching to online pedagogy. And I usually ask myself if my teachers are ready for this unexpected change. The decision to move to online teaching was circumstantial and like any other higher education institute, I must make this demanding decision. However, I was always curious whether my teachers had self-efficacy to use the technology that we introduced for online teaching, and to what extent they are ready for that. These questions bothered me for a long time, and I realized that I must take the role of researcher to address these questions more effectively. Thus started the PhD journey.

During this journey I had to face a lot of challenges, the most important among those was my positionality. As mentioned in the methodology chapter, how I dealt with my positionality as a researcher. In the context of this study, my positionality was particularly nuanced. As the president of the university where the research was conducted, and with the participants being faculty members of the same institution, the dynamics were layered with complexities. This dual role, both as a leader and a researcher, brought forth unique challenges and opportunities. The inherent power dynamics of being the university's president could have influenced the responses and interactions of the faculty members. They might have been more reserved or cautious in their

responses, fearing potential repercussions or simply aiming to provide answers they believed I might want to hear (L. T. Smith, 2021).

Recognizing the potential influence and bias that my position as the president of the university could introduce, I was compelled to make strategic decisions from the outset. The pilot phase was particularly revelatory in this regard, highlighting the need for a more nuanced approach to data collection and participant interaction. The key moment in my journey was adopting reflective practices. By keeping detailed notes on my reflections, I was able to confront my assumptions and biases head-on. This practice served as a compass, continually guiding me toward more objective inquiry. In short, the most profound outcome of this PhD journey was the personal and professional reformation it catalyzed. The experience has not only augmented my knowledge base but also refined my leadership approach. I have emerged from this process with a heightened appreciation for the role of continuous learning and adaptation in educational excellence. Moreover, it has reinforced my commitment to fostering an institutional culture that values and supports CPD for educators, recognizing it as a cornerstone for enhancing teaching efficacy and readiness for online pedagogy.

7.10 Future Work

The incorporation of technology, namely digital resources, has emerged as a fundamental aspect of contemporary education. This change necessitates not only that teachers have access to platforms and devices, but also that they have the knowledge and assurance necessary to use these resources efficiently. While Continuous Professional Development interventions can boost self-efficacy beliefs, bridging the belief-action gap is still a significant challenge. Tackling this gap between belief and action is an important direction for future research – particularly in understanding how to design interventions that not only enhance self-efficacy. also translate these enhanced beliefs into effective teaching practices the discrepancy in technology usage between younger and older instructors, as revealed by this study conducted in Bahrain, presents interesting considerations regarding the problems and preparation of teachers. To provide guidance for techniques that can improve the integration of technology into Bahrain's educational system for all age groups, this section suggests possible avenues for further research on this subject. Future studies should examine more complex conceptions of teachers' acceptance of technology considering these criticisms. It is imperative to transcend the dichotomy of digital natives versus

immigrants and examine a spectrum of digital proficiency that considers individual variances, experiences with professional growth, and contextual elements affecting technology adoption. With this method, more specialised and efficient Continuous Professional Development programs can be created that cater to the unique requirements and difficulties faced by teachers of diverse ages and digital proficiency levels. The integration of technology, particularly online resources, has become a cornerstone of modern education. This shift demands access to devices and platforms and a teacher workforce equipped with the skills and confidence to leverage these tools effectively. The initial observation of younger teachers readily embracing technology while older teachers seem hesitant warrants further investigation. Here are some research questions to explore:

- What underlying reasons for the age-related disparity in technology adoption? Are there generational differences in comfort levels, learning styles, or perceived value of technology in education? Interviews, surveys, and focus groups can gather qualitative data on teachers' perspectives.
- Do younger and older teachers hold different views on how technology can best be used in the classroom? Consider exploring their pedagogical philosophies and how they perceive technology's role in supporting those approaches.
- Have there been any significant differences in the pre-service or in-service training that younger and older teachers received regarding technology integration? Investigate past training programs and their effectiveness in equipping teachers with the necessary skills and confidence.

