IN-SERVICE HEALTHCARE PROVIDERS' PERCEPTIONS OF E-LEARNING ENABLERS AND BARRIERS IN CONTINUING PROFESSIONAL EDUCATION DURING COVID-19 PANDEMIC: A QUALITATIVE CASE STUDY OF ONLINE CPE PLATFORM IN UKRAINE

BY

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ABSTRACT

The evident expansion of e-learning products and systems worldwide reflects a recent tendency and possibly long-term implication on the development of the education field, while the application of these solutions in continuing professional education (CPE) of medical personnel is not well-documented. The objective of this research is to explore the perspectives of in-service healthcare providers on the enablers and barriers that influenced their e-learning in the CPE during the COVID-19 pandemic in Ukraine, which was also impacted by the invasion of Ukraine by the Russian Federation. Ukraine constitutes a unique low- or middle-income country (LMIC) setting for a case study because the Ukrainian state currently addresses not only the complex effects of the COVID-19 pandemic but also the existential and military threats posed by the large-scale attack of the Russian Federation on the sovereign country of Ukraine since February 2022.

This exploratory single-case study focused on the perceptions, personal experiences, views, and beliefs of adult learners, who were in-service healthcare providers, collected during in-depth interviews regarding the use of the e-learning system for their CPE through a prism of qualitative research methodology. The results of the study indicated that the cost-effectiveness, versatility, and accessibility of online courses were the enabling factors for e-learning use by healthcare practitioners, though the lack of time due to excessive workload, inability to interact with peer learners and instructors, or insufficient technical knowledge for navigating the e-learning platform were the barriers to such practice. This study ultimately develops a unique perspective on e-learning use by adult learners during the pandemic and large-scale military confrontation in Ukraine, suggesting research and practice implications for further improvement of e-learning solutions through additional technical orientation, digital literacy skill training, and technical support for learners; improved education program design; and further prevention of common sense of detachment and isolation among e-learners that could be achieved by multiple means.

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CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT

Introduction

E-learning represents a crucial trend and solution in modern education. Although the e-learning domain has constituted an innovative educational approach and a promising tool for learning personalization in the previous decade, the emergence of the COVID-19 pandemic has transformed the trend into a priority for multiple countries. Digital learning represents a prevalent strategy for the continuity of education during the pandemic with associated travel restrictions or social distancing measures and a cost-efficient educational opportunity in low- and middle-income countries (LMICs). E-learning systems in medical education can address the shortage in the healthcare workforce and the inaccessibility of medical training due to COVID-19 mitigation measures in LMICs (Barteit et al., 2020). However, the increasing application of digital learning solutions in healthcare settings due to the pandemic has exhibited multiple deficient aspects of such initiatives in LMICs. The countries with low-resource healthcare settings affected by the pandemic can encounter inadequacy of digital skills among practitioners, insufficiency or redundancy of equipment, and inappropriate instruction models derived from conventional face-to-face education, which deteriorate the possible beneficial potential of e-learning for healthcare workers (Regmi & Jones, 2020). E-learning models have represented an appealing and feasible educational solution in healthcare, while the pandemic has challenged the application of these learning instruments in LMICs.

The selected research setting of Ukraine exemplifies the low- and middle-income country (LMIC) context with the developing economy and healthcare sector affected by the COVID-19 pandemic and the invasion of the Russian Federation with the assault on its sovereignty. As Ukraine is currently in the middle of a large-scale war launched by the Russian Federation, the

confrontation poses significant public health, economic, humanitarian, and social burdens on Ukrainian society, exacerbating the challenging impact of the COVID-19 pandemic on healthcare provision and education of medical workforce (Alnahhas et al., 2022; Shushkevich, 2022). Existing scholarly literature has partially addressed the determinants of digital learning use in CPE of healthcare workers in other countries without the focus on Ukraine, though more recent examinations, such as Alnahhas et al. (2022) or Shushkevich (2022), display the challenges associated with the pandemic and the Russian-Ukrainian war in the Ukrainian healthcare sector.

The war with the Russian Federation has developed complex influences not only on the Ukrainian society and social systems like healthcare but also on the individuals and healthcare providers, who will be the informants in this case study. The war and the COVID-19 pandemic could have shaped the particular interconnected barriers and enablers to e-learning use for medical practitioners, which currently can affect their perceptions and recollections of e-learning experience throughout the previous three years. In this setting, this research project aims to focus on the initial impact of the pandemic on the described practice of CPE yet possibly revealing the emerging issues in CPE of Ukrainian medical professionals related to the large-scale war in the Russian Federation. In this dissertation project, the researcher will address the gap in the current body of knowledge and scientific evidence on specific context-related enablers and barriers to e-learning use in CPE of Ukrainian in-service healthcare providers affected by the COVID-19 pandemic as well as the ongoing Russian-Ukrainian war in the period between 2020 and 2022.[1]

[1] This study will cover the period between 2020 and 2022, including the period of large-scale Russian invasion of Ukraine at the end of February 2022. The timeframe of the study includes three whole years of 2020, 2021, and 2022.

The utilization of an exploratory case study methodology with a desk review and a series of semi-structured interviews enable the verification of the researcher's assumptions about e-learning strengths and limitations in the Ukrainian healthcare sector developed from an examination of literature and professional experiences while identifying context-specific and unique understanding of local providers and experts on the issue that can contribute to enhanced digital learning use in other contexts. This case study as "a distinctive form of empirical inquiry" (Yin, 2014, p.19) with an investigation of the e-learning courses is expected to create additional knowledge that could assist other practitioners in the field as well as policymakers and funders seeking to advance different modalities of virtual learning in LMICs, particularly within the area of adult professional/continuing professional education. The significance of this study is shaped by the aim to address the gap in the body of evidence regarding the experience with online CPE in Ukraine that encounters the burdens of the pandemic and the war launched by the Russian Federation. The identification of context-specific and unique factors that shape the experience of healthcare workers with e-learning in Ukraine will strengthen the capacity of practitioners in the field of CPE to manage barriers to e-learning use and capitalize on the opportunities related to expanding e-learning application for continuity of education in the medical field in Ukraine.

Purpose of the Study

The presented research explored adult learners' perspectives on the factors that impact the dynamics of e-learning use in continuing professional education (CPE) of public health practitioners based on the case study of a medical distance learning platform, the online Platform of the Public Health Center (PHC) of the Ministry of Health (MoH) in Ukraine. This dissertation project presents learners' experiences with an e-learning solution within a LMIC context through the prism of users' personal perceptions, experiences, and beliefs.

The methodological framework of the research included a qualitative single-case study approach with an exploratory design. The selected indicators of e-learning application in the defined setting were the measures of user experience and opinions on this phenomenon. Further justification and procedural descriptions regarding the selected measures can be found in the Methodology section. The focus on user experience and perspectives on the Platform and distance learning use offered a unique angle in the context of examination of e-learning application. This methodological framework also ensured the description of desired improvements at the level of personal experiences and institutional requirements of mandatory e-learning experienced by in-service public health providers in Ukraine during the pandemic. The conceptual frameworks of the capital theory by Pierre Bourdieu and andragogy by Malcolm Knowles informed the identification of enablers and barriers to e-learning use with the recommendations for the optimization and improved accessibility of e-learning for the CPE of in-service healthcare providers in Ukraine.

The goal of this dissertation was to explore the perspectives of in-service healthcare providers in regard to the perceived enablers and barriers that influenced their e-learning in the continuing professional education (CPE) during the COVID-19 pandemic in Ukraine, which also was later impacted by the invasion of Ukraine by the Russian Federation.

Research Questions

The use of the e-learning platform and courses developed by the PHC of Ukrainian MoH in CPE of medical care professionals in Ukraine during the COVID-19 pandemic raises the following questions:

- What are the perceived enablers that affect adult learner experience and e-learning application among in-service healthcare providers in Ukraine?

- What are the perceived barriers that affect adult learner experience and e-learning application among in-service healthcare providers in Ukraine?
- What was the perceived impact of the COVID-19 pandemic that started in 2020 and the large-scale Russian invasion into Ukrainian territory launched in 2022 on user experiences with e-learning and its application in CPE of in-service healthcare providers in Ukraine?
- What are the perceptions of in-service healthcare providers in Ukraine on possible improvements of the online Platform of the Public Health Center (PHC) of the Ministry of Health (MoH) in Ukraine at personal and institutional levels?

Conceptual and Theoretical Frameworks

Paradigms

Tracy (2019) defines paradigms as "preferred ways of understanding reality, building knowledge, and gathering information about the world" (p. 38). The paradigms that will underpin the design and completion of this dissertation include the constructivist and pragmatist worldviews. The researcher also follows Stake's take on qualitative research "being experiential, using personal judgement as the main basis for assertions about how something works" (Stake, 2010, p. 61) and will rely on such definition throughout the whole process of study design as well as data analysis and interpretation. This perspective on qualitative research resonates with the assumptions of constructivism, the core of which is the continuing and interactive construction of knowledge throughout social experiences (Chuang, 2021) and pragmatism that emphasizes the relevance of experiential learning and research aimed at the identification of solutions to real-world practice issues (Wang et al., 2020).

Constructivism represents a crucial philosophical perspective in social sciences and education research, which implies the continuous construction of social reality and knowledge by individuals. Constructivism in education, initially discussed by Swiss developmental psychologist Jean Piaget in his theory of cognitive development, suggests that persons or learners acquire knowledge during information transmission not only by passively perceiving the data but also by actively constructing novel understandings of phenomena or disciplines through experiences, prior knowledge, social interactions, and discourse formation (Terenko, 2019; Chuang, 2021). Knowledge construction as the central philosophical assumption in education research can also be observed in the works of Dewey (1916), Piaget (1973), Vygotsky (1978), and Bruner (1996) (Chuang, 2021). Constructivism as a research worldview integrates the determination of understanding based on multiple views of participants and is aimed at theory advancement informed by the inductive perspective of data collection and subsequent identification of patterns, theories, and interpretations, which will be the guiding principles of this case study.

Constructivism also generates a set of implications for adult education research focused on e-learning. Recent scholarly observation demonstrates that e-learning causes significant isolation of learners, whereas educators can "fail to understand that distance education is really about creating a different kind of structure for learning and teaching" (Huang, 2002, p. 31). In this case, constructivism can shift the comprehension of e-learning as context-free learning facilitated by technologies to a specific social environment with a possibility of learners' isolation, which can contribute to persons' performance in distance education. Recent research also emphasizes the significance of learning quality and authenticity, the role of educators (instructors), learner-centeredness, or pre-authentication controversy with a conflict between

collaborative learning and individual differences (Huang, 2002). In this case, the constructivist approach to education research will inform the interpretation of user experiences with e-learning in this dissertation.

Pragmatism is another worldview that will guide the completion of the described dissertation project. The epistemological and philosophical position of pragmatism includes the focus on actions, contexts, and consequences as the critical determinants of phenomena, while the pragmatist perspective in education refers to the interrelation between learning and experience, accentuating that education is a problem-oriented and practical activity utilized by individuals of different ages and backgrounds (Wang et al., 2020). Pragmatism also entails a specific perspective on education as the hands-on application of various strategies or instruments to solve learners' issues or accommodate their practical needs. The defined worldview posits that the design and distribution of educational content should include knowledge and skills that are useful and necessary for the learners to operate in desired environments efficiently, adapt to change, innovate new solutions, and transform personal life contexts (Pham, 2021).

Pragmatism as a knowledge-development framework in a scientific context will ensure the problem-centered and real-world practice-oriented perspective on e-learning in adult education, focusing on the exploration of consequences associated with the COVID-19 pandemic and the identification of functional and viable practice solutions for the enhanced application of digital learning tools for CPE of public health practitioners. The pluralistic nature of pragmatism as well as the notions of constructivism inform the selection a qualitative case study approach with the focus on experiences and perspectives of adult learners in this investigation, ensuring the in-depth analysis of multiple stances on e-learning. Per Morgan (2007), the core concepts of pragmatism, such as the "lines of action," "warranted assertions," and a general emphasis on

"workability" (p. 66), are intertwined with the aspects of the constructivist approach, as pragmatism has emerged consolidating the elements of constructivism and positivism worldviews. Such a connection enables the use of constructivism and pragmatism paradigms in congruence to inform the design and conduct of this dissertation project.

Theoretical Frameworks

Capital Theory

The central theoretical framework in this dissertation is capital theory, which will contribute to the conceptual model in the design and completion of the study. Capital theory was introduced in 1986 by French sociologist and public intellectual Pierre Bourdieu, associated with the School for Advanced Studies in the Social Sciences in Paris and the Collège de France, whose perspective to significant extent was built upon analysis and critique of economic theory by Karl Marx and Max Weber but also other prominent psychologists and sociologists of the century. In his original work, Bourdieu defines capital as "accumulated labor (in its materialized form or its 'incorporated,' embodied form) which, when appropriated on a private, i.e., exclusive, basis by agents or groups of agents, enables them to secure social energy in the form of reified or living labor" (1986, p. 15). He further argues that for effective analysis of "the structure and functioning of social world" it is important to depart from the narrow definition of capital by economic theory and its adepts who considered the phenomenon as just one form of material goods and resources and "reintroduce capital in all its forms" (Bourdieu, 1986).

In his capital theory, Bourdieu introduces five core forms of capital such as economic, cultural, social (1986), symbolic, and technical (2002), detailed definition of which could be found in the Table 1 below (Bourdieu, 1986, 2002).

Table 1. Forms of Capital, Bourdieu Capital Theory (1986-2002).

Form of Capital	Definition
Economic	Money, which could be institutionalized in different forms such as property rights or other assets
Cultural	Shared cultural signals including attitudes, preferences, behavior, and educational qualifications
Social	Social obligations, connections, emotional credentials, socio-economic status, which could be institutionalized in the form of titles
Symbolic	Authority, knowledge, prestige, reputation, degrees
Technical	Technology-related knowledge and skills

Source: Adapted from Bourdieu (1986), (2002); Deng & Sun (2022).

Bourdieu emphasizes the fluidity of these forms of capital that could be derived from the economic capital or converted into such, with economic capital being at "the root of all other forms of capital" that reinforces class inequality in society (1986, p. 54). Only recently, Bourdieu's capital theory has been applied to the scholarship of e-learning with some evidence that lack of or inequality in terms of capital types can serve as an indication of a barrier to education and results in academic adversity for students (Deng & Sun, 2022). The capital theory has impacted the comprehension of knowledge phenomenon in recent educational research, displaying that the concept of skills has replaced the idea of knowledge with the emphasis on "human capital and human resources that need to be cultivated to fuel the labor market and to enhance national competitiveness on the global stage" rather than impersonal, instrumental, and decontextualized knowledge (Mikulec & Guimarães, 2022, p. 13). In this case, capital theory emphasizes the value of knowledge and education in contemporary society. Therefore, the

notions of capital theory resonate with the pragmatist idea of the practical application of learning outcomes and the constructivist emphasis on the critical role or agency of learners and instructors in knowledge creation.

A set of recent studies have focused on the implications of e-learning on the capital of learners, though a limited body of research has addressed the influence of initial capital dimensions on the use of e-learning solutions. For example, Cocquyt et al. (2019) examine the role of blended learning in adult education with specific types of learning support that can reinforce social inclusion and social capital of adult learners, whereas Khan et al. (2022) address the influence of specific behaviors in e-learning systems, such as active engagement in discussion boards, on the social capital gains among learners. Conversely, Goudeau et al. (2021) have analyzed how distance learning use due to lockdown during the COVID-19 pandemic can increase the achievement gap between different social classes, ultimately limiting the social capital of learners. The researchers argue that learning processes in e-learning largely rely on family and peer support, as well as self-organization capacity, that heavily depend on the socioeconomic status and networks of learners rather than the instructor's role, which can exacerbate social-class academic disparities, contributing to social-class-based academic inequality (Goudeau et al., 2021, p. 1273).

Nonetheless, the connection between e-learning and learners' capital is still not a well-studied phenomenon in e-learning scholarship. Carr et al. (2018) have explored the potential of a distance learning framework with the integration of pedagogy, andragogy, and heutagogy approaches to facilitate lifelong learning processes that can consequently "generate positive externalities and impact livelihoods" in the context of Kenya (p. 69). The researchers view these approaches as a pedagogy-andragogy-heutagogy continuum ("pedagogy (theory of teaching),

andragogy (theory of self-directed learning), and heutagogy (theory of self-determined learning)," p. 2), differentiating these models according to the degree of learners' autonomy from pedagogical experience of guidance at schools and andragogic principles used at higher education institutions to innovative and advanced heutagogy that should accommodate the unique and complex needs of adult learners in postgraduate and lifelong learning (Carr et al., 2018). However, the scholars also note that the cases of adult lifelong learning promotion should be located in relevant socioeconomic settings to yield significant effects on empowerment and living standards improvement. Carr et al. (2018) suggest that "network linkages, social capital, and interaction with formal research" develop differential outcomes for adult learners who engage in lifelong learning programs, shaping the effectiveness of informal and formal learning procedures for these individuals (p. 74). Hence, this research will generate insights not only into the influence of distance learning on the capital of adult learners in the LMIC environment but also into the role of social and financial capital as the predisposing factors to the e-learning implementation and the experience of adult learners with this learning framework.