By understanding the root causes of the adoption gap, policymakers and educators can tailor professional development programs that address specific needs and concerns. This could involve creating differentiated training modules that cater to different learning styles and address potential anxieties about technology use. While the initial study identifies a generational divide, younger and older teachers likely encounter obstacles using online resources. Further research can delve deeper into these challenges and explore potential support structures:

- Are there issues with access to reliable internet, appropriate devices, or user-friendly online platforms? Investigate the technical infrastructure available in institutes and identify any areas for improvement.
- Do teachers feel overwhelmed by the vast online resources? Explore their strategies for identifying and evaluating the quality and suitability of online resources for their students. Research could also examine the role of institute librarians or curriculum specialists in supporting teachers with content curation.
- How can teachers effectively integrate online resources into their lesson plans while managing time constraints? Investigate time management strategies employed by successful technology-using teachers and explore ways to support teachers in lesson planning that incorporates online resources.
- Does the use of online resources correlate with improved student engagement, critical thinking, or content mastery? Utilize quantitative research methods like pre- and post-tests or analyze student performance data to assess the impact of technology use.
- How can online resources enhance, not replace, teacher-student interaction? Explore how teachers can leverage technology to personalize learning experiences and facilitate student communication.
- To what extent do professional development programs on technology integration improve teacher confidence and technology usage in the classroom? Track the impact of professional development programs on teachers' technology skills and classroom practices.

By measuring the impact of technology integration on student learning and teacher practice, policymakers can gain valuable insights into the effectiveness of various strategies. This data can refine professional development programs and ensure that technology is used to its full potential to improve overall educational outcomes in Bahrain. The effective integration of technology in education requires a collaborative approach. By researching the reasons behind the technology adoption gap, identifying the challenges teachers face, and measuring the impact on student learning, policymakers, institute administrators, and teacher training institutions can work together

to create a more supportive environment for technology use in Bahraini institutes. Further research can explore successful models from other countries that effectively address similar challenges. Ultimately, the goal is to equip all teachers, regardless of age, with the skills and confidence to leverage online resources to create engaging and effective learning experiences for their learners.

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ANNEXURES

Annexure 1. Need Analysis Survey

PART A

Directions: Please complete this questionnaire to help us better understand your experiences and needs related to online teaching, ensuring we can offer more tailored support and resources in the future.

Self-Evaluation of Online Teaching Skills

1 How comfortable are you with utilizing online teaching tools?
- A. Very Uncomfortable
- B. Uncomfortable
- C. Neutral
- D. Comfortable
- E. Very Comfortable

2 How would you rate your ability to implement online teaching strategies?
- A. Very Poor
- B. Poor
- C. Average
- D. Good
- E. Very Good

3 If not mandatory, how frequently would you use online teaching?
- A. Never
- B. Rarely
- C. Sometimes
- D. Often
- E. Always

Challenges in Online Instruction

4 How often do you face challenges when teaching online?
- A. Never
- B. Rarely
- C. Sometimes
- D. Often
- E. Always

5 Which of the following challenges do you face?
- **A.** Computer literacy
- B. Lack of Technology
- C. Connectivity
- D. Work organization and time management
- E. Teaching without training
- F. Hard of hearing students.
- G. Data privacy and insecurity.
- H. Institutional Cultural

Students' engagement

6 How often do you gather feedback from your students on your online teaching?
- A. Never
- B. Rarely
- C. Sometimes
- D. Often
- E. Always

7 How often do you gather feedback from your students regarding their online learning experience?
- A. Never
- B. Rarely
- C. Sometimes
- D. Often
- E. Always

8 To what extent do you change your online teaching strategies based on students' feedback?
- A. Never
- B. Rarely
- C. Sometimes
- D. Often
- E. Always

Self-Assessment of Online Pedagogical Knowledge

Rate your confidence in the following areas of online pedagogy:

9 Designing online curriculum:
- A. Very Unconfident
- B. Unconfident
- C. Neutral
- D. Confident
- E. Very Confident

10 Engaging students online:

A. Very Unconfident
B. Unconfident
C. Neutral
D. Confident
E. Very Confident

11. Assessing students online:
A. Very Unconfident
B. Unconfident
C. Neutral
D. Confident
E. Very Confident

Learning Preferences for Professional Development

12. Have you ever taken any Professional Development Training before?
Yes (Please specify: _____)
No

13 Have you previously engaged in any Continuous Professional Development programs related to online teaching?
Yes (Please specify: _____)
No

14 How much do you prefer webinars for professional development?
A. Not at All
B. Slightly
C. Neutral
D. Moderately
E. Very Much