The researcher seeks to integrate capital theory in this dissertation project in its unconventional (as per Bourdieu's contribution) sense, meaning the use of the capital framework as an impartial conceptual network that will facilitate the conceptualization of factors that affect experiences with e-learning among Ukrainians healthcare practitioners. In their analysis of social capital term within the public health research, Szreter and Woolcock (2004) label capital as the "essentially contested concept" of social sciences, similar to the terms of race and gender, that entails notable broad nature, political and ideological saturation, as well as the lack of scientific and public consensus regarding its definition (p. 654). The application of capital theory in analysis of e-learning is also a relatively rare analytical approach in the defined area of education

research, which implies the absence of conventional and dominant perspective on the application of capital theory in this sector. In such context, the researcher employs Bourdieu's capital theory, adapting the key dimensions based on extensive literature review and personal experience, to conceptualize the factors that shape the use of e-learning system by medical care providers in their CPE. Essentially, these factors incorporate the resource, finance, institutional, and social elements that originate in the social frameworks of inequality, addressed by Bourdieu and other critical perspective scholars. Nonetheless, the objective of this dissertation project is the exploration of enablers and barriers to e-learning use among healthcare workers in Ukraine, which the researcher expected to originate from specific social, financial, institutional, or contextual dynamics, as well as personal perspectives, capabilities, and motivations, which expand the scope of conventional Bourdieu's capital sense.

In this dissertation, Bourdieu's theory guided the design of the data collection tool and the subsequent analysis of informant interviews in terms of the development of a deductive segment in the coding system by the researcher. For instance, the capital theory facilitated the identification of thematic patterns in empirical data on the factors that shape e-learning use among medical practitioners, focusing on the factors that contribute to or impede e-learning application in consistency with the types of capital in Bourdieu's capital theory. Capital theory informed the coding procedure in this study, guiding the deductive coding phase with predetermined categories and inductive coding phase with appropriate conceptualization of emerging themes in empirical data.

The Theory of Andragogy

Another fundamental theory in this project is the theory of adult learning by Malcolm Knowles (2015), labeled *andragogy*. This theoretical framework is relevant to e-learning, as

adults are frequently engaged in distance learning which is directly exemplified by the case of e-learning use for the CPE of in-service public health professionals, designed for adult learners (Simonson et al., 2019, p. 48). The core assumption of this theory is the andragogic process of learning, with adults perceiving themselves as self-directing individuals, which comprises seven specific components. The following elements reflect the aspects of the andragogic process: "the establishment of a climate conducive to adult learning, creation of an organizational structure, diagnosis of needs for learning, formulation of directions, development of a design for activities, formation of a plan, and the use of quantitative and qualitative evaluation" (Simonson et al., 2019, p. 48). Table 2 below outlines these elements of the andragogic process adapted from Simonson et al. (2019, p. 48).

Table 2. The Phases of Andragogic Process as per Knowles's Andragogy Theory.

No	Phases/Elements of Andragogic Process	Description
1	Establishment of a climate conducive to adult learning	The combination of appropriate physical context for the well-being of learners and the psychological climate based on the principles of "mutual respect, collaborativeness, trust, openness, and authenticity" (p. 48).
2	Creation of an organizational structure	The formation of planning groups that generate input concerning preferred learning activities, content, and modes.
3	Diagnosis of needs for learning	Differentiation between felt needs and ascribed needs.
4	Formulation of directions for learning	The identification of learning objectives and directions for the advancement of skills and knowledge.
5	Development of a design for activities	The definition of resources and approaches required for the attainment of previously identified learning objectives.
6	Development of a plan	The formulation of a strategic perspective on the achievement of identified objectives.

Table 2 (cont.)

7	Use of quantitative and qualitative evaluation	The employment of evaluation tools that enable continuous assessment of progress and needs of learners.

Source: Adapted from Simonson et al. (2019), p. 48.

A recent scientific study of Knowles's adult learning theory in the digital learning age accentuates the relevance of this theoretical framework to e-learning and distance learning systems. Egan (2020) argues that distance learning can integrate the principles of andragogy, citing Knowles's statement that adults can "access learning in a just-in-time, just-enough format under conditions of full learner control" in distance learning settings (Knowles et al., 2015, p. 237). Moreover, Knowles also notes the possible limitations of adult learning in e-learning related to his theoretical assumptions, referring to the necessity of "very well-developed self-directed learning skills" for learners who can alternatively exhibit insufficient self-organization abilities or a lack of confidence to effectively participate in e-learning initiatives (2015, p. 237).

Recent evidence has produced insights into the application of andragogy in e-learning during the COVID-19 pandemic. Barker & Smith (2021) articulate the utilization of an andragogy-informed approach in Systems Engineering education, which the scholars label as "a largely interactive and applied discipline which has been mainly taught via face-to-face tuition" (p. 1). This description of the Systems Engineering field resonates with the characteristics of medical education for in-service practitioners, which is an applied discipline with the prevalence of a face-to-face education approach, which has encountered a challenge regarding the transition to e-learning due to the COVID-19 pandemic. Barker and Smith (2021) proceed to claim that andragogic strategy and principles can inform the design of distance learning courses for adults, ensuring the effective application of e-learning systems among adult learners. Similarly, Greene

and Larsen (2018) and Brieger (2020) note the relevance of andragogy in virtual education contexts, stating the need for the integration of andragogic notions into the design and instruction approaches of e-learning courses for adults.

A recent scientific analysis of andragogy applied in distance learning in Nigeria generates significant implications for the use of this framework in e-learning examination in LMICs. Adebisi and Oyeleke (2018) suggest the blended pedagogical and andragogic models of learning to promote online teaching and learning programs, displaying the practical strategies to integrate these two approaches into adult education systems to "activate students' curiosity about a class topic, engage students in learning, develop critical thinking skills, keep students on task, or engender sustained and useful classroom interaction" (p. 153). Another scholarly observation emphasizes the significance of the andragogy framework in education of adults during the COVID-19 pandemic. Ladwig et al. (2021) propose that andragogy can guide the transition of content from a face-to-face style of delivery to online delivery of education, claiming that andragogy principles can address the emerging limitations or barriers to effective learning in distance format. Thus, the discussed scientific literature illustrates the relevance of andragogy in the analysis of distance learning use among adults.

Overall, the paradigms of constructivism and pragmatism guide the researcher's vision and study completion in terms of philosophical assumptions about the essence of a qualitative case study, its purpose, scope and significance of findings in the selected practice field. Bourdieu's capital theory informed the development of a conceptual framework for identifying and analyzing perceived e-learning enablers and barriers in the CPE of in-service public health specialists in Ukraine, using five major domains such as economic (financial), cultural, social, symbolic, and technical. The theoretical framework of andragogy by Knowles also facilitated the

identification and analysis of enablers and barriers to e-learning application in CPE of medical practitioners during the pandemic in Ukraine, contributing to the formulation of coding parameters in data analysis stage for deductive coding procedure with a predetermined set of codes and facilitating inductive coding of themes at the later stage. This theory also guided the generation of possible improvement strategies that should inform the optimization of distance learning design and delivery in line with all the elements of the andragogic process outlined above as a response to the healthcare and social crises in the Ukrainian context. The application of capital theory and andragogy concepts in this study is further articulated in the Methodology section of this dissertation, as well as the interview guide (Appendix A), the Draft Codebook (Appendix B), and Finalized Codebook (Appendix E) for data analysis.

Operational Definitions of Key Terms

As this study on the enablers and barriers to e-learning in the continuing professional education of healthcare workers in Ukraine has emerged in the broader field of education research and practice, the definitions of education and learning are the central concepts that underpin this specific analysis and its scientific or practical settings. Banathy (1992) and Chazan (2022) offer a set of definitions of education, and in the more recent formulation, this concept refers to the "deliberate, systematic, and sustained effort to transmit, provoke or acquire knowledge, values, attitudes, skills or sensibilities as well as any learning that results from the effort" (Chazan, 2022, p. 27). In this case, the operational definition of education will refer to the systematic, conscious, or institutionalized nature of education processes and systems that aim to advance knowledge, experiences, and learning of individuals through the transmission of various information phenomena from educators to learners.

Learning is another central concept in this study. In its initial sense, this term refers to the advancement of knowledge and expertise through education, while lifelong learning is a more relevant concept for the analysis of continuing professional education among established practitioners (Blaschke, 2021). Recent research reports suggest a multifaceted definition of lifelong learning with an emphasis on subject-development skills of reflection, autonomy, or self-efficacy, object-related skills of digital literacy and agility, as well as organization-related skills of cooperation and communication competencies (Blaschke, 2021).

Considering the e-learning practice, Rodrigues et al. (2019) defines e-learning as "the use of information and communication technologies to enable access to online learning/teaching resources" (p. 5). Although e-learning (electronic learning) and online learning differ in the integration of an online dimension to the electronically based learning approach, researchers argue that modern e-learning systems frequently include an online component to ensure the availability of materials, instructional sources, and peer interactions through Internet access (Kumar Basak et al., 2018). In this case, the term e-learning is used as an essential concept in this dissertation that reflects learning practices facilitated by electronic devices that incorporate online elements in the content delivery and communication of learners in a learning system in consistency with the tendency in international and Ukrainian research on such educational practice. Although distance education is the umbrella concept for the description of physically distanced interactions between educators and learners facilitated with technological media and possibly online connection among education actors and to instructional materials (Kacetl & Semradova, 2020), the researcher uses the term e-learning to address all distance education practices, interventions, or experiences explored in this study.

The central subjects in this dissertation are the healthcare workers or healthcare providers who are employed in the healthcare sector. These are the individuals who provide medical care services or support in state-funded organizations (Health Protection Surveillance Centre, 2023) and are employed by the Ministry of Health of Ukraine within any position in the healthcare sector according to the state-delineated nomenclature of medical professions approved by the order of the MoH of Ukraine (The List of Medical Staff Positions in Health Care Institutions, the MoH of Ukraine, 2022).

Other key concepts in this dissertation include enablers and barriers to e-learning practice among healthcare providers. The researcher uses the definition of an enabler as a factors, assistance, persons, technology, or strategies that can support the capacity, motivation, and ability of healthcare providers to engage in e-learning, whereas the definition of a barrier used in this research entails circumstances or obstacles that inhibit or challenge the defined practice or activity of medical professionals (Passey et al., 2016). The focus of this dissertation is on perceived enablers or barriers to the mentioned practice, which refers to the exploration of informants' perspectives on possible enabling or challenging factors in their experience with e-learning on the Platform. This aspect is situated in the constructivist position on the ways that healthcare providers use to perceive their experience with e-learning and the capacity of the researcher to present these perspectives in this exploratory study.

Medical education constitutes the broad conceptual and practice setting of this dissertation. Medical education refers to the formalized, accredited, and institutionalized curriculum that comprises the instruction, training, and other educational components that ensure the preparation of licensed and certified medical professionals, as the ultimate goal of this system is "to supply society with a knowledgeable, skilled, and up-to-date cadre of health care

professionals who put patient care above self-interest, and who undertake to maintain and develop their expertise over the course of a lifelong career" (Swanwick, 2019, pp. 1-2).

The continuing medical education (CME), continuous professional development (CPD), and continuing professional education (CPE) form the fundamental conceptual network in this dissertation. In the field of medical education, the concept of continuing medical education (CME) reflects the conventional, accepted, and formalized system of education and training aimed at learning and knowledge updates among in-service medical care specialists in the form of courses, conferences, or workshops, the completion and attendance of which is a certification or license maintenance or renewal factor for healthcare practitioners implemented on the legislative and governmental basis in multiple countries (Raza et al., 2009; Swanwick, 2019). The term 'continuous professional development' (CPD) refers to the broader system and approach to the advancement of knowledge and competence among individuals and teams that work in different sectors, which is rooted in the described lifelong learning perspective and situated in a professional context (Ryan, 2003; Peleman et al., 2018).

The concept of continuing professional education (CPE) has acquired prominence in recent decades as a component of the CPD framework. CPE integrates ongoing training and education initiatives for in-service professionals with the dimension of maintained certification in a specific field of operation for practitioners (Nolan et al., 1995). While CPE emerged in the middle of the twentieth century, it has evolved into a modern system of professional development activities with workplace in-service education, courses, workshops, self-directed study, and e-learning activities since the 1990s (Cervero & Daley, 2016).

In the case of this study situated in the context of Ukraine, the concepts of CME and CPE are equivalent regarding the practice of continuing education of healthcare workers in Ukraine, and CPD is a broader area of knowledge and competence improvement in the work setting. In *The Law of Ukraine on Education (2017), Article 18. Adult Education* defines postgraduate education (PGE) as the acquisition of new or improvement of existing competencies based on earlier education and continuous professional development (CPD) as education and improvement of professional competencies of a specialist after the completion of higher and/or postgraduate education. Ukrainian law currently recognizes CPD as the framework of continuing education of medical practitioners. Nonetheless, this dissertation will focus on e-learning in the CPE of healthcare providers in Ukraine as the general experience of these practitioners with lifelong continuing education in their professional field rather than the exclusive focus on state-regulated practice associated with special requirements further articulated in the Study Setting Section of the Methodology Chapter of this dissertation.

Significance of the Study

The general focus of this dissertation project, e-learning, has become the critical modality of CPE and CME with the emergence of the COVID-19 pandemic, as practically all professional education events and practices have migrated into the online realm (Shah et al., 2020). Furthermore, e-learning is likely to maintain its central education model status in medium- and long-term perspectives within the broader medical education field being currently persistent, cost-effective, convenient, and rapidly developing educational solution (Colaceci et al., 2020). Three years of e-learning application, particularly in medical education, during the COVID-19 pandemic have generated robust evidence on the practical implications of e-learning on the CPE of medical professionals. Hence, analysis of learners' experiences with e-learning solutions in

this sphere is vital for the sustainability and improved performance of e-learning models that can support the continuity of medical education despite new emerging crises such as military conflicts or new pandemics.

This study highlights the perceived enabling and challenging factors concerning e-learning application in CPE of medical specialists in Ukraine, presenting a unique exploration of an e-learning case in CME within Ukraine, a LMIC. Ukraine has been massively affected by the COVID-19 pandemic and, later on, by the invasion of the Russian Federation with the assault on its sovereignty during the last eight years and, on a much bigger scale, since February 2022. As Ukraine is currently in the middle of a large-scale war launched by the Russian Federation, the confrontation poses significant public health, economic, humanitarian, and social burdens on Ukrainian society, exacerbating the challenging impact of the COVID-19 pandemic on healthcare provision and education of the medical workforce (Alnahhas et al., 2022; Shushkevich, 2022). Recent reports indicate the prominent issues of healthcare staff shortage and education system decay due to the war hostilities, displacement, evacuation, and infrastructure destruction in Ukraine since early 2022 (Roborgh et al., 2022; Sheather, 2022). Matviichuk et al. (2022) state the "urgent need for training experience, organization, and implementation" of e-learning interventions to ensure education continuity despite the adverse consequences of the COVID-19 pandemic and the Russian invasion of Ukraine. In this case, the examination of learners' experiences with digital learning in CME can promote the advancement of e-learning modality as a critical solution in the new reality of education in Ukraine, which should address the need for rapid healthcare workforce renewal and strengthening the capacity for healthcare cadres, remaining in Ukraine. Hence, this dissertation project represents a relevant and unique

investigation of perceived enablers and barriers to e-learning application in the CME of in-service healthcare providers in the Ukrainian context.

Outline of the Study

This dissertation includes five chapters.

Chapter 1 provides an overview of the problem, its context, and its relevance. This chapter contains purpose statement, research questions, theoretical and conceptual frameworks, describes the significance of the study, its delimitations, operational definitions of key terms, and ends with an outline of the dissertation.

Chapter 2 establishes the context of this dissertation project and provides a review of literature related to the field of professional education for healthcare providers. This chapter addresses key conceptions of e-learning, proceeding to the discussion of recent scientific evidence regarding the use of e-learning for CPE during the COVID-19 pandemic in low-resource countries. Chapter 2 also displays the gaps in the body of literature that this dissertation aims to address, emphasizing study relevance and novelty.

Chapter 3 focuses on the articulation of the methodological framework and the procedures with the justification of exploratory single-case study design. This chapter provides the descriptions of the qualitative data collection methods and procedures, presenting the data analysis approach and considerations regarding validity, researcher's role, and limitations of the study.

Chapter 4 speaks to the case study results from analysis the qualitative in-depth interviews that address the perceived enablers and barriers to e-learning use among medical

professionals in Ukraine with the recommendations on the improvement of e-learning use in CME.

Finally, Chapter 5 constitutes a review of study procedures and essential findings, identifying recommendations for the improvement of healthcare providers' experiences with e-learning in CPE. The chapter addresses the academic and practical implications of this dissertation and specifies further research directions while offering concluding thoughts on this project.

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CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter develops an overview of relevant research fields that constitute the foundation for this dissertation. The purpose of this chapter is to explore existing evidence on the application of digital learning solutions for the continuous professional development of medical care providers in low-resource settings, specifying the findings on the factors that can facilitate or inhibit the use and effectiveness of e-learning models in these contexts. Next sections will indicate the conceptual differences and similarities across the variety of terms that relate to e-learning as well as address the trends of e-learning application in medical education. The chapter also integrates a discussion of e-learning practices in medical education of in-service healthcare providers in low- and middle-income countries (LMICs) as well as presents the review of research scholarly evidence on the enabling and challenging factors in the use of e-learning for the education and continuing professional development in the healthcare sector. It opens up with the discussion of the methodological framework that the researcher applied to consolidate the literature for the review section, followed by the articulation of conceptions and conceptual frameworks used to describe and study e-learning in medical education and the traced historical patterns of e-learning application in the defined field. The subsequent parts of this chapter display evident enablers and barriers derived from recent studies that have shaped different e-learning interventions as well as the topic of decolonization in medical education and CPE of healthcare workers in LMIC contexts. The review of the national context of e-learning in Ukrainian medical education establishes the environment of the study's emergence and conduct, depicting the relevance of this research. In essence, this chapter displays the existing

underpinnings of e-learning use in the continuous professional development of healthcare practitioners in low-resource countries, affected by the COVID-19 pandemic.

Methodological Framework of Literature Review

The methodological framework for the completion of literature and context review within this research project comprised a series of philosophical, theoretical, and practical solutions to literature search and management. As a practitioner working in the field of adult in-service education in the public health area, the researcher aimed to focus this investigation on a practical problem and diving into applied questions around specific practice in order to create additional knowledge that could be of help to other practitioners and, possibly, policymakers, in the field ("what must we understand before we know what to do" type of questions). Per Hart (1998), the primary objectives in this literature review section will be to distinguish what has been done globally from what needs to be done in the area of e-learning application in CPE of healthcare practitioners; discover important variables relevant to the topic of this research; synthesizing existing data and gaining a new perspective on it; identifying relationships between ideas and practices in the area; establishing proper context for the research; and rationalizing its significance.

Applying Cooper's Taxonomy of Literature Reviews (1988), which stated that literature reviews should be classified according to five characteristics (focus, goal, perspective, coverage, organization, and audience), the researcher focused on both theories and practices in this literature review with the primary goal of identifying central issues in the priority of researchers and practitioners at the moment. The preference was given to the neutral perspective in the planned analysis along with a purposive sample coverage approach. In terms of organization, the

chapter was designed based on a historical format applied to a brief overview of theoretical background and a conceptual one regarding the analysis of current central issues in the literature on the subject of adult e-learning in the area of public health and impact of the recent global COVID-19 pandemic on those. Following Randolph's Guide to Writing the Dissertation Literature Review (2009), the researcher examined a body of literature that was primarily qualitative and/or contains a mixture of qualitative and qualitative results. Next, Ogawa's and Malen's method of qualitative literature review was applied which entails eight steps such as creating an audit trail; sharpening the focus of the proposed review; searching for literature; classifying documents that are found; creating summary database; identifying constructs and hypothesized causal linkages; searching for contrary findings and rival interpretations; and using peer review to corroborate findings (Gall et al., 2009).

The two initial sections of this chapter on the conceptions of education and learning as well as e-learning and distance learning discussion in healthcare integrate the prevalent resources, definitions, and theories that constitute the foundational knowledge of education and learning with the data from recent publications to explore the innovative or challenging perspectives in the field. The data in these sections emanates from peer-reviewed literature and classic publications in the defined sphere regardless of their publication date, though the focus on more recent evidence has implied the review of verified scholarly sources published within the timeframe of the previous five years (2018-2022).

The sections on e-learning use during the COVID-19 pandemic, the evidence regarding enablers and barriers to e-learning in medical education, the decolonization narrative, and the national context of the study include a review of exclusively recent studies that depict the frontier of research on the described phenomena. The search for sources for these sections of the

chapter was limited to published peer-reviewed e-learning and educational research articles. The Google Scholar, the Education Resources Information Center (ERIC), and the University of Illinois Library databases were searched using the keywords below for articles published between the years 2018 and 2022 using both the Title and Keyword functions for the following search terms: “e-learning medical education” OR “e-learning education of healthcare practitioners” OR “distance learning medical education” OR “online education healthcare providers” OR “online education healthcare LMICs” OR “e-learning medical education andragogy” OR “e-learning medical education capital theory.” Table 3 displays the essential inclusion and exclusion criteria used for article search and selection in this literature review. The articles that have not reflected all of the mentioned criteria were not included in the review.

Table 3. Inclusion and Exclusion Criteria for Source Selection in the Recent Evidence Review.

Criterion	Inclusion	Exclusion
Resource Focus	E-learning in education of medical practitioners Digital learning in CPE of medical professionals E-learning in medical education	Articles that do not focus on e-learning application in medical education or CPE of healthcare providers
Publication Date	2018 to 2022	Before 2018
Rigor	Articles that include an identifiable method and results section that addresses the study conduct and includes the findings	Discussion papers without a statement of research methods and results
Language	Journal articles in English	Journal articles in other languages were not analyzed

Conceptions of Education and Learning in this Study

Education and learning represent the central general theoretic concepts that delineate the focus of this dissertation. Chazan (2022) notes three distinct contemporary meanings of education employed in research and practice fields based on their findings. These essential perspectives include the socialization model with a perception of education as a conscious effort to equip persons with functional knowledge that will contribute to their operations in society; the acculturation model with a focus on education as exposure to, the experience of, and acquisition of knowledge and competencies that are necessary to function in a cultural framework; and the person-centered model of education that emphasizes the enabling impact of education on reflective thinking and ability of personal development (Chazan, 2022, p. 29). Proposed research perspective was based on the integration of the mentioned three models of education definition, as the researcher herself observed and explored exceptional multidimensionality and complexity of education practices reflected in all three facets of education concept through her professional and scholarly experiences.

Learning is another critical concept in this research since the education practices examined in this study include different learning frameworks and outcomes directly linked to the experiences of participants in this investigation. Singh & Thurman (2019) provide a robust literature review of learning definitions, labeling learning as a transformative, continuous, collaborative, and intrinsically personal process with the adoption of skills, knowledge, or cultural phenomena of values or attitudes. These scholars also adduce the definition of learning addressed by R. Smith, an expert in adult education and learning, in his book "Learning How to Learn: Applied Theory for Adults," which includes the three dimensions of learning being the "(1) the acquisition and mastery of what is already known about something, (2) the extension and

clarification of the meaning of one's experience, or (3) an organized, intentional process of testing ideas relevant to problems" (p. 295). In this case, while education is related to a frequently formalized, systematic, externally-acquired, and conservative (in the meaning of existing knowledge or narrative preservation through its continuous transmission) process, learning refers to a personalized, informal, internalization-oriented, progressive, and change-inducing practice that is a component and objective of education (Barron et al., 2015).

Here, learning as a practice and framework resonates with the constructivist viewpoint of individuals being assertive actors of knowledge construction through the consolidation of previous and currently acquired or used information and experiences (Moore, 2020). Consistent with the constructivist perspective, the environment of the educational setting, personal life circumstances, and perceptions of an individual affect the learning process and outcomes, whereas a person also possesses substantial agency in shaping educational context, learning aims and activities, and the border learning experiences. Another linkage between the constructivist framework and learning coined by Candra & Retnawati (2020) focuses on the personalized perspective and activities of individuals who operate in and interact with educational environments, educators, and peers to generate knowledge and expertise with the specific life-related aims of professional or personal development, ultimately engaging in and generating learning process.

Lifelong learning is another vital dimension of the learning concept that is an integral component of the conceptual framework in this study. While education typically signifies a set of time-restricted and context-specific initiatives with knowledge transmission that occurs during certain life periods of individuals, learning constitutes a broader and less tacit term of continuous knowledge and experience advancement that can occur in any setting or period. Lifelong

learning has been the central concept in recent education research studies, especially with the progress of technological components that enable education and learning in different contexts or life circumstances of learners, as the scientists advocate the shift to a perspective on learning as a continuous rather than a static process with a learner-centered comprehension on these activities (Aspin & Chapman, 2000; Moore, 2020). Sala et al. (2020) assign the following capacity fields of "personal (flexibility, self-regulation, and well-being); social (collaboration, communication, and empathy); and learning-to-learn (critical thinking, growth mindset, and learning management)" to the necessary elements of lifelong learning (p. 5). Overall, the researchers also accentuate the significance of lifelong learning practice and skills in experiences of modern humanity since efficient lifelong learning ensures employability, management of challenges associated with the pandemic in professional and personal environments, and attainment of personal objectives with self-determined learning (Blaschke, 2021).

The presented conceptions will be situated in the field of medical education, which is a central network and notion in this study of education experiences among medical professionals. Medical education integrates the three dimensions or sectors of undergraduate, postgraduate, and continuing education, and this study will focus on the continuing medical education (CME) framework that enables the prolonged professional development of certified clinical specialists. The current dynamics in the field of medical education display the growing prioritization of patient-centeredness as a holistic concept with specific characteristics of patient-provider interactions within the patient care context that should be embedded and transferred through the medical education system. The contemporary emphasis on patient-centered medical education is reinforced by emerging regulations and accreditation entities' requirements regarding patient care excellence. The patient-centeredness incorporates providers' flexibility in approaching

patients, as well as concern for patient's aims and information needs, integrated understanding of the patients' worldview and experiences, managerial agreement capacities, and focus on (enhanced) prevention and health promotion (Hearn et al., 2019).

However, medical education has not always displayed similar structured, regulated, and patient-focused features. The recent exploration concerning the roots of current medical training in Europe and the United States will facilitate the description of historical trends in medical education within the European setting that correlates with the context of this research. The formal framework of medical education emerged in the late Middle Ages, and scholars report the existence of two essential tiers of academic doctors with theoretical expertise and practically trained surgeons of diverse specialties from approximately the 11th to the middle of the 19th century (Custers & Cate, 2018). The nineteenth century brought increasing educational formalization and certification requirements for medical providers. By the first half of the nineteenth century, medical practitioners were required to complete dissertations to acquire the status of doctors, and state authorities exerted more supervision of medical education through examinations with the objective of public health improvements (Custers & Cate, 2018). Since the end of the nineteenth century, European and American medical education institutions have standardized this sphere and introduced increasing portions of practical training initiatives, though by the middle of the twentieth century, providers and other stakeholders still articulated discontent with medical education and internship programs due to excessive curricular load and the lack of practical training (Custers & Cate, 2018).

The modern medical education field and its developments include the growing state oversight and specialization of education systems on the quality-assuring components of competence-based and learning evaluation solutions. Since the 1950s, different organizations and

governmental bodies ensure the national control and regulation of undergraduate and postgraduate medical education, forming integrated, problem-based, and interactive curricula shaped by the directives of the European Union and nation-states in the European environment (Custers & Cate, 2018). Recent advancements in medical education in Europe include the increased training length, enhanced content, and higher qualifications imposed by the authorities, as well as the efforts to reduce education system costs with the maintenance of training standards and quality through the implementation of individualized, competence-based, and time-constrained educational models (Custers & Cate, 2018). Alsoufi et al. (2020) also mention that the COVID-19 pandemic has substantially altered and disrupted the sphere of medical education, requiring transformations in training provision that can include a transition to e-learning and virtual clinical experience solutions. Therefore, the medical education framework has evolved from a theoretically-oriented academic discipline to an increasingly practice-oriented system of training that is subject to significant optimization, individualization, and restructuration due to the CPVID-19 pandemic in recent years.

As mentioned by the researchers in the analyses of developments within the medical education field, competence-based education belongs to the central notions of educational optimization and quality improvement. According to the described review of medical education history, the focus on competence-based medical education (CBME) term has reflected the acknowledgment of deficiencies of existing medical training systems by education and regulatory actors, as the modern educational initiatives should address the needs of learners for the development of specified competencies and adequately measure the attainment of these competencies for medical care provision (Custers & Cate, 2018). The emphasis on competencies as the critical guidance and indicator of medical education effectiveness has existed implicitly

throughout the history of medical education, while modern advocates of CBME define the critical role of this aspect in the development of high-quality and efficient educational interventions at the undergraduate and postgraduate levels of training for medical professionals. A competency-based approach to medical education depicts the change from an apprenticeship model to outcomes-based training and implies that learners in the defined field should "develop and demonstrate the necessary competence for patient care" with the necessary introduction of "evidence-based way of thinking and acting to both prepare our community . . . and support us through emergent adaptations" (Stoffman, 2022, p. 1). In this case, the competence-based perspective in medical education is likely to shape the curricular design and implementation of current and future medical learning programs.

Recent evidence on medical education dynamics in the postgraduate sector, which is the broader setting for this research on the experiences of healthcare providers with an e-learning system in Ukraine, displays the critical role and potential of competence-based principles to advance medical education progress and outcomes. The competence-based approach focuses on learning outcomes and applications rather than educational processes, which is a central notion for the professional development of medical practitioners, as the evacuation of knowledge, skills, and practical capacities of providers to attain patient care objectives is a fundamental indicator of education quality. The study on CBME in Canada reveals the dimensions and prospects of such an approach in medical education. According to Miller et al. (2022), states should ensure formalized competence-based professional development frameworks for healthcare workers to provide them with tools and strategies to document and at times revise their scope of practice, opportunities to engage in lifelong learning, and possibilities to exhibit tools and strategies to document and at times revise their scope of practice (p. 563). The recent review of similar

medical education trends in Brazil illustrates that the local National Curriculum Guidelines advocate competence-based and active learning on physicians, and CBME contributes to the translation of existing medical curricula into clinical practice, which resonates with the country's focus on the enhancement of medical education quality and clinical care outcomes (Francischetti et al., 2020). This study explores the application of the competence-based model in the continuing medical education of healthcare providers in Ukraine.

The addressed competence-based medical education framework relates to the continuous professional development (CPD), along with continuing professional education (CPE) and continuing medical education (CME) notions. These terms also represent the essential conceptual networks for this research, as the study will focus on the use of e-learning interventions in the CPE of healthcare providers in Ukraine. The term 'continuous professional development' (CPD) refers to the broader system and approach to the advancement of knowledge and competence among individuals and teams that work in different sectors, which is rooted in the described lifelong learning perspective and situated in professional context (Ryan, 2003; Peleman et al., 2018). The concept of continuing professional education (CPE) has acquired prominence in the recent decades as a component of the CPD framework. CPE integrates ongoing training and education initiatives for in-service professionals with the dimension of maintained certification in a specific field of operation for practitioners (Nolan et al., 1995). While CPE has emerged in the middle of the twentieth century, it has evolved in a modern system of professional development activities with workplace in-service education, courses, workshops, self-directed study, and e-learning activities since the 1990s (Cervero & Daley, 2016).

In the field of medical education, the concept of continuing medical education (CME) reflects the conventional, accepted, and formalized system of education and training aimed at

learning and knowledge updates among in-service medical care specialists in the formed of courses, conferences, or workshops, the completion and attendance of which is a certification or license maintenance or renewal factor for healthcare practitioners implemented on the legislative and governmental basis in multiple countries (Raza et al., 2009). Recent evidence on these phenomena includes the advocacy of expanded and holistic perspective on CPE and CME in healthcare settings based on the broad CPD framework with the improved integration of e-learning and other non-conventional education tools (Cook et al., 2018). Since the medical professional's scope of practices transforms throughout the life cycle of clinical practice, researchers and practitioners have advocated for the ongoing, personalized, lifelong, and flexible learning approaches to be adopted and communicated in a population of medical care providers (Links, 2018; Moore, 2020). Overall, lifelong learning, competence-based approach, and CPD-oriented advancements will be the critical components of medical education framework, as clinicians typically engage in ongoing education to effectively operate in continuously-evolving healthcare environments, medical cases, and societal contexts.

Transition to Digital and Online Education

The multiple technological and digital transformations in contemporary societies throughout the previous decades in diverse sectors and at various levels have led to the integration of innovative solutions in teaching-learning frameworks. As the COVID-19 pandemic has limited the use of physical environments in classrooms and educational institutions across the globe, recent observation indicates that 1.5 billion students and 63 million educators worldwide had to alter their academic practices and transfer education and learning activities to an online format (Valverde-Berrocoso et al., 2020, p. 1). In this case, online educational practices

that have been implemented during past decades, have been significantly expanded and developed since the emergence of the pandemic. Further analysis of specific e-learning case in the CPE of medical care specialists in Ukraine requires the clarification of other key concepts. E-learning is the central concept of this study, which will be further explored in the next section of this Chapter.