15 How much do you prefer professional development activities where an instructor is always present to guide?
A. Not at All
B. Slightly
C. Neutral
D. Moderately
E. Very Much

Goals to participate in Continuous Professional Development

If Continuous Professional Development is made mandatory for you to learn various skills of online pedagogy, which on the following would you rate the important:

16 Enhancing online engagement techniques:
A. Not Important
B. Slightly Important
C. Neutral
D. Important
E. Very Important

17 Improving assessment methods:
A. Not Important
B. Slightly Important
C. Neutral
D. Important
E. Very Important

18 Improve curriculum implementation:
A. Not Important
B. Slightly Important
C. Neutral
D. Important
E. Very Important

Prevailing Support Systems

19 Which of the following support services do you currently use for online teaching? (Check all that apply)
A. Technical support
B. Pedagogical guidance
C. Online teaching resources (e.g., lesson plans, software)
D. Peer support groups or forums
E. Others (Please specify: _____)

20 What other support services do you believe would enhance your online teaching experience? (Open -ended response)
_____

21 Are there specific upcoming trends or tools in online education that you're keen on delving into? (Open -ended response)
_____

Annexure 2. Teachers' Readiness for Online Pedagogy Questionnaire

PART B						
Directions: This questionnaire is designed to help us gain a better understanding of teachers' teaching strategies. Please TICK (√) your opinion about each of the questions below. Your answers are confidential. -						
#	STATEMENTS	Strongly Disagree (1)	Disagree (2)	Not Sure (3)	Agree (4)	Strongly Agree (5)
1	I am consistent in setting and adhering to my teaching schedule.	1	2	3	4	5
2	I can adapt my teaching style to suit various online platforms.	1	2	3	4	5
3	I regularly update my online course materials to keep them relevant.	1	2	3	4	5
4	I am proficient in using online teaching platforms and tools.	1	2	3	4	5
5	I believe that online teaching requires as much effort, if not more, than face-to-face instruction.	1	2	3	4	5
6	I am motivated to adapt my teaching methods for an online environment.	1	2	3	4	5
7	I am comfortable using multimedia (videos, podcasts) to enhance my lessons.	1	2	3	4	5
8	I can create engaging online content that keeps students interested.	1	2	3	4	5
9	I can troubleshoot basic technical issues related to online teaching.	1	2	3	4	5
10	I think online teaching provides me with more flexibility in terms of scheduling.	1	2	3	4	5
11	I complete my course preparations and grading in a timely manner.	1	2	3	4	5
12	I believe that online teaching can be as effective as face-to-face instruction.	1	2	3	4	5
13	I am proactive in reaching out to students who may be struggling online.	1	2	3	4	5
14	I regularly back up my teaching materials and student data.	1	2	3	4	5
15	I believe that online teaching goes beyond just delivering content; it's about fostering a virtual community.	1	2	3	4	5
16	I am persistent in overcoming challenges related to online teaching.	1	2	3	4	5
17	I actively seek feedback to improve my online teaching methods.	1	2	3	4	5
18	I use various online tools to assess student performance and provide feedback.	1	2	3	4	5
19	I am comfortable guiding students using online tools and resources.	1	2	3	4	5
20	I understand that students may face unique challenges in online learning, and I am prepared to support them.	1	2	3	4	5
21	I can manage my time effectively to balance online teaching with other responsibilities.	1	2	3	4	5
22	I am comfortable collaborating with colleagues and students in a virtual environment.	1	2	3	4	5
23	I am willing to hold virtual office hours or Q&A sessions for students.	1	2	3	4	5
24	I stay updated with the latest technological advancements in online education.	1	2	3	4	5
25	I feel that I might miss the personal interactions that come with face-to-face teaching.	1	2	3	4	5
26	I am open to participating in online forums or discussions with peers and students.	1	2	3	4	5

Annexure 3. Teachers' Self-efficacy for Online Pedagogy Questionnaire

PART C

Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their teaching activities. Please TICK (√) your opinion about each of the questions below. Your answers are confidential. -