Digital education constitutes a conceptual network that ultimately integrates the terms of e-learning and online learning. Digital education refers to the "pedagogical use of digital technologies to support and enhance teaching, learning and assessment and the development of digital competencies by learners and education and training staff" (Kumar Basak et al., 2018, p. 195). Thus, this concept incorporates digital tools and associated strategies added to the already addressed term of systematic and institutional education processes. Online education reflects a further branch of digital education that integrates the conventional systematic education structure, digital solutions, and online instruments or capacities, such as an online study program or a learning resource available with access to the Internet, that facilitate education and learning (Kumar Basak et al., 2018). Garad et al. (2021) suggest that distance/remote; face-to-face/in-person; and on-campus/onsite terms that are the characteristics of educational and learning processes can be applied interchangeably.

In multiple popular and academic publications, analysts have noted the interchangeable use of online education and distance education terms, which scholars have noted to be challenging (Park & Shea, 2020). Distance education signifies the existence of separation and distance between educators and learners, while technology may be a solution to address this separation. Desmond Keegan, the leading theorist of distance education and learning, has stated that distance education incorporates the critical elements of educator-student separation as

opposed to face-to-face education settings, the presence of educational institution, use of technical media, and the possibility of educator-student dialogue, interactions, or meetings (Saykili, 2018). This definition reflects the planned and conscious education and learning experiences; though more recent investigations have expanded the existing conceptual approach to distance education. Saykili (2018) proposes a contemporary version of distance education definition as follows: "Distance education is a form of education which brings together the physically-distant learner(s) and the facilitator(s) of the learning activity around planned and structured learning experiences via various two- or multi-way mediated media channels that allow interactions between/among learners, facilitators as well as between learners and educational resources" (p. 5). Hence, distance education focuses on non-contiguous communication between educators and learners that enables learning regardless of distance or time differences for individuals with various commitments that prevent them from attaining face-to-face education initiatives.

Distance learning resonates with the characteristics of the distance education framework while exhibiting the crucial conceptual differences between education and learning terms described in the previous section. Distance learning includes a broad range of experiences and practices in the environment where educators and learners are not physically present in one location at the same time, while the separation of these actors is addressed through different technology means that can incorporate online communication and information retrieval or sharing activities (Kacetl & Semradova, 2020; Saykili, 2018; Rodrigues et al., 2019). Following this strand of reasoning based on the evidence from a recent literature review, electronic learning (e-learning) can be described as the evolution or a new generation of distance education and learning, viewed as a recently developed instrument or approach to distance education with the

advancement of the Internet in the previous three decades (Rodrigues et al., 2019). According to the mentioned systematic review of evidence on the e-learning concept, the fundamental dimensions of this term include technology-driven, delivery-system-oriented, communication-oriented, and educational paradigm that is an advancement of an existing or conventional framework of face-to-face education and learning (Rodrigues et al., 2019, pp. 89-88).

The broad concept of distance education as well as the e-learning practice, which is the focus of this research, comprise a series of specific instruments and practices, the definitions of which should be articulated to proceed to the analytical parts of this study. Blended learning is a specific pedagogical system with the integration of face-to-face and technology-mediated and/or online instructional approaches, though this term can also include other mixing models with the combinations of different instructional methods, technologies, or pedagogical models (Hrastinski, 2019; Kacetl & Semradova, 2020). Recent evidence on blended learning use in the context of CME among healthcare workers has demonstrated its efficiency and potential enabling role in the implementation of emerging e-learning solutions in the CPE of medical care providers. The frequently articulated blended modalities include the integration of face-to-face and e-learning activities, which develop the consolidated advantageous implications of distance learning with low costs, optimized, and individualized learning with the simultaneous practice-oriented and socialization activities of conventional education in a face-to-face format, while educators and other stakeholders advocate increased consideration of design and implementation phases of blended modules, response to learners' needs with tailored and targeted programs, and rigorous evaluation of learning outcomes (Valentina et al., 2019).

Blended learning represents an auspicious approach in medical education. Such an approach can adequately prepare clinicians for practice in contemporary dynamic healthcare and

social systems if integrated with the previously described competence-based approach, where healthcare workers can acquire necessary knowledge updates as well as demonstrate and refine their skills and competence in practice settings (Watkins, 2020). Hence, blended learning reflects the novel, experiential learning modality that can advance the practice of medical education along with a competence-based approach.

Learning Management Systems (LMSs) represent the essential organizational dimension of online and blended learning initiatives. These tools are Internet-based software platforms that facilitate the delivery, monitoring, and administration of digital and online learning activities (Bradley, 2020). While the concept of LMSs can resonate with the term Virtual Learning Environments (VLEs) and these notions can be used interchangeably in different sources, LMSs emphasize the administrative component of e-learning interventions, and VLEs include the orientation on course authoring and production with the compilation of software frameworks that involve materials and facilities for e-learning activities (Flavin & Bhandari, 2021). Massive Open Online Courses (MOOCs) constitute other relevant frameworks of e-learning that will be represented and examined in this study. The concept of MOOCs signifies extensive and frequently free-of-charge online courses designed for large populations of learners and accessible via the Internet in any location or period; however, specific additional services within these systems, such as certification, can require payment for access or the possibility to reuse materials (Weinhardt & Sitzmann, 2019). MOOCs can integrate the use of Open Educational Resources (OERs) that include instructional, learning, and research materials provided in a digital or other media with an open license that permits no-cost access and distribution that can be accessed and reused by learners at any time or location (Feitosa de Moura et al., 2021). MOOCs suggest to

learners an immersive course experience in an online environment, and OERs facilitate instruction and learning in both MOOCs and other distance learning contexts.

Finally, e-learning within MOOCs and other e-learning systems entail two crucial delivery modalities of synchronous and asynchronous learning. Synchronous learning models imply the simultaneous, immediate, and collaborative approach to instruction and interactions in e-learning among learners and educators within a set period, whereas asynchronous learning occurs individually or in a group context with instruction and communication being separated in time, which ensures personal flexibility and autonomous learning for students (McCann, 2021; Mahoney & Hall, 2019). Both synchronous and asynchronous learning schemes include beneficial implications for education and learning in online environments while causing possible discrepancies for specific learners or in different disciplines. The effectiveness of an e-learning system and its influence on the learning experiences of students depends on the appropriate combination of synchronous and asynchronous modalities, which will be further explored and articulated in this research on e-learning use among healthcare providers for continuing professional education.

Emergence of E-learning and its Integration into Mainstream Education

E-learning solutions have been implemented in various educational settings, with the boost of their use during the previous decades and after the emergence of the COVID-19 pandemic. Rahmah et al. (2018) claim that the term "e-learning" was coined at the end of the 1990s, specifically in 1999, when the initial seminar based on computer-based training (CBT) technology was held in the U.S. (p. 3). Since 1999, scholars and practitioners acknowledged the expansion of the conceptual framework regarding e-learning. Nonetheless, distance education in

its essential form of physical separation between educators and learners has been a topic of scholarly and practice debates. Researchers date the emergence of distance education systems and activities back to the nineteenth century with the correspondence study that occurred at a distance between institutions and learners via the medium of mail (Li, 2018; Rahmah et al., 2018).

Conducting an extensive exploration of e-learning evolution, Li (2018) specifies five stages of e-learning concept and practice development with the following descriptions: correspondence learning (before the 1960s); distance learning through multiple technologies (1960 to 1985); distance learning with increasing use of computers and networks (1985 to 1995); e-learning through high-bandwidth computer technologies (1995 to 2007); and interactive learning Web 2.0, mobile and synchronous technologies (2008 to the present) (pp. 409-412). Computer- and Internet-mediated interactions and access to learning resources have revolutionized distance education. Walsh et al. (2019) note that e-learning has emerged as not only an advancement in education practices but also "a social phenomenon and part of a wider technological revolution" (p. 1). Recent evidence also indicates the considerable growth and advancement of the e-learning framework since the beginning of the twenty-first century. Rahmah et al. (2018) illustrate the expansion of e-learning programs adopted by business entities in an effort to optimize employee training and the growing body of e-learning programs in the education sector since the 2000s. Bai et al. (2020) present an outstandingly robust systematic review of more than 7,000 research articles on e-learning from 1999 to 2018, developing feasible evidence on the application and research concerning e-learning, dividing its development into two phases of 1999-2008 and 2009-2018 (p. 1389).

The scholars accentuate the gradual advancement of e-learning topics in research, implying similar transformations in the practical dimension of this e-learning field. Bai et al. (2020) report the lack of research on e-learning issues in 1999-2000, which resonates with the claim of e-learning conceptualization during this period, and the gradual development of these innovative teaching and learning strategies from 2000 to 2006 with conceptual and research-strengthening dynamic up to 2008 (p. 1407). Later stages of field development included the creation of mobile learning, and further subdivisions of topics and terms, with the increasing role of e-learning topics. Researchers propose that up to 2018, the spectrum of critical e-learning issues has focused on social media and Web 2.0, instructional design, and blogging (Bai et al., 2020). Another review of evidence from the recent years also demonstrates that the literature in this field comprises "a more concentrated focus on the learner domain including engagement and learner characteristics with more limited attention to topics pertaining to the classroom or organizational level" (Martin et al., 2020, p. 13).

The described studies of developments in the e-learning field propose a detailed scheme of the historical application trends before the emergence of the COVID-19 pandemic, which has generated multiple significant impacts on this sector. Before the global healthcare crisis with diverse implications on other societal areas, e-learning was adopted as a solution to the limitations in the conventional face-to-face education or training in multiple spheres, as business actors, educational institutions, or governments have deliberately explored the potential of e-learning solutions for the purposes of improved efficiency or cost savings in education and training (Walsh, 2019). By analogy, e-learning interventions have been implemented in healthcare and healthcare professional education during the past two decades, and e-learning has

been “increasingly present in clinical settings for the continuing education of health professionals” (Fontaine et al., 2019, p. 1).

However, as an optional education solution before the COVID-19 pandemic in different sectors including healthcare, e-learning has been continuously and critically assessed in terms of its purpose, content, and outcomes with a focus on its cost-effectiveness and long-term implications. For example, Rouleau et al. (2019) state the notable influence of e-learning interventions on the reactions, knowledge, and skills of healthcare workers, though “the effectiveness of e-learning interventions in a continuing education context remains unknown” (p. 1), whereas Vaona et al. (2018) conclude that “e-learning may make little or no difference in patient outcomes or health professionals’ behaviors, skills or knowledge” and argue that “even if e-learning could be more successful than traditional learning in particular medical education settings, general claims of it as inherently more effective than traditional learning may be misleading” (p. 2). In this case, the conflicting evidence on the use and efficiency of e-learning in the education of healthcare practitioners has required subsequent growth of academic, practice-based, methodological, and conceptual insights for the specification and advancement of e-learning use in this sector.

COVID-19 Era of E-learning Use in Professional Education of Healthcare Providers

Nonetheless, the emergence of the global healthcare challenge in early 2020 has rapidly transformed the field of education and specifically continuous education of practitioners in multiple fields, including healthcare, causing the crisis-reactive and massive transition of education and learning from conventional face-to-face modalities into digital and online forms. While Regmi & Jones (2020) the relatively unchanged nature of medical education between

2010 and 2019 and the limited effects of the growing e-learning trend in this area, the COVID-19 pandemic has led to the recognition of e-learning as the central and mainstream dimension of educational systems since 2020 (Shah et al., 2020). The limitations of travel, commute, and corporate or educational interactions in an effort to mitigate the pandemic have jeopardized conventional education approaches with face-to-face communication, transferring education and learning into the online realm. With the progression of the pandemic, practically all CPE and continuing medical education (CME) activities and events have migrated into the online realm, though specific events could have been postponed or canceled (Shah et al., 2020).

Moreover, the rapidly expanded (and almost exclusive) application of e-learning in the education of medical students and professionals during the pandemic has generated robust evidence and practical implications with evident benefits and barriers that affect the experience of educators and learners or the dynamics in the healthcare sector. Shah et al. (2020) claim that the use, practicality, cost-effectiveness, and versatility or time-saving opportunities for clinicians are likely to maintain the significance and prevalence of e-learning during the post-COVID era. The scholars also state that the future of this approach in medical education can involve "a hybrid approach of blending digital with face-to-face experience" while requiring sufficient regulatory guidance for the creation of "safe, secure, and user-friendly" e-learning and digital communication solutions for healthcare practitioners (Shah et al., 2020, p. 1). Researchers also focus on the long-term implications of e-learning use among medical care providers during the current stage of the pandemic, which has lasted for over two years. Colaceci et al. (2020) display that while "an online approach to in-service education is effective at improving practices and attitudes" of healthcare providers in an immediate arrangement, further practice and research

interventions should focus on knowledge transition and retention among medical staff in long-term perspective (p. 254).

Overall, e-learning has demonstrated its role as a crucial transformative direction in medical education before and during the COVID-19 pandemic. Since the global healthcare crisis has substantially altered education and healthcare practices, transforming conventional face-to-face education models into remote learning solutions, policymakers, practitioners, and governments have prioritized e-learning as a strategy in continuing education for medical professionals (Valverde-Berrocoso et al., 2020). Digital learning options are an exceptionally relevant solution for healthcare sectors in LMICs, as local practitioners, authorities, or international entities encounter notable discrepancies in healthcare structures, health workforce shortages, and resource insufficiency, reinforced by the healthcare and social crisis of the COVID-19 pandemic. LMICs with limited resources and healthcare system capacity demonstrate inadequate adaptation to the COVID-19 outbreak burden and the simultaneous management of chronic non-communicable diseases, though various free digital instruments can inform appropriate e-learning interventions for the expansion of the critical healthcare workforce in low-resource settings (Kalaitzoglou et al., 2020; Nicolosi et al., 2018). The affordability and accessibility of digital medical education for healthcare providers have highlighted the relevance of these tools for capacity-building efforts in healthcare systems of low-resource countries. However, such interventions will require the detailed exploration of context-specific enabling and challenging factors that can affect the experience and efficiency in the implementation of e-learning solutions in LMIC contexts particularly.

Decolonizing Medical Education

The topic of decolonization in the education field represents the central issue concerning the adoption, transfer, implementation, or reforms in the educational practices of LMICs. The global health networks and medical education frameworks frequently "entail partnerships between institutions in low- and middle-income countries (LMICs) that were previously colonized and high-income countries (HICs) that were colonizers" (Eichbaum et al., 2020, p. 329). Eichbaum et al. (2020) also advocate the increasing awareness of the colonial legacy in global health education, which can be also characteristic of medical education systems in LMICs. Garba et al. (2021) report that the engagement of participants from LMICs or previously colonized settings in medical training is subject to challenges with funding, inability to take absences, lack of preparation, and disregard of mentors (p. 29). Medical educators, practitioners, institutions, and authorities should prioritize decolonization actions in the education field to shift the instructional approach towards equitable and effective development of professionals in low-resource settings.

Evidence from different LMIC contexts depicts the efforts that have contributed to decolonization practice in medical education. Lekhetho (2021) argues that significant education equity outcomes were attained in the Republic of South Africa through the implementation of indigenous languages to scaffold learning, the development of decolonization policies, and the use of technology to promote equity and access to medical education. The recent exploration of MOOC (massive open online course) use in Mexico also generates substantial insights into the necessity and practices concerning the decolonization of medical education. Olivares et al. (2021) report that e-learning can be an essential modality in medical education that can not only address education disruptions during the COVID-19 pandemic but also ensure expansive and

equitable access to medical training among diverse populations, accelerating curricula and instruction decolonization. With the existing shortage of educational interventions available in the medical training field, a MOOC can be a valuable solution for competence development with a flexible and autonomy-oriented learning approach accessible to multiple individuals (Olivares et al., 2021). In this case, the shift from face-to-face education with a physical presence on campuses of other sites to e-learning can foster beneficial decolonization dynamics for learners from LMICs, resulting in an accessible and collaborative medical education network.

Although the evidence on similar decolonizing processes in Ukrainian medical education is scarce, in 2018 the researcher herself developed research on the adaptation of the American e-learning course to the Ukrainian setting with my colleagues from Ukraine and the University of Washington, the U.S., which displayed relevant insights on decolonization progress and prospects in Ukraine. This analysis focused on the implementation of a fully online course on Leadership and Management in Health (LMiH) adapted from the U.S. model into the CME system of Ukraine, targeting this e-learning solution as the first similar educational intervention for Ukrainian healthcare providers. The lessons extracted from this experience resonate with the decolonization agenda for Ukrainian medical education, and authors of the paper, who have observed that effective use of foreign-development e-learning systems requires such steps as "1) using language conducive to your audience learning; 2) confirming that your audience can access the Internet and is computer literate; 3) making sure your audience is ready to accept the distance learning approach; 4) checking if similar online courses have already been made available; 5) e-learning being cost-effective even in resource-limited settings; 6) using local public figures as role models to make the course culturally relevant; and 7) having local partners taking ownership over and sustaining the course" (Downer et al., 2018, p. 9). The insights from this observation

include the necessity to ensure the representation of local voices in the design and implementation of an e-learning intervention as well as to enable consideration and modification of intervention content based on local context and healthcare history. Ultimately, decolonization is a fundamental topic in medical education of Ukraine which has been under the colonial rule of the Russian Empire and then within the inherently colonial structure of the Soviet Union, being currently affected by the regulatory, financial, and other efforts of high-income countries (HICs) in the European Union or the U.S. Decolonization of medical education and emerging e-learning systems in Ukraine will likely affect the application of e-learning solutions, as the inclusion, empowerment, and collaboration with local actors can serve as an enabling aspect to e-learning use among medical professionals of Ukraine, fostering equity, accessibility, and commitment to continuous improvements in Ukrainian medical education and practice.

Evidence on Enablers of E-learning Use in Education of Medical Practitioners

The utilization of e-learning systems in education of healthcare providers has been substantially explored during the previous decade, reflecting the boost in the application and analyses of such solutions in LMIC contexts during the pandemic. Researchers report the inadequacy of medical training among healthcare providers in low-resource countries and the potential of available e-learning options to address multiple challenges in healthcare sectors of LMICs, including the problematic healthcare dynamics in rural and suburban areas, which displays the significance of such interventions (Barteit et al., 2019; Hoedebecke et al., 2018). A recent study on the education of healthcare providers in Ireland (Republic of Ireland and Northern Ireland) also documents the existence of a sufficient evidence base on the benefits or disadvantageous implications of e-learning tools in medical education. According to Callinan

(2020), e-learning systems enable flexibility for healthcare practitioners with self-paced learning approach, while organizations can benefit from the data-managing and optimization capacities of digital learning solutions. However, the lack of technical expertise and individual learning styles can constitute a challenge to the effective application of these distance learning instruments in CPE of medical staff (p. 395).

Furthermore, the mentioned study of in-service education of healthcare providers in Ireland also generates relevant evidence on the enablers and barriers to e-learning use among healthcare workers working in palliative care. The results of this investigation with cross-sectional surveys illustrate that "dedicated time; quick technical and administrative support; computer training before completing an e-learning course; and regular contact with the tutor in online course work," as well as face-to-face instruction or hands-on training sessions significantly facilitate the engagement of healthcare providers in e-learning interventions (Callinan, 2020, p. 394). Another research with a systematic review of the factors affecting e-learning in health sciences education defines the possible enablers that affect the implementation and effectiveness of digital education for healthcare scholars and providers. These aspects include the quality and quantity of communication among learners and tutors, the motivations, attitudes, and expectations of learners, the technological characteristics of educational solutions, and pedagogical approaches utilized in e-learning frameworks (Regmi & Jones, 2020).

Other investigations also suggest that the advantageous integration of e-learning systems in professional medical education depends on improved infrastructure, financial support, and workplace policies that enable providers' engagement in these interventions without external limitations (Sarin-Gulian et al., 2021; Dele-Olowu, 2020). Specifically, the examination of distance learning initiatives in the LMIC context of Nigeria exhibits the potential of these

instruments and their role in the development of healthcare structures in low-resource environments. The affordability, flexibility, user-centeredness, and convenience of digital education models constitute an opportunity to confront increasing health inequities and service insufficiency during the COVID-19 pandemic in Nigeria (Dele-Olowu, 2020). While digital learning models represent a less expensive option for the healthcare sector than conventional in-person approaches, the analysis by Dele-Olowu (2020) demonstrates the necessity of financial resources for e-learning implementation as authorities should invest in the adequate design and integration of digital learning systems with the equitable distribution of devices and other resources.

A recent explanatory mixed-method study of enablers and barriers to e-learning among medical students during the COVID-19 pandemic also generates relevant insights into the factors of e-learning use in the healthcare sector. The scholars have evaluated the influence of device possession, Wi-Fi or mobile broadband coverage, and Internet speed on the capacity of students to effectively engage in digital learning from the quantitative perspective, conducting a survey at the Malaysian university (Roslan & Halim, 2021). The findings of the qualitative component of the study facilitate the development of a conceptual model with the enablers of digital learning among students. The authors of the research argue that self-regulation strategies and Internet connection at the students' level, teaching aids at the instructors' level, and competent technology departments, trainers, or infrastructure at the level of institutions significantly contribute to the success of digital learning initiatives (Roslan & Halim, 2021, p. 12). Hence, the adoption of digital learning tools in the CPE of healthcare practitioners in the medical systems of LMICs affected by the COVID-19 pandemic depends on a set of enabling factors at personal, institutional, and governmental levels.

The example of Armenia as an LMIC context displays another enabling determinant of distance learning use in the CPE of healthcare workers. The crucial aim of e-learning application in the Armenian medical field is consistency with European medical education and practice standards. Armenian healthcare providers, managers, and government officials articulate the need to harmonize the existing continuing medical education (CME) model with internationally accepted criteria of the European Accreditation Council for CME (EACCME), which includes the utilization of standardized medical education systems and E-Learning components (Chekijian et al., 2020). Such a focus on coherence with European professional frameworks during the development of e-learning interventions can originate in the geopolitical course of the state after the disintegration of the Soviet Union, which exceptionally resonates with the geopolitical goals and course of Ukraine. The recent observation also addresses the need for innovative interventions in the management of discrepancies and resource insufficiency given the constraints of the pandemic in Armenia (Chekijian et al., 2020). Armenian scientists note the relevance of standardization with accepted European CME systems in the use of distance learning approaches within the local medical education structure that reflect the enabling factors in the growing implementation of e-learning interventions in the state healthcare sector.

In sum, the examined body of literature on the factors that affect the application of e-learning solution in CPE of medical care providers, focused on LMICs exhibit the current progress in the utilization of digital learning instruments in the healthcare field and the impact of the COVID-19 pandemic on the described activities. Researchers continuously mention that availability of time, sufficient, technical and administrative support, access to infrastructure, appropriate learning approaches and user-centered design of e-learning instruments, as well as external requirements or norms facilitate the adoption of e-learning in medical education and

enhance the experiences of learners. Digital learning can address the implications of the crisis by providing healthcare providers with standardized, accessible, and efficient education options that do not require substantial investment solutions or time- and resource-intensive design and implementation procedures.

Evidence on Barriers to E-learning Use in Education of Medical Practitioners

Recent scientific explorations also indicate the limitations and challenges within the existing e-learning systems for healthcare workers. According to Barteit et al. (2020), the expansion of small-scale, short-termed, and localized pilot versions of e-learning solutions into standardized and comprehensive education models can alleviate shortages in healthcare workers and improve the capacity-building of medical care systems in LMICs. The explorations of African and Western Asian contexts focused on LMIC settings illustrate the similar barriers to the adoption of digital learning approaches in continuing medical education, which include technology and Internet access issues, power supply disruptions, or legislation and administrative challenges (Olum et al., 2020; Chekijian et al., 2020; Zalat et al., 2021).

Specifically, the analysis of distance learning interventions in the Armenian healthcare sector, which exemplifies an LMIC setting, displays the lack of time for e-learning practices among Armenian healthcare providers due to notable workload, exacerbated by the pandemic, and financial constraints related to the inadequate compensation rates to cover additional payments for external professional education services in Armenia as the critical constraints in e-learning use in the sector (Chekijian et al., 2020). Consistent with these findings, the author of the previously described study of in-service education of healthcare providers in Ireland also emphasizes the limited time as the critical barrier to using e-learning in CPE (Callinan, 2020, pp.

397). Healthcare practitioners from Ireland have reported a preference for face-to-face interaction integrated into the e-learning system, noted the challenge with remaining motivated to engage in e-learning, and mentioned that the insufficient computer skills, “lack of opportunity for impromptu engagement/group dialogue,” or “inability to ask questions” significantly hamper their participation and performance on e-learning systems (Callinan, 2020, pp. 397-398). The surveyed medical staff of the palliative care nursing department have also attributed the problems with the use of technologies to the “age thing,” suggesting that younger people grew up with modern technologies and older individuals are less familiar with such solutions, which challenges the use of e-learning systems among older healthcare providers (Callinan, 2020, p. 398).

Infrastructure deficiencies constitute another significant group of barriers to e-learning application in the healthcare structure of LMICs. Sarin-Gulian et al. (2021) state that technical issues with Internet connectivity and information technology, including inadequate Wi-Fi capacity for video-viewing and streaming purposes or the lack of available devices for the education of professionals in healthcare facilities, form substantial infrastructure limitations that inhibit efficient digital education programs in Armenia. Such a tendency resonates with the challenges in the Nigerian context, where the government focuses on the provision of equitable Internet access and device availability for healthcare providers involved in digital learning systems (Dele-Olowu, 2020). Moreover, Dele-Olowu (2020) argues that the government and facility managers should ensure appropriate infrastructure support, including device provision and enhanced interconnectivity, electricity, and Wi-Fi supply, to address the current challenges in online training for healthcare workers. Another mixed methods study on e-learning application among medical licentiate practitioners in Zambia identifies digital learning limitations in

resource-limited settings. The scientists propose that the existing e-learning solution in Zambia lacks multimedia materials that transfer skills, such as medical procedure visualization and interactive exercises while exhibiting the underused online e-learning possibility as opposed to offline digital learning through tablets (Barteit et al., 2018).

A recent study on e-learning use in medical education in India, one of the largest developing nations and examples of LMIC, addresses the fundamental barriers and prospects of further digital learning interventions. The research by Syed et al. (2021) has integrated a survey of healthcare and allied professionals in India who participated in e-learning activities during the pandemic for the identification of their experience, attitudes, and readiness concerning the implementation of such solutions in continuous education. The scholars accentuate that the lack of adequate infrastructure, including Internet connection or dedicated spaces and devices for the participation in e-learning, insufficient technical knowledge, and privacy concerns constitute the central barriers to the use of e-learning tools, although the participants have reported increased usage of e-learning platforms during the pandemic (Syed et al., 2021). This investigation also notes the discrepancy between the compulsory use of e-learning solutions for providers to ensure healthcare knowledge advancement and updates without the necessary infrastructure, technology, and learning support in the form of computer literacy training. Syed et al. (2021) argue that the trend of expanding e-learning use in education of healthcare practitioners is likely to persist after the pandemic, whereas governments, institutions, practitioners, and other stakeholders in LMIC environments should enable and advocate the creation of necessary regulatory provisions and increased learner support in the forms of infrastructural, technological, and learning assistance.

Overall, the reviewed literature represents the barriers to e-learning use in medical education for practitioners, focusing on LMIC contexts. The evidence from various countries reflects the existence of similar issues reported by scholars and practitioners in medical education that relate to excessive workload, lack of time, financial constraints, insufficient technological expertise, and infrastructure challenges, such as the lack of available devices in facilities or insufficient Internet connectivity. These barriers prevent optimized utilization of e-learning systems for the medical education of medical professionals. Therefore, the effective integration of e-learning systems in continuous medical education depends on improved infrastructure, financial support, regulatory frameworks, and workplace policies that enable providers' engagement in distance learning interventions.

Exploring Perceived Enablers and Barriers to E-learning in Education of Medical Practitioners

The body of located evidence on enablers and barriers in the application of e-learning in medical education integrates a field of studies on the perceptions of learners regarding digital education and its use in specific contexts. Meşe & Sevilen (2021) and Curelaru et al. (2022) present two recent observations concerning the student perspectives on online teaching and learning, focusing on the implications of the COVID-19 pandemic on the increasing use of e-learning mode instead of conventional face-to-face education. These studies address the ambiguous perceptions of learners regarding e-learning, as the scholars note the convenience of e-learning in terms of absence of commute and accessibility of educational content with the simultaneous concerns of students about the lack of social interaction and deficiencies in the delivery of learning materials (Meşe & Sevilen, 2021); Curelaru et al., 2022).

Other analytical resources describe the overall acceptance of e-learning solutions among learners with their perception of beneficial e-learning implications for education and personal experiences of students, which can be the perceived enabling factors in e-learning use. Curelaru et al. (2022) describe the adaptation of students to the novel educational dynamics shaped by the pandemic, suggest the positive aspects of e-learning articulated by students ("comfort and accessibility, economy (saving time and money), and psychological and medical safety"), and list a series of recommendations for e-learning improvement again noted by the respondents (enhanced leaner support, increased interactivity of the learning process, or changes in communication among tutors and learners) (pp. 8-11). Turkyilmaz et al. (2019) report that students prefer the blending of conventional face-to-face and e-learning modes while acknowledging the convenience and credibility of e-learning in medical education curricula. In a similar tendency, Khalil et al. (2020) claim that e-learning modality has been "well-received" by the students who note the "enhanced utility of time" with the engagement in e-learning while mentioning "methodological, content perception, technical, and behavioral challenges" associated with online course completion (p. 1). Thus, different research initiatives emphasize the convenience and accessibility of e-learning as the essential perspectives of learners on the beneficial or enabling factors in digital learning use.

However, some investigations also demonstrate a series of negative perspectives or perceived barriers to e-learning application in different educational contexts, including medical education. Curelaru et al. (2022) refer to students' views of e-learning as a phenomenon that can generate health and psychosocial problems (such as isolation) and learning challenges (such as disengagement or lack of feedback) for learners (p. 7). Syauqi et al. (2020) argue that students perceive e-learning as a less effective education mode imposed on them during the COVID-19

pandemic as compared to conventional face-to-face modality, whereas educators need to accommodate to novel e-learning requirement and trend by adjusting the design of educational activities, advancing the quality of learning materials, and ensuring the interactivity of the learning processes. Patricia Aguilera-Hermida (2020) and Ibrahim et al. (2021) articulate the moderate acceptance of digital learning and persistent preference of students regarding face-to-face learning over e-learning due to deficiencies in online course design, lack of interactions between tutors and students, or behavioral challenges that reflect to perceived negative aspects and barriers to the use of e-learning solutions.

The evidence on perceived enabling and challenging factors of e-learning use according to students from LMIC settings also constitutes the background for this research study in Ukraine, which is a LMIC. A study from Pakistan displays the limited acceptance of digital learning in the medical education system of the country, as students demonstrate the preference of face-to-face learning due to low online teaching and learning quality (Abbasi et al., 2020b). In a cross-country comparison of learner perspectives on e-learning, Abbasi et al. (2020a) demonstrate that students from developed states were more satisfied with e-learning solutions than learners from developing nations, while students from developing contexts frequently noted Internet connectivity, device availability, and instructional design as central challenges they experience with e-learning. Żammit (2021) also refers to the segregation of learners who engage in e-learning "with respect to access to the Internet, computers and basic IT skills," which can be attributable to low-resource social contexts of one's origins (p. 94). In this case, LMIC contexts belong to the essential factors that shape the application of e-learning and perspectives of students regarding the use of e-learning in education.

Although the mentioned scientific investigations have focused on perceptions of students with e-learning, limited set of sources covered the experiences of adult learners with e-learning mode in professional education, especially medical education. Curran et al. (2019) describe the investigation of adult learners' perspectives on e-learning in CPE activities of medical professionals, noting the perceived benefits of this learning mode as well as barriers to attaining preferred performance levels. Diep et al. (2019) also articulate the needs of adult learners in online and blended modalities without a focus on professional medical education. Han et al. (2021) report the ambiguous quality and implications of e-learning experiences for adult students associated with the lack of instructional and interpersonal support of learners in e-learning systems during the pandemic. Żammit (2021) suggests that adult learners express the perceived convenience and relevance of e-learning for embracing preferred lifestyles and commitments, whereas some adults note personal commitments, financial issues, and Internet connectivity or absence of an appropriate device as factors that hamper their performance in e-learning (pp. 87, 93). In this case, the analysis of context-specific enablers and barriers to e-learning use in CPE of medical practitioners during this study will contribute to the body of literature on the experiences of adult learners with e-learning solutions within the LMIC settings.

The examined scholarly evidence indicates that the effective integration of e-learning systems in professional medical education depends on improved infrastructure, financial support, and workplace policies that enable providers' engagement in these interventions without external limitations. The review of scientific evidence on e-learning in the recent decade demonstrates that the body of literature in this field comprises "a more concentrated focus on the learner domain including engagement and learner characteristics with more limited attention to topics pertaining to the classroom or organizational level" (Martin et al., 2020, p. 13). Hence, the

essential contribution of this project will include the generation of implications for the enhancement of e-learning interventions in Ukraine and displaying improvement opportunities for education of medical care practitioners at the personal and institutional levels in Ukraine and potentially other LMIC environments.