#	Questions	Nothing (1)	Barely any (2)	Very little (3)	A little (4)	Some influences (5)	Moderate influence (6)	Quite a bit (7)	Considerable (8)	A great deal (9)
1	How sure are you about connecting with the toughest students online?	1	2	3	4	5	6	7	8	9
2	How well can you promote deep thinking in students during virtual sessions?	1	2	3	4	5	6	7	8	9
3	How equipped do you feel to spark interest in disengaged students in online lessons?	1	2	3	4	5	6	7	8	9
4	To what extent can you persuade online learners to trust their academic potential?	1	2	3	4	5	6	7	8	9
5	How well can you encourage students to appreciate education in an online setting?	1	2	3	4	5	6	7	8	9
6	How certain are you nurturing inventive thinking in students during virtual classes?	1	2	3	4	5	6	7	8	9
7	How adeptly can you clarify concepts for a student facing difficulties in online lessons?	1	2	3	4	5	6	7	8	9
8	How equipped are you to advise families on aiding their child's online academic journey?	1	2	3	4	5	6	7	8	9
9	Online, how sure are you in addressing complex questions from your students?	1	2	3	4	5	6	7	8	9
10	In virtual classes, how good are you at gauging your students' understanding level?	1	2	3	4	5	6	7	8	9
11	Online, how well can you craft meaningful queries suited for your students?	1	2	3	4	5	6	7	8	9
12	How skilled are you in tailoring your online materials to match individual student progress?	1	2	3	4	5	6	7	8	9
13	Online, how proficient are you in using diverse assessment techniques?	1	2	3	4	5	6	7	8	9
14	When students are puzzled online, how adeptly can you provide a clearer viewpoint or example?	1	2	3	4	5	6	7	8	9
15	In your online class, how skillfully can you integrate different teaching strategies?	1	2	3	4	5	6	7	8	9
16	Virtually, how well can you design engaging tasks for your top-performing students?	1	2	3	4	5	6	7	8	9
17	In an online setting, how equipped are you to handle disruptions by students?	1	2	3	4	5	6	7	8	9

18	Online, how adeptly can you convey your expectations about student behavior?	1	2	3	4	5	6	7	8	9
19	In virtual lessons, how skilled are you in setting up smooth transitions between activities?	1	2	3	4	5	6	7	8	9
20	How adept are you in ensuring students follow the virtual classroom rules?	1	2	3	4	5	6	7	8	9
21	Online, how proficiently can you calm a disruptive student?	1	2	3	4	5	6	7	8	9
22	How sure are you in crafting a structure suitable for varied online student groups?	1	2	3	4	5	6	7	8	9
23	In your online space, how well can you guarantee that a few challenging students don't hinder others' learning?	1	2	3	4	5	6	7	8	9
24	When faced with pushbacks from students online, how skillfully can you manage and react?	1	2	3	4	5	6	7	8	9

Annexure 4. Detailed Plan of Continuous Professional Development

Cycle	Day	Objectives	Learning Material	Online Platform	Use of Online Platforms	Assessment	Assessment activities
1	1	Get ready for online teaching.	Easy read "Online Teaching Wins!"; Short clip about teaching online vs. face-to-face.	Zoom, Padlet	Chat on Zoom about teaching online; Share hopes and worries on Padlet.	Quick game on Kahoot!	3 things: What's cool, What's scary, How you feel about starting.
1	2	Plan your first online lesson.	Easy guide "First Steps in Online Lessons"; Video "Making Simple Content."	Moodle, Google Docs	Plan together on Google Docs; Share thoughts on Moodle.	Shared lesson idea on Moodle	2 things: Your lesson plan, What you want to teach.
1	3	Make your first lesson.	Video "Your First Lesson Made Easy"; A sample lesson to look at.	Edpuzzle, Moodle	Try making a lesson on Edpuzzle; Chat on Moodle about how it went.	Show your lesson on Moodle	2 things: A short clip or slideshow, A small write-up.
1	4	Test students the right way online.	True tales "Testing Truths Online"; Easy guide "No Cheating Allowed!"	Moodle, Kahoot!	Zoom chat about good tests; Make a fun test on Kahoot!	Your test on Kahoot!	3 things: Pick the right answer, Write a bit, Thoughts on the test.
1	5	Use online tools like a pro.	Friendly tips for online tools; List "Picking Your Online Tool."	Zoom, Moodle	Zoom session trying out Moodle; Share thoughts in a chat.	Your first go at Moodle	2 things: A hello message, A fun start activity.
2	1	Make lessons fun and cool.	Guide "Fun in Online Lessons"; Examples of cool online activities.	Padlet, Kahoot!	Try a fun tool on Kahoot! Share fun moments on Padlet.	Fun activity on Kahoot!	2 things: Your fun quiz or game, how it makes learning cool.
2	2	Teach live and feel connected.	Easy guide "First Live Lesson"; Clips of great live sessions.	Zoom, Teams	Host a mini lesson on Zoom; Chat on Teams about the feels.	5-min live chat on Zoom	2 things: Topic intro, Feedback from buddies.
2	3	Build a friendly online space.	Tips "Warm Online Spaces"; Videos about online friendships.	Flipgrid, Moodle	Share stories on Flipgrid; Talk about friendships on Moodle.	Welcome note on Moodle	2 things: Your friendly message, why online friends matter.
2	4	Teach everyone, everywhere.	Guide "Teaching All"; Lessons that everyone can enjoy.	Moodle, Google Slides	Workshop on Google Slides; Share on Moodle.	Adjusted lesson on Moodle	3 things: Your lesson tweak, why you chose it, Feedback from pals.
2	5	Understand and respect all students.	True tales "Online Class Stories";	Zoom, Padlet	Zoom talk about understanding; Share feelings on Padlet.	Shared story on Padlet	2 things: Thoughts on a story, how to be