The Impact of COVID-19 on E-learning Use in Medical Education

The COVID-19 pandemic has substantially affected education worldwide, including the medical education field with undergraduate and postgraduate dimensions. The global healthcare crisis and its multiple implications on social, political, and economic processes have disrupted education continuity, required the adoption of novel education solutions, and initiated long-term transformations in education and learning practices of students and practitioners in diverse areas of the world, particularly affecting LMIC contexts with limited resources for educational changes (Singh et al., 2021). The recent body of research regarding the effects of the pandemic on medical education frequently focuses on the undergraduate medical education sphere, addressing the feasibility of emerging e-learning solutions for education continuity, related instructional methods that should facilitate e-learning use in the defined environments, and perceptions of learners and instructors concerning e-learning applications (Kaur et al., 2020; Singh et al., 2021). The studies on e-learning systems in undergraduate medical education accentuate the role of learners' readiness and expertise in the use of these solutions, regulatory support in the form of policies from institutions and governments, feedback mechanisms, and financial aid for the effective application of e-learning practices in LMICs during the COVID-19 pandemic (Kaur et al., 2020; Singh et al., 2021). Since the pandemic has caused an abrupt transition to e-learning without additional preparation for tutors and students, the researchers

emphasize the necessity to conduct training sessions for all stakeholders on the usage of e-learning tools and practices, suggesting the significant potential of blended learning schemes with online and offline (downloadable) components for the improved application of e-learning solutions in undergraduate medical education within low-resource settings (Olum et al., 2020).

However, recent evidence does not include multiple focused explorations of e-learning use in the medical education of in-service healthcare workers during the pandemic. While the body of literature in the addressed sphere typically integrates surveys and overviews of undergraduate education dynamics affected by the global crisis, limited evidence covers the use of e-learning in CME or professional training of medical care providers. Hayat et al. (2021) note the exceptional opportunities and challenges posed by the COVID-19 pandemic for medical students and in-service providers, claiming the broad and long-lasting effects of the pandemic on medical education with the opportunities of increased learning autonomy, education continuity, or monitoring of learning on e-learning systems and the barriers of limited interactions, infrastructure deficiencies, and time constraints that shape the application of e-learning in CME of medical professionals during the pandemic. Although Tang et al. (2020) reported the lack of evidence for the evaluation of innovative educational curricula and e-learning applications in CME, Ish et al. (2022) propose the Changes in Old teaching methods with the adaptation of Virtual Innovative methods for Doctors training (COVID) e-learning strategy that should promote the integration of e-learning for CME in the medical community (pp. 118-119). Ish et al. (2022) also note that the actions to mitigate the disrupting influence of the pandemic on medical education will include the implementation of e-learning in the firm of lifestyle for healthcare workers to ensure deep and continuing learning, multidisciplinary participation, alleviate barriers to education, and promote "sustainable academia" framework (McMahon et al., 2021, p. 735).

The impact of the COVID-19 pandemic on e-learning in medical education in the research setting for this study, Ukraine, has been substantially documented in undergraduate learning contexts without the available evidence on such practices in postgraduate CME environments. Tsekhmister et al. (2021), Shevchenko et al., 2021), and Odintsova et al. (2022) develop explorations on the use of e-learning in medical education of undergraduate university students during the pandemic, suggesting that e-learning can be a viable instrument for education continuity and stability in Ukraine despite the disruptions associated with the global healthcare crisis, though the inability to adapt to rapid transformations of the education domain, the lack of technical expertise among learners and tutors, or the lack of practical components and interactions with patients in online training can impede the adoption of e-learning in Ukrainian medical education. The virtual absence of located scientific analyses on the COVID-19 impacts on e-learning use in medical education of in-service healthcare workers demonstrates the relevance and novelty of expected research findings from this study. Hence, this study will address the gap in the literature on the context-specific implications of the pandemic on the application of e-learning in the medical education of healthcare providers in Ukraine, generating evidence for the improved use of these technological solutions in the CME of care providers in other LMIC contexts.

Medical Education in Ukraine: National Study Context

The research setting of Ukraine exemplifies the low- and middle-income country (LMIC) with the developing economy and healthcare sectors, which operate in the social and cultural domain of European states and cultural framework. Consistent with the worldwide and European trends of e-learning applications in education, specifically the education and training of

healthcare workers, the Ukrainian government and practitioners have implemented different e-learning solutions in various spheres during the previous decade. For instance, in recent explorations, Bobrytska et al. (2020) address the use of e-learning courses in Ukrainian higher education, and Falfushynska et al. (2021) focus on e-learning as a strengthening factor for conventional higher education practices in Ukrainian pedagogical universities. Bilotserkovets & Gubina (2019), Kulichenko & Polyezhayev (2020), and Khomik et al. (2021) also focus on e-learning applications in Ukrainian higher education institutions. Grynyuk et al. (2022) provide an analysis of distance learning use in Ukrainian higher education during the COVID-19 academic, emphasizing the crucial transformations in education due to social distancing measures and the status of distance learning as a priority for the continuity of education. This research notes the acute challenges in education that emerged with the global healthcare crisis and envisages the opportunities for alleviation and sustainability of e-learning after the pandemic.

The studies by Isayeva et al. (2020) and Mahrlamova & Chabanovych (2021) describe the use of blended learning initiatives in medical education within Ukraine. The explorations focus on the undergraduate medical education system in Ukraine and accentuate the role of blended learning with e-learning components as the essential aspect of contemporary education. The existing evidence on graduate or in-service medical education of healthcare providers is the article of the researcher's co-authorship on the e-learning course adaptation within the continuing medical education system in Ukraine. The article by Downer et al. (2018) presents the case of e-learning implementation for CME of medical practitioners before the pandemic that generates significant insights into e-learning application in this context, focusing on the strategies and challenges to launch such solutions in the LMIC context. In this investigation, the researcher with her co-authors anticipated the expansion of the continuous education sphere for medical

practitioners in Ukraine with e-learning instruments and argued that consolidation of "key stakeholders, national level support, and technical assistance" should facilitate the localization and adaptation of existing e-learning solutions to the LMIC setting of Ukraine (Downer et al., 2018, p. 1). However, this work does not address the rapid changes and opportunities or challenges regarding e-learning use in CPE of healthcare workers in Ukraine during the COVID-19 pandemic.

Ukraine has been massively affected by the COVID-19 pandemic and the invasion of the Russian Federation with the assault on its sovereignty during the past years and specifically since the beginning of 2022, which caused notable disruptions in multiple social areas. As Ukraine is currently in the middle of a large-scale war launched by the Russian Federation, the confrontation poses significant public health, economic, humanitarian, and social burdens on Ukrainian society, exacerbating the challenging impact of the COVID-19 pandemic on healthcare provision and education of the medical workforce (Alnahhas et al., 2022; Shushkevich, 2022). Existing scholarly literature has partially addressed the determinants of digital learning use in CPE of medical staff in other countries without a focus on Ukraine, though more recent examinations, such as Alnahhas et al. (2022) or Shushkevich (2022), display the challenges associated with the pandemic and the Russian-Ukrainian war in the Ukrainian healthcare sector. Matviichuk et al. (2022) also focus on e-learning practices in Ukraine during wartime, stating the "urgent need for training experience, organization, and implementation" of e-learning interventions to ensure education continuity despite the adverse dynamics due to the Russian invasion of Ukraine. The authors address the potential factors or sources of challenges with the implementation of innovative learning solutions during the war, accentuating the impact

of resource limitations and time constraints that impede the capacity of educators to fully employ the potential of e-learning activities.

This review of evidence on the national experience in the implementation of e-learning tools for CPE of healthcare practitioners in Ukraine encapsulates the significance and relevance of the study. The located resources in the Ukrainian context primarily focus on e-learning use in the higher education field in Ukraine, suggesting an analytical perspective on distance learning in medical education, yet, within the undergraduate framework. There is an evident lack of data on in-service education of medical care providers in Ukraine and the implementation of e-learning in this environment, specifically affected by the COVID-19 pandemic. Hence, this dissertation will aim to address the gap in the current body of knowledge and scientific evidence on the context-related enablers and barriers to e-learning use in CPE of in-service healthcare providers affected by the COVID-19 pandemic in Ukraine, which exemplifies a LMIC setting. The identification of context-specific and unique factors that shape the experience of healthcare workers and other actors with e-learning in Ukraine will possibly facilitate the alleviation of emerging challenges with this practice and capitalization on the opportunities related to enhanced digital learning use in Ukraine. This study is ultimately expected to create additional knowledge that could assist practitioners in the field of CPE of healthcare workers as well as policymakers and funders seeking to advance different modalities of virtual learning in LMICs, particularly within the area of adult professional/continuing education within the healthcare sector.

Since the emergence of the idea for this research project occurred before the Russian invasion of Ukraine, the essential emphasis of this study was anticipated to be on the influence of the COVID-19 pandemic on e-learning use in the CPE of healthcare workers. Nevertheless, the outbreak of large-scale war in Ukraine in February 2022 has affected the lives of millions of

Ukrainians, altering the plan for and perspective on this study. The timeframe of this research and the constraints of the case study include the period of the COVID-19 pandemic, though it is impossible to separate the experience of learners and experts associated with the pandemic from the war during the past three years. This investigation will concentrate on the experience of e-learning use for in-service education of healthcare providers during the pandemic, acknowledging the complex burdens and changes in care provision and professional education associated with the war in Ukraine. The unique context of Ukraine as an example of a LMIC shapes the experience of Ukrainian healthcare workers with e-learning in their CPE, and the outbreak of the large-scale war in this country in the midst of the COVID-19 pandemic further specifies and complicates the mentioned experience, the expected outcomes of this research, and the comprehension of e-learning use during the pandemic in Ukraine.

Conclusion

The review of existing scholarly evidence regarding the conceptual framework and experience of e-learning use in continuing medical education exhibits the considerable focus of researchers and practitioners on the growth and expansion of e-learning terminology and related interventions. The examined evidence situates the current research within the network of definitions, rationales, explanations, and approaches associated with e-learning use in CPE of medical care providers, conceptualizing essential phenomena. The body of recent studies on the experience of e-learning use explored in this chapter indicates that the characterization of context-specific enablers and barriers to e-learning application in the CPE of healthcare workers belongs to the priorities of researchers and practitioners involved in the capacity-building of healthcare systems in LMICs. The review of context and literature has refined the problem for

this study, crystalizing the scope of this research to the feasible analysis of enabling and challenging factors in e-learning application among healthcare providers in Ukraine. In this case, the focus of this empirical study on Ukraine as an example of the LMIC environment can generate relevant insights into the digital learning use for adult education in a low-resource country during the COVID-19 pandemic.

The evident lack of recent and relevant scientific literature on the use of e-learning solutions for in-service education of healthcare workers in Ukraine displays the gap in the body of evidence that this dissertation will address. This research on enablers and barriers to e-learning use in CPE of healthcare staff in the LMIC context of Ukraine as well as the publication of its findings can inform the efforts related to the mitigation of barriers encountered by healthcare providers and institutions in other settings. The fundamental goal of this research project is to inform the development of e-learning systems and interventions for healthcare practitioners and promote care and education continuity during the global healthcare crisis and the ongoing war in Ukraine. Moreover, the findings of this investigation based on the review of context and literature in this chapter can ultimately contribute to effective involvement of healthcare workers in e-learning with the consolidation of stakeholders for the advancement of e-learning course designs, advocacy of changes in institution-level policies that affect digital learning, and development of a wide variety of e-learning products to address emerging needs of providers in LMICs affected by the COVID-19 pandemic.

CHAPTER 3: METHODOLOGY AND PROCEDURES

Introduction

A qualitative research approach was used to explore the perceived enablers and barriers that influence e-learning application in CPE of medical care providers during the COVID-19 pandemic as well to develop a set of recommendations on possible improvements in the described practice in Ukraine. The researcher identified and analyzed the perceptions, personal experiences, views, and beliefs of adult learners who engaged in e-learning through the e-learning Platform for healthcare providers in Ukraine, applying a prism of qualitative research methodology detailed in this Chapter. Stake defines qualitative research as "experiential, using personal judgement as the main basis for assertions about how something works" (1995, p. 61), which fully resonates with the purpose of this study. This research integrated the exploratory single-case study design with the focus on the case of the Public Health Center (PHC) online Continuous Professional Education (CPE) Platform of the Ministry of Health (MoH) of Ukraine.

Definition and Rationale for Qualitative Methods

Yin (2014) describes the case study format as an empirical research method that "investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (p. 45). Yin (2014) also labels case study "as one of the five major types of qualitative research," referring to the practice of case studies as of frequently used and acceptable forms of qualitative observation, though case studies may be viewed as a separate research approach from the qualitative format with distinctive research procedures and historical perspective (p. 25).

Yin (2014) offers a set of possible rationales for selecting a single-case case study design, including the analysis of critical, unusual, common, revelatory, or longitudinal cases (p. 84). Considering the characteristics and contextual factors observed in the identified case of the PHC e-learning Platform, which would be further articulated in the next section of this Chapter, this e-learning system constitutes a critical case for the theory advancement in the field of e-learning use in adult professional education. The Platform represents a novel and unique fully formalized and digitalized CPE solution in Ukraine, and the analysis of perceived enablers and barriers to its use among adult learners in this study will generate critical evidence for the verification of existing assumptions about factors that affect e-learning use among adults and extending the theory towards the application of similar learning mode and system in LMIC contexts, exemplified by Ukraine.

While this study will focus on the Ukrainian-language e-learning platform and online courses offered in Ukrainian, the research materials, protocols, tools, and interviews were completed in English. Additionally, the focus of this research is on the two specific online courses on the Platform, “AstraZeneca COVID-19 Vaccination” and “COVID-19 Vaccination,” completed by learners between 2020 and 2022. Such selection occurred based on the consultation and the recommendations of the Head of the Department of Training Programs at the PHC of Ukrainian MoH. The total number of such individuals, who took the two selected courses within the given timeframe, mounts up to 26,426 persons. Further justification regarding the selection of these courses can be found later in this Chapter under the Description of courses on PHC Platform section.

The investigation of the selected case is bounded in time with the primary focus on the experiences of adult learners who took the chosen two online courses in the period of 2020-2022.

Both courses include 4 up to 16 academic hours, and learners could have completed them without time restrictions during the time of course availability on the Platform. Expanded description of the courses can be found further in this Chapter under the Description of courses on PHC Platform section. Although both courses were published on the Platform in 2021, the timeframe for this investigation includes three years – 2020, 2021, and 2022. The researcher aimed to gauge the experiences of healthcare providers not only with the identified courses but also with e-learning during the pandemic (since the beginning of 2020) in general, assuming that the start of the pandemic in 2020 and related shifts in the field of education could have affected the experience of informants with offline and online training. The focus on the identified period enables the researcher to frame learners' experiences in line with the COVID-19 pandemic timing and seek their reflections on how the latter influenced their learning experiences and their perceptions of enablers and barriers in their online training based on the case of the PHC Platform.

Therefore, the qualitative single-case case study design is a suitable solution for this dissertation project seeking to explore in depth a multitude of data related to individuals' experiences of adult learners as a real-life phenomenon in a single, bounded context (Creswell, 2013; Yin, 2014; Stake, 1995). The case study format is a practical framework for this study concerning the stated research focus and questions. The case study design enabled the detailed exploration of the PHC Platform as the novel formal and fully digitalized CPE instrument for healthcare providers in Ukraine. The qualitative data collected will contribute to the particularization of the case and the in-depth analysis of the process and outcomes of e-learning at the specified site in Ukraine.

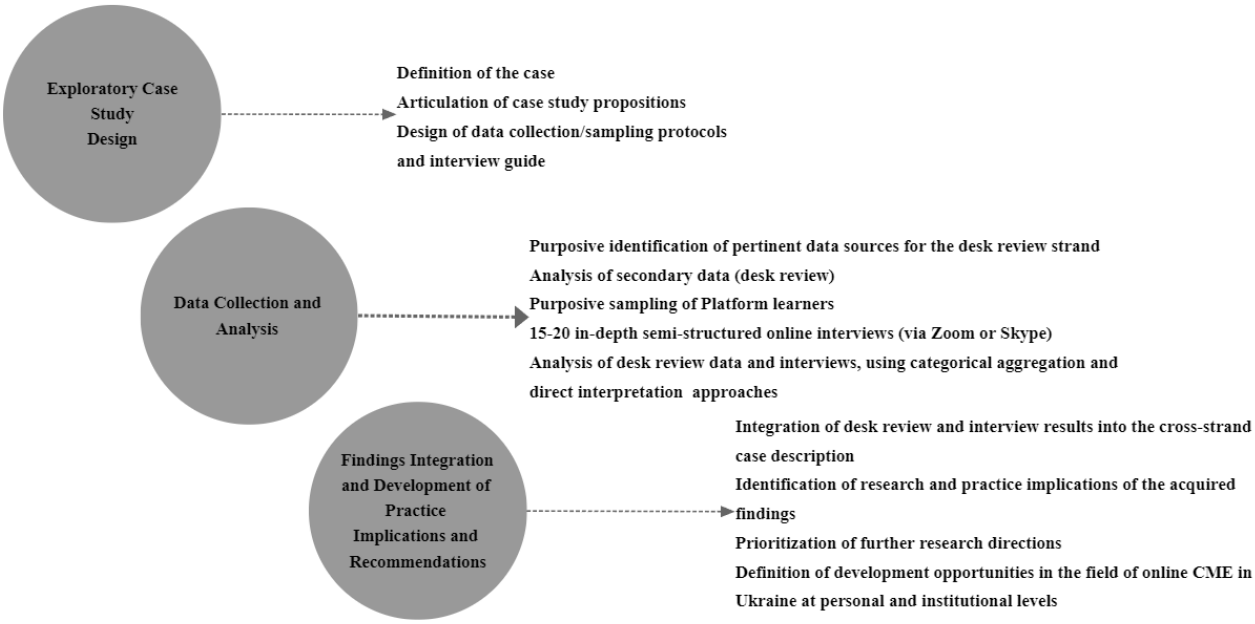
Study Design

The methodological framework in this project is a qualitative exploratory single-case study, which is a limited-scope qualitative research (the study with clearly defined boundaries and in which "findings will be limited to a more specific population") (Tracy, 2019, p. 174). The methodology of this dissertation project is situated in the epistemological viewpoints of constructivism and pragmatism. These paradigms emphasize the simultaneous creation of perceptions during the interactions among the researcher, informants, the case, and its context, as well as the practical orientation of the investigation on the identification of implications for further theory advancement and practice improvements (Chuang, 2021; Wang et al., 2020). In the case of this study, the focus is on the identification of directions to optimize the e-learning system in Ukraine. The described epistemological positions ensure the definition and assessment of multiple views and perspectives on e-learning use in CPE of healthcare providers as well as the identification of practical recommendations and improvement opportunities that can guide the application of e-learning solutions in adult education in Ukraine and other contexts.