			Clips about different cultures.				understanding online.
3	1	Handle online classes smoothly.	Guide "Easy Online Class Flow"; Clips of calm online classes.	Zoom, Trello	Role-play on Zoom; Plan a class flow on Trello.	Role-play feedback on Trello	3 things: Your role-play act, how you handled a challenge, Thoughts on the experience.
3	2	Save time and solve problems.	List "Quick Online Tips"; Tales "Handling Online Oops Moments".	Asana, Moodle	Workshop on Asana for planning; Moodle chat about tricky moments.	Shared time tip on Moodle	2 things: Your favorite time-saver, A problem and how you'd solve it.
3	3	Always learn and stay fresh.	List "New Online Wonders"; Article "Why We Keep Learning".	Zoom, Padlet	Zoom chat on new tools; Share a cool find on Padlet.	New tool or tip on Padlet	2 things: A new tool you like, why it's exciting.
3	4	Feel good teaching online.	Clips "Happy Online Moments"; List "Relax After Class".	Flipgrid, Zoom	Share happy moments on Flipgrid; Zoom chat about relaxation.	Shared relaxation tip on Flipgrid	2 things: Your go-to relaxation move, how it helps you.
3	5	Use content rightly and respect it.	Guide "Right Use Online"; Clips about giving credit.	Moodle, Zoom	Zoom talk about using content; Share experiences on Moodle.	Discussed story on Moodle	2 things: How you use someone's content, why giving credit is key.
4	1	Keep student info safe.	Easy guide "Guarding Student Secrets"; Tales "When Data Gets Loose".	Moodle, Zoom	Zoom chat on data safety; Share safety steps on Moodle.	Quick game on Kahoot!	3 things: A data scenario, True/False on privacy, Your top safety tip.
4	2	Reflect and get thoughts.	Tool tips "Hearing from Students"; Reflect read "Looking in the Mirror".	Google Forms, Zoom	Make feedback form on Google; Zoom chat on self-reflection.	Feedback on a lesson on Google Forms	3 things: Feedback received, your thoughts, one change you'd make.
4	3	Get inspired by online stars.	Collection "Online Teaching Heroes"; Chats with top online teachers.	Zoom, Padlet	Zoom chat on what works; Share your hero on Padlet.	Your hero story on Padlet	2 things: Your online teaching hero, A trick you'd borrow.
4	4	Use all you've learned.	Recap "Our Online Journey"; Motivate clip "Changing Lives Online".	Moodle, Edpuzzle	Make a full lesson on Edpuzzle; Celebrate on Moodle.	Full lesson showcase on Moodle	3 things: Your best lesson part, Peer feedback, one thing you'd redo.

4	5	Look back and plan.	Reflect guide "Our Past and Future"; Plan sheets "Next Steps Online".	Zoom, Google Docs	Zoom chat on past lessons; Plan on Google Docs.	Your next steps on Google Docs	3 things: Your next big goal, A challenge ahead, Your dream online class.