The methodology of this project is also rooted in the procedural framework of qualitative case study reporting proposed by Baxter and Jack (2015), which integrates the components of case definition, case study propositions, data sources/collection, data analysis, and strategies to ensure project trustworthiness (validity). This case study was bound within the fundamental dimensions of the context, place, time, and activity presented in the following statement: the experience with the use of two selected online courses (activity) on the PHC Platform (place) in within the CME system in Ukraine (context) between 2020 and 2022 (time) (Yazan, 2015).

Overall, the research design in this dissertation project followed the qualitative single-case study model that enabled the concentrated, single inquiry, and holistic investigation of the case entirety (Yazan, 2015), being summarized in the Figure 1 below.

Figure 1. Qualitative Exploratory Single-Case Study of the CPE Platform, Flow Chart.



The analysis of learners' perceptions on enablers and barriers to e-learning use and patterns of e-learning in CPE in Ukraine during the pandemic can generate significant evidence on the discussed processes beyond the aggregate data on e-learning (Barbazza et al., 2021). The qualitative single-case methodology of this inquiry reflects the essential benefit the case study design, which is the "applicability to human situations and contemporary contexts of real life" (Quintão et al., 2020, p. 276). The qualitative findings align with the intended purpose of this research to identify perspectives on enablers and barriers to e-learning use among healthcare workers and develop an actionable plan for the improvement of e-learning practice and decision-making in Ukrainian CPE of medical care providers currently affected by the pandemic and the Russian war against Ukrainian nation.

More detailed study process with specific timelines is outlined in the Table 4 below.

Table 4. Study Flow and Timeline.

Month(s)	Activity
February 2023	Application for the IRB approval submitted to the University of Illinois Urbana-Champaign
March - April 2023	IRB approval is received from the University of Illinois Urbana-Champaign
April 2023	Research Proposal is reviewed and approved by the Dissertation Committee
April-May 2023	Desk review of the retrospective data from the Online Platform of the PHC of the MoH, PHC's program, annual and other reports and information notes conducted. Recruitment of participants
May 2023	15 in-depth semi-structured interviews conducted, data transcribed, coded, and analyzed
June 2023	Preliminary analysis with recommendations for online Platform and online training improvement and review with the Academic Advisor and the PHC of the MoH prepared
June-July-August 2023	Final analysis prepared and integrated into the dissertation manuscript, final version of the manuscript is disseminated to all stakeholders (the University of Illinois Urbana-Champaign, the PHC of the MoH of Ukraine) for final review
September-October 2023	Final findings presented to the PHC of the Ministry of Health of Ukraine and prepared for dissertation defense/the dissertation is defended, using the findings, at the University of Illinois Urbana-Champaign in partial fulfillment of the requirements for the EdD degree

Case Definition

In this research, the case represents the Public Health Center (PHC) online Continuing Professional Education (CPE) Platform of the Ministry of Health (MoH) of Ukraine utilized for the continuing professional education of public health practitioners in Ukraine. The Platform represents a unique and novel e-learning solution that enables fully online formalized CPE of medical care providers. This e-learning system is currently a governmentally-approved and managed CPD instrument that offers educational courses in online mode and relevant governmentally-required certification for all medical practitioners in Ukraine. The factors of the Platform's uniqueness, novelty, and related unpredictability of the environment, where the tool is

currently adopted, justify the selection of the case study format for the investigation of this site (Albright et al., 1998). The influences of the Platform on the CPE of healthcare providers constitute a complex issue, whereas the LMIC environment of Ukraine, aggravated by the challenges of the COVID-19 pandemic and ongoing war, launched by the Russian Federation against Ukraine, form an inherently complex and unpredictable context. Thus, the case reflects a real-world phenomenon of digital education system applied for CPE of medical care providers in Ukraine, where the particular contextual conditions pertinent to the case such as COVID-19 pandemic, war launched by the Russian Federation against Ukraine, and formalization of online CPE in medical field, significantly shape the dynamics of its use by adult learners/healthcare workers. The location of the case in this project is Ukraine, a LMIC in Eastern Europe. This dissertation will focus on two online courses on the Platform, "AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination," considering the feasibility measures and specification aims developed by the researcher.

This case study focuses on the period between 2020 and 2022, covering the emergence of the pandemic in 2020 and the Russian invasion of Ukraine in 2022. The selected case highlights the experiences of adult learners, who took the chosen two online courses and generally engaged in e-learning practice between 2020 and 2022. The author of this dissertation project purposefully selected 15 users of the Platform who had enrolled in both of the two courses - "AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination" - between 2020-2022. The sample for the qualitative data collection in this study includes healthcare providers, who are registered users of the PHC Platform and possess the qualification of in-service healthcare practitioners, including medical doctors, nurses, and physician or nurse assistants. The criteria

for purposive respondent sampling and sampling procedures are further articulated in the next sections of this chapter.

Study Setting

The current investigation of the perceived experience with e-learning of healthcare providers in Ukraine is situated within the social and legal context of adult education and postgraduate education of Ukrainian medical practitioners. *The Law of Ukraine on Education* with *Article 18. Adult Education* defines postgraduate education (PGE) as the acquisition of new or improvement of existing competencies based on earlier education and continuous professional development (CPD) as education for advancement of professional competencies of a specialist after the completion of higher and/or postgraduate education (The Verkhovna Rada of Ukraine, 2017). Ukrainian law currently focuses on CPD as the central concept of post-graduate education and professional advancement among medical practitioners.

CPD of healthcare providers is further regulated by the 2019 Order No. 446 of the MoH labeled "*On Some Issues of Continuous Professional Development of Medical Doctors*." According to this order, medical doctors should accumulate credits or CPD points via a range of formal, non-formal, and informal educational events or practices within a five-year cycle (The Ministry of Health of Ukraine, 2019). The implementation of this order has been a significant factor in the development of the PHC Platform because it prompted the legal recognition of online training done via e-learning as the base for the formal accreditation and assignment of medical category for healthcare practitioners in Ukraine.

The 2018 Decree of the Cabinet of Ministers No. 302 labeled "*On Approval of Regulation on System of Continuous Professional Development of Professionals in Public*

Health" is another component of the regulatory setting regarding CPD of healthcare providers in Ukraine. According to this Decree, CPD training providers in healthcare can include CPD academies or CPD departments of medical universities, as well as the MoH, Public Health Departments of regional and municipal administrations, scientific organizations, higher education institutions, CPD institutions, professional councils, professional associations, nonprofit organizations (NGOs), international organizations, international professional associations and their offices in Ukraine, Ukrainian enterprises, and other organizations (The Cabinet of Ministers of Ukraine, 2018). This rule also specifies the procedure for the registration of CPD providers and ensures surveillance of their activities in the national field of medical CPD.

The described state law, the Order of the MoH, and the Decree of the Cabinet of Ministers with related changes in the field affected the perceptions of healthcare workers regarding online courses, as reported by the PHC representatives. The perspectives of medical personnel shifted from viewing e-learning as a way of self-development or individual intellectual exercise to e-learning as a part of formal educational process. During the initial period after the implementation of the mentioned orders and rules, the state and the MoH did not impose multiple requirements or restrictions on e-learning for CPD of healthcare providers, which enabled the rapid expansion and development of e-learning solutions.

However, later the state and other regulatory entities, such as MoH, proceeded to developing restrictions on CPD methods and e-learning implementation among medical practitioners. The mentioned Decree of the Cabinet of Ministers No. 302 "*On Approval of Regulation on System of Continuous Professional Development of Professionals in Public Health*" delineates the process of collecting CPD points for healthcare providers, requiring each

practitioner to develop a 5-year CPD portfolio with the results of regular attestation to obtain a license or obtain/extend their qualification category, in which at least 50 CPD points should be collected annually to maintain their certification and meet CPD goals (The Cabinet of Ministers of Ukraine, 2018). Additionally, out of each 50 points achieved a year, at least 42 points should come from training within their specific specialty field and only 8 points can be acquired through training in other specialties (The Cabinet of Ministers of Ukraine, 2018). A personal educational portfolio with the results of CPD is created by each healthcare provider, practitioners manage the record of their CPD points themselves and these portfolios are then certified by their employers at the workplace.

The COVID-19 pandemic and the war with the Russian Federation have substantially impacted the regulatory setting and the CPD practice in Ukraine. Previously, a restriction regarding the number of points collected annually during online and offline training events was placed on the CPD of healthcare workers. For instance, according to the PHC representative, before 2020, the regulatory bodies required healthcare providers to accumulate their 50 annual CPD points with only 10 points attending online training, and the majority (40 points) could be collected exclusively during offline events. Nonetheless, since 2020 this restriction has been lifted, allowing healthcare workers to accumulate 50 points a year selecting the format of training of their choice. The PHC representatives note that this change was a substantial factor contributing to full-fledged functioning of the Platform. Restrictions on the share of CPD points for online and offline training do not apply to the required annual minimum of points collected until 2024 (Ukrainian Association of Ambulatory Physicians, 2022). In this case, healthcare providers in Ukraine can attend both in-person and e-learning training events without any limits on the share of each training format they should complete for certification acquisition or renewal.

The war between the Russian Federation and Ukraine also impacted the requirements regarding the number of CPD points that should be collected by each healthcare provider annually. The recent edition of the Order No. 446 of the MoH of Ukraine delineates the required number of CPD points to be accumulated annually during the period of war and martial law (The Ministry of Health of Ukraine, 2019). In 2022, at least 100 continuous professional development points obtained during the two years of 2020 and 2021 must be submitted for certification, and during 2023, at least 100 CPD points obtained in 2020, 2021 and CPD points obtained in 2022 must be submitted for certification, meaning that the minimum number of CPD points accumulated for 2022 is not specified in the rule (Ukrainian Association of Ambulatory Physicians, 2022). In this case, the healthcare providers were not obliged to submit at least 50 CPD points collected during 2022, when the Russian Federation launched the large-scale invasion into Ukraine. In 2024, at least 50 CPD points obtained in 2022, 2023 must be submitted for certification, which lowers the requirement concerning CPD points accumulated in 2022-2023 from 50 to 25 points a year (Ukrainian Association of Ambulatory Physicians, 2022). This change implies the lifted requirement to accumulate 50 points annually for the CPD of healthcare providers in Ukraine, attempting to ease the burden of war on these practitioners. The fluctuation in the regulatory climate regarding the share of CPD points that could be acquired through e-learning and the number of points required to be collected annually due to the COVID-19 pandemic and the war are reported as a challenge in e-learning field by the PHC representatives. The rapid normative changes between 2020 and 2022 illustrate relatively unstable regulatory environment, which can generate confusion among healthcare providers and potentially constitute a barrier to the use of e-learning solutions in their CPD.

Additionally, the PHC representatives have articulated a set of other current challenges associated with the regulatory settings for e-learning application in CPD of healthcare workers. Although the described orders and decrees were designed to specify the requirements and processes related to the transition of CPD record-keeping into electronic format, some CPD providers and regulatory agencies still manage data manually or in Google Forms, which are the unsafe and inefficient solutions to store information on healthcare workers, their personal data, or their educational performance. Other issues in the contemporary Ukrainian medical CPD sphere include the possible commercial interest of the pharmacological companies that developed different online courses, the absence of national academic integrity management and plagiarism control mechanisms, limited oversight of training providers. In contrast to the mentioned lack of regulatory tools, the PHC representatives note the excessive regulation in specific areas of e-learning field, as CPD provider registration procedure can be complicated in terms of documentation required to acquire the status of CPD providers and internal regulations that affect registration process.

The PHC, as an institutional part/agency of the MoH, attempts to address the described issues by establishing internal quality assurance procedures for e-learning. The implementation of relevant orders and decrees through cooperation among the government, the PHC, and other experts contribute to institutionalization of e-learning as the critical mode for CPD continuity in Ukraine. The online mode is currently recognized as full-featured training format not only for quarantine period during the pandemic but also as an accepted mode for CPD of healthcare workers. However, the regulatory climate related to e-learning and its use in CPD of healthcare workers is notably unstable in Ukraine due to the COVID-19 pandemic and the ongoing war.

These are the key factors that shape the institutional development of the Platform as a component of the formal postgraduate medical education.

The PHC Online CPE Platform (the Platform)

The PHC Platform emerged in 2017 as an informal educational resource and an additional tool in the system of medical professional development for healthcare practitioners in Ukraine. The Platform initially contained training programs on human immunodeficiency virus (HIV) and tuberculosis (TB), while the Ukrainian MoH prioritized offline training sessions and thematic advanced training programs implemented together with the medical postgraduate education institutes. The following description of the Platform is derived from the extensive discussions and consultations with the PHC specialists, specifically in the Department of Development of Educational Programs and Professional Competencies.

From the technical perspective, the Platform contains an open code that is delivered through the EdX script which is free of charge and accessible for anyone to download. Nonetheless, the specifics of this script involve its complexity, and the use of a basic package will require substantial customization. The development of the Platform with the EdX script since 2017 has integrated three deployment stages. The first stage was primary deployment, when all needs for Platform functionality were covered by the basic EdX package. The second stage included further elaboration of the primary settings, yet the Platform was still based on the basic EdX package without any additional functions. The third stage entailed a transition from the basic EdX package to the landing mechanism implemented in cooperation with the World Health Organization (WHO) specialists in 2021. In the period from September 2021 till February 2022, the PHC integrated several services to the Platform in cooperation with the WHO. First,

the Platform currently comprises a full-featured interface for online courses, a storage of educational materials adopted by WHO, and a schedule of events linked to the PHC internal system. The Platform is currently an independent resource that can be used without any additional communication efforts and is managed by the PHC of the Ukrainian MoH.

Given the described technical background of the Platform, its current functioning does not require extensive financing except for server operation maintenance and the work of technical professionals who maintain the operations of the Platform. The technical assistance (TA) expenses are covered by the financial projects from the Global Fund to AIDS, Malaria, and Tuberculosis (GFATM) and the U.S. government, particularly the Centers for Disease Control and Prevention (CDC). The PHC also acquires some funding to sustain the Platform from the Ukrainian state budget as a state agency under the MoH. TA projects facilitate course development and the Platform's maintenance. The PHC also cooperates with different program offices, including WHO or CDC, on HIV treatment, TB treatment, substitution maintenance therapy, as well as regional development programs. These offices develop and disseminate program tasks and targets, which can be, for example, the decrease of disease incidence or the increase in health service coverage, and the online courses are well fitted into the achievement of these goals. The PHC Platform not only ensures training for health workers to increase their knowledge in specific topics in short-term manner but also advances their expertise during online training to strengthen their capacity for the achievement of the program goals of the healthcare sector in Ukraine in long-term perspective. Hence, the PHC Platform is substantially integrated in the governmentally-regulated CPD framework, the healthcare system, and the public sector of Ukrainian society.

The expansion of the Platform included three essential considerations. Firstly, the PHC aimed to target online courses on large audiences of hundreds and thousands of healthcare practitioners in Ukraine as opposed to the conduct of offline training events that could engage up to 100 or 150 individuals in terms of communication and efficiency. Secondly, the PHC considered transmitting the narrow expertise of specific healthcare providers to large audiences, experiencing the challenges with scaling up the expertise of 2-3 narrow specialists to 100-150 healthcare providers during offline events. Thirdly, a financial aspect also affected the development of the Platform, as the PHC had estimated that though the development and deployment of an e-learning Platform would require significant initial investments, the use of such a solution would be a more cost-efficient option for expansion of CPD interventions in Ukraine as compared to cost-intensive and limited-capacity offline training events in the longer run.