Annexure 5. Detailed Principle Component Analysis of Teachers' Readiness for Online Pedagogy Questionnaire

Annex-5. Principle Component Analysis of Teachers' Readiness for Online Pedagogy Questionnaire

Item #	Factor 1 Self-Discipline & Motivation	Factor 2 Teaching Styles & Collaboration	Factor 3 Course Management & Engagement	Factor 4 Technical Skills & Resources	Factor 5 Perceptions and Expectations of Online Teaching
Q11	0.94				
Q6	0.91				
Q21	0.85				
Q16	0.56				
Q1	0.51				
Q22		0.93			
Q12		0.92			
Q2		0.9			
Q17		0.83			
Q7		0.82			
Q26		0.79			
Q3			0.83		
Q8			0.72		
Q13			0.72		
Q18			0.64		
Q23			0.62		
Q4				0.78	
Q9				0.75	
Q14				0.71	
Q19				0.69	
Q24				0.62	
Q15					0.71
Q10					0.63
Q20					0.61
Q25					0.54
Q5					0.52

Annexure 6. Detailed Principle Component Analysis of Teachers' Self-efficacy for Online Pedagogy Questionnaire

Annex-6. Principle Component Analysis of Teachers' Self-efficacy for Online Pedagogy Questionnaire

Item #	Factor 1 (Efficacy in Student Engagement)	Factor 2 (Efficacy in Instructional Strategies)	Factor 3 (Efficacy in Classroom Management)
Q9	0.91		
Q2	0.87		
Q4	0.85		
Q6	0.82		
Q22	0.8		
Q12	0.8		
Q14	0.76		
Q1	0.72		
Q7		0.88	
Q10		0.86	
Q20		0.86	
Q17		0.81	
Q18		0.75	
Q24		0.74	
Q23		0.69	
Q11		0.51	
Q3			0.94
Q19			0.86
Q8			0.81
Q13			0.76
Q21			0.73
Q16			0.71
Q15			0.68
Q5			0.57

Annexure 7. Semi-structured interview guide

Introduction to the Research:

"Thank you for agreeing to participate in this interview. We are conducting research to understand the impact of the Continuous Professional Development program you recently participated in. This program was designed to enhance your readiness and self-efficacy for online pedagogy. The insights you provide will be invaluable in assessing the effectiveness of the program and identifying areas for improvement. Please feel free to express your honest opinions and experiences. All responses will be kept confidential and used solely for the purpose of this research."

INTERVIEW QUESTIONS:

Initial Experience with Online Teaching:

"Can you describe your experience with online teaching before participating in the Continuous Professional Development program?"

Prompts: "What were your main challenges? How comfortable did you feel using online teaching tools?"

Perceived Impact of the Continuous Professional Development Program:

"In what ways do you feel the Continuous Professional Development program has impacted on your ability to teach online?"

Prompts: "Can you share any specific skills or knowledge you gained that you found particularly useful?"

Changes in Self-Efficacy:

"How has your confidence in conducting online classes changed after the Continuous Professional Development program?"

Prompts: "Do you feel more prepared to handle the challenges of online teaching? Are there areas where you still feel uncertain?"

Application of Learned Skills:

"How have you applied the skills or strategies learned in the Continuous Professional Development program to your online teaching?"
Prompts: "Can you provide examples of how you integrated these new approaches into your classes?"

Feedback on Program Content and Structure:
"What are your thoughts on the content and structure of the Continuous Professional Development program?"
Prompts: "Was there anything missing in the program that you think should be included? Were the sessions interactive and engaging?"

Suggestions for Improvement:
"Based on your experience, what improvements would you suggest for future Continuous Professional Development programs focused on online pedagogy?"
Prompts: "Are there specific areas or topics that need more emphasis? How can the program better support teachers with varying levels of experience in online teaching?"

Overall Impact on Teaching Practice:
"Overall, how do you think participating in the Continuous Professional Development program has influenced your teaching practice?"
Prompts: "Has it changed your approach to teaching? Do you feel more equipped to engage and motivate students in an online environment?"

Conclusion:
"Thank you for sharing your valuable insights. Your feedback is crucial in understanding the effectiveness of the Continuous Professional Development program and will contribute significantly to enhancing online teaching practices. If you have any additional comments or thoughts, please feel free to share them now."