The COVID-19 vaccination campaign that started in Ukraine in 2020 was a fundamental factor that accelerated Platform development and expansion. According to the PHC specialists, the rapid development of the situation with the COVID-19 outbreak and vaccination as well as the growth of clinical staff audience who required immediate training in online format caused the necessity for inevitable transition CPD events into e-learning mode via the Platform. While at the beginning of the COVID-19 pandemic it was possible to engage the members of the mobile emergency teams into offline training using the cascade method (one team trained several other teams), the emergence of approximately 3,100 vaccination sites across Ukraine required immediate online training for such an expansive audience. The Platform included courses on vaccination for vaccination sites covering the use of specific vaccines, such as Pfizer or CoronaVac, and a more extensive course on COVID-19 vaccination with updates intended for

already trained specialists and for medical staff without prior training. The Platform served as a significant entry point for medical practitioners in Ukraine who were administering vaccines by providing necessary training and certification. During the COVID-19 vaccination campaign, the PHC coordinated their efforts regarding e-learning in CPD with the Ukrainian MoH, supporting specific activities and program goals (e.g. on the number of healthcare workers and vaccination points needed in specified regions and location) based on the state-formed COVID-19 response roadmap.

By 2022, the Platform has evolved into a standardized formal CPE system utilized as the element of conventional and governmentality-required professional development of healthcare providers in Ukraine. As of June 2023, the Platform offered 84 courses, covering such topics as laboratory diagnostics, HIV infection, COVID-19 and other SARS, additional WHO courses on public health, immunoprophylaxis, tuberculosis, viral hepatitis, drug management, non-infectious diseases, substitution maintenance therapy, other infectious diseases, organization and management in public health, mental health and social support, as well as epidemiological surveillance (The State Institution "Public Health Center of the Ministry of Health of Ukraine," 2023a).

Currently the PHC Platform, expanded and modernized with the support of the WHO, contains the following resources, the presentation of which can be seen on Image 1 below with the user interface of the system:

- online courses from leading Ukrainian and international experts on various topics: including the WHO courses, courses on HIV infection, tuberculosis, COVID-19, prevention of infectious and non-infectious diseases, substitution maintenance therapy and other aspects;

- WHO materials: practice guidelines, most important documents, educational and reference materials;

- a catalogue of CPD events, such as seminars or conferences.

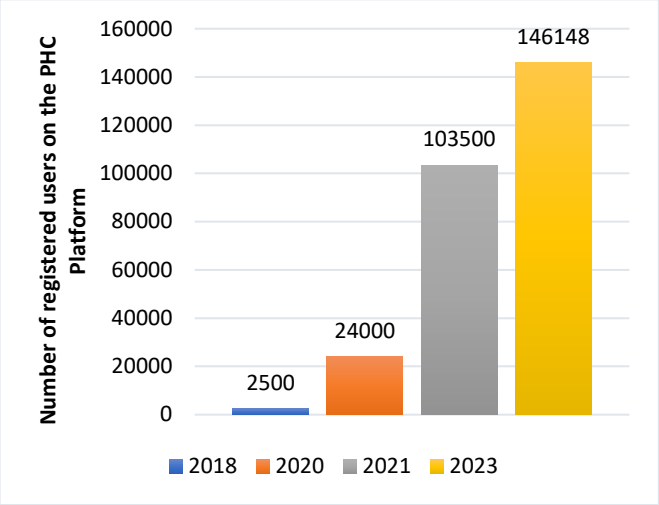
All materials and courses on the platform are provided free of charge and available for everyone. These resources can be of use to healthcare workers, social workers, psychologists, as well as anyone who wants to learn more about the latest medical practices and methods of psychosocial support for patients (The State Institution "Public Health Center of the Ministry of Health of Ukraine," 2023b).

Image 1. The PHC Platform User Interface.

Image source: PHC Platform website, open access. https://portal.phc.org.ua/uk/

The contents, functionality, and application of the Platform have substantially expanded with the emergence of the COVID-19 pandemic in 2020, reflecting the efforts of the Ukrainian government to maintain CPE for medical providers in quarantine and restrictions contexts and harmonize its CPE framework with the international standards and requirements. The engagement of Ukrainian healthcare providers in e-learning also displays the mentioned tendency. According to the PHC data (acquired from the PHC representatives in the summer 2023), the Platform had 2,500 registered users in 2018; 24,000 registered users in 2020; 103,500 registered users in 2021; and 146,148 users as of June 2023 (data for 2019 and 2022 was not available), which consistently reflects the transition of CPD training into online format since the beginning of the pandemic in 2020, visualized in Figure 2.

Figure 2. Number of Registered Users on the PHC Platform by Year between 2018 and 2023, Bar Chart



Source: PHC data, acquired via interview with the PHC representative.

Training Courses Offered via the PHC Platform

The PHC Platform currently offers 84 courses on various topics, presented in the previous section with Platform description. The courses are open and available free of charge to registered users exclusively. The registration is easy, fast, and free of charge as well. Upon completing the courses and the assessment in the form of tests after the course, the participants can acquire a certificate about course completion, which is generated automatically on the

Platform. The certificates contain the name of the course, the number of academic hours, the name of course provider with the signature of a provider's lead, and the unique identification number assigned to a specific user. The certificate itself contains a unique number generated by the system with user ID, course number, and the date. Such mechanism for number generation prevents the falsification of certificates. The certificates can also be validated by the external quality control agency. The Testing Board of the Professional Competence of Specialists with Higher Education in the Fields of Training "Medicine" and "Pharmacy" at the Ministry of Health of Ukraine" (Testing Board) is a state non-commercial enterprise, the central function of which is the external control of the quality of training of specialists in the healthcare field and the monitoring of compliance with the standards of higher education by means of standardized testing by the Ukrainian MoH (State Non-Profit Enterprise "Testing Board," 2023). This entity integrates a certification committee with the mandate for ensuring and evaluating the validity of issued certificates on the PHC Platform.

The course contents, development, and quality standards are defined in a set of Platform Regulations approved by the PHC orders. The quality of each course is maintained and ensured by course developer, instructional designer, and education coordinator, and each course is monitored and created by each of the professionals. An educational coordinator possesses the critical role in course development and delivery, providing oversight of training materials, scripts, the appearance of the slides, the absence of the conflict of interests or commercial interests in the courses.

While the PHC specialists mentioned that the Platform possesses the capacity to conduct both asynchronous and synchronous courses, the synchronous format is not a typical option for the EdX script used to run the Platform. The PHC team has conducted a set of fully synchronous

courses on COVID-19 treatment regimens, immunoprophylaxis of infectious diseases, and a training for trainers (TOT) on the subject of communication for regional medical practitioners. The synchronous courses integrated a series of live streams on YouTube, Zoom, or Facebook as auxiliary platforms. Later, these streams were recorded and integrated into the courses that were stored on the Platform. During the synchronous part of the courses, the learners were trained and tested via Google Forms with the possibility to receive certificates. Recordings of these sessions were stored on the Platform with all videos, tests, and additional materials. Hence, these courses conducted in synchronous format were transformed into asynchronous courses.

However, most courses on the platform are non-facilitated asynchronous online courses that engage from 100 to 20,000 of participants. All the courses on the Platform represent Massive Open Online Courses (MOOCs) that are free of charge, include open enrollment, and engage large audiences (Moore & Blackmon, 2022). The basic format of these courses integrates video-lectures with an expert presenting a topic along with visual materials, additional resources, handouts, presentations, and quizzes (test assignments) in the format of written multiple-choice, short answer, and extended answer questions. The courses typically include a short quiz after each module and a final more extensive quiz at the end of the course. The users are required to successfully complete at least 80% of test assignments throughout the course along with the final quiz to acquire a certificate about course completion.

As mentioned previously in the Study Design section, this research will focus on the two specific online courses on the Platform, “AstraZeneca COVID-19 Vaccination” and “COVID-19 Vaccination,” for feasibility purposes. The decision was based on the consultations with the PHC representatives, which revealed the leading status of both courses on the Platform concerning the number of users and issued certificates about course completion. The focus on the specified

courses also enables the consistency in comparison of user experiences across the two courses with similar thematic approaches regarding COVID-19 and vaccination, as well as the corresponding advanced technical level of content development, presentation, and delivery. "AstraZeneca COVID-19 Vaccination Course" is a mandatory educational initiative for all providers in Ukraine, the completion of which was required for healthcare workers to continue the practice and conduct vaccination for patients. However, "COVID-19 Vaccination" course is a non-mandatory course for healthcare providers and is an open educational initiative, available for all users, registered of the Platform. In this case, the obligatory and non-mandatory nature of the selected courses will be a critical variable that can potentially impact user experience and perceptions regarding the completion of these courses, as per the perspective of the researcher.

The background for the development and implementation of both courses is as follows (The Public Health Center Platform, 2023a):

> "*The roadmap for the introduction of a vaccine against the coronavirus disease and mass vaccination in response to the COVID-19 pandemic in Ukraine in 2021-2022 was officially approved by the order of the Ministry of Health of Ukraine dated December 02, 2020 No. 2784.*
>
> *Starting from the 2nd stage of vaccination, vaccines will be administered not only by mobile outreach teams, but also on the basis of vaccination points. All medical personnel involved in this process must undergo mandatory training and master the instructions on the specifics of the vaccination against COVID-19 to avoid programming errors*."

The target audience for both courses includes medical practitioners with the medical specialties "Pediatricians," "General Practitioners-Family Medicine," "Therapists," "Infectious diseases," and "Immunology" in accordance with the nomenclature of medical specialties

approved by the order of the MoH of Ukraine dated February 22, 2019 No. 446 (in the edition of the order of the MoH of Ukraine dated August 18, 2021 No. 1753) (The Public Health Center Platform, 2023 a, b). Both courses are the educational products that do not promote any commercial interests in any way. The content of the courses complies with national and international recommendations for vaccination against COVID-19.

"COVID-19 Vaccination" Course

The course "COVID-19 Vaccination" is an asynchronous MOOC, similar to other courses on the Platform, listed as number 65 on the PHC Platform website. The course was created with the support of Pfizer. As of June 2023, the number of enrolled learners on this course is 14,448 individuals, and the number of issued certificates about course completion since the publication of the course in 2021 till June 2023 is 9,305 certificates (according to the PHC Platform data acquired through collaboration with the PHC representatives, June 2023).

The learning goal in this course is to "systematize knowledge about the specifics of vaccination against COVID-19 to avoid practice and program errors" (The Public Health Center Platform, 2023b). The duration of the course is approximately 16 academic hours, which translates into 8 CPD points. Learners can complete the course in the preferred pace after enrollment without limitations until December 2025. The course entails the following structure (The Public Health Center Platform, 2023b):

Module 1

1. Organization of the vaccination campaign against COVID-19 in Ukraine
2. An overview of vaccines against COVID-19
3. Pre-vaccination examination and informed consent

Module 2

1. Organization of the vaccination session. Requirements for vaccination conduct in healthcare facilities and during field vaccination sessions.
2. Vaccination with the Comirnaty ® vaccine (Pfizer/BioNTech). Requirements for transportation and storage; contraindications; administration of the vaccine.
3. Vaccination with Covishield / SKBio / Vaxzevria ® vaccine (AstraZeneca/Oxford). Requirements for transportation and storage; contraindications; administration of the vaccine.
4. Vaccination with the Coronavac ® vaccine (Sinovac Biotech Ltd.). Requirements for transportation and storage; contraindications; administration of the vaccine.
5. Immunization with the Moderna ® vaccine (ModernaTX, Inc.). Requirements for transportation and storage; contraindications; administration of the vaccine.

Module 3

1. Immunization and vaccine safety - global recommendations and issues related to vaccination.
2. Waste management in the context of vaccination against COVID-19.
3. Actions and recommendations after the administration of the vaccine.
4. Anaphylactic reaction: diagnosis and first aid.

Module 4

1. Pharmacovigilance for NPPI / adverse reactions of vaccines.
2. Additional information about vaccines against COVID-19. Communication.
3. Management of electronic medical records.

4. How to correctly fill out the International Certificate of COVID-19 vaccination.

Course speakers are the following experts (The Public Health Center Platform, 2023b):

1) Fedir Lapii, head of the National Technical Group of Experts on Immunoprophylaxis;
2) Oleksandr Zaika, Head of the Department of Immunization of the PHC of MoH of Ukraine;
3) Yevhenii Grechuha, head of the immunoprophylaxis department of the Kyiv City PHC;
4) Olena Khoromska, head of the pharmacovigilance department of the State Expert Center of the MoH of Ukraine;
5) Yuriy Kryvonos, Medical Director of the training company "Special Training Center."

Each module of the course ends with a short quiz. After the completion of the last module with a quiz, all enrolled learners are suggested to also take the final test. If learners complete all modules and the final test with at least 80% of correct answers, they can acquire a certificate about course completion. Learners also have an option not to complete final test after all the modules, and this option implies that the PHC will not issue a certificate for course completion, while the learners will still have access to learning materials and module contents. The course design and certification procedures in this course reflect the description of all courses on the PHC Platform presented above in this section.

"AstraZeneca COVID-19 Vaccination" Course

The "AstraZeneca COVID-19 Vaccination" course (full label on the PHC Platform is "Vaccination against COVID-19 with the AstraZeneca vaccine (AZD1222/ChAdOx1-S) - for medical staff of vaccination centers") is an asynchronous MOOC, similar to other courses on the Platform, listed as number 56 on the PHC Platform website. The course organization, tests,

completion requirements, access options, and certification are identical to the characteristics of the “COVID-19 Vaccination” course described in the previous part of this section. As of June 2023, the number of enrolled learners on this course is 16,231 individuals, and the number of issued certificates about course completion since the publication of the course in 2021 till June 2023 is 12,357 certificates (according to the PHC Platform data acquired through collaboration with the PHC representatives, June 2023).

The learning goal in this course is to “generate knowledge about vaccination against COVID-19 with the AstraZeneca vaccine (AZD1222/ChAdOx1-S)” (The Public Health Center Platform, 2023a). The duration of the course is approximately 4 academic hours, which translates into 2 CPD points. Learners can complete the course in the preferred pace after enrollment without limitations until December 2025. The course entails the following structure (The Public Health Center Platform, 2023a):

Module 1:

1.1 Organization of the vaccination campaign against COVID-19 in Ukraine

1.2 Vaccines against COVID-19

1.3 Pre-vaccination examination and informed consent

Module 2:

2.1 Transportation and storage of vaccines

2.2 Administration of vaccines against COVID-19

2.3 Disposal of vaccines and injection material

Module 3:

3.1 Contraindications to vaccination

3.2 Pharmacovigilance

3.3 Actions after vaccine administration

3.4 Additional information about vaccines against COVID-19. Communication

3.5 Monitoring and recording vaccination against COVID-19

3.6 Management of electronic medical records

Course speakers are the following experts (The Public Health Center Platform, 2023a):

1) Fedir Lapii, head of the National Technical Group of Experts on Immunoprophylaxis;
2) Oleksandr Zaika, Head of the Department of Immunization of the PHC of MoH of Ukraine;
3) Olena Levchenko, epidemiologist of the PHC of MoH of Ukraine;
4) Yevhenii Grechuha, head of the immunoprophylaxis department of the Kyiv City PHC;
5) Olena Khoromska, head of the pharmacovigilance department of the State Expert Center of the MoH of Ukraine;
6) Maria Karchevych, Director General of the Directorate for the Development of Digital Transformations in Health Care of the MoH of Ukraine.

Case Study Propositions

According to the procedural and reporting approach to completing qualitative case studies defined by Baxter and Jack (2015), case study propositions reflect an essential component of this research design that enables the researcher to explicitly state the boundaries of the study's scope and increase the feasibility of the research project (p. 551). The researcher has developed a series of case study propositions that constitute the assumptions about the case and practice dynamics in the specified contexts of CPE of healthcare workers in Ukraine. Per Baxter and Jack (2015),

the propositions had been derived from an in-depth literature review, carefully selected related conceptual and theoretical frameworks (particularly, Bourdieu's capital theory and Knowles' andragogy theory), and researcher's professional experience in the field of adult learning within the Ukrainian healthcare sector.

The propositions in this case study were significantly informed by Bourdieu's capital theory and Knowles' andragogy theory. Specifically, the fundamental assumption of the researcher behind the creation of the propositions is that the presence or sufficiency of different capital types is likely to form perceived enablers to e-learning use among healthcare providers in Ukraine, whereas the absence of these capital forms can constitute a barrier to such practice. Additionally, the identification of necessary capital forms and course design characteristics based on andragogic learning principles in e-learning will guide the generation of recommendations for enhanced e-learning use in the CPE of healthcare workers in Ukraine during the pandemic and the war launched by the Russian Federation.

The case study propositions displayed in Table 5 below not only delineated the scope and feasibility of this case study but also constituted the guiding model for the development of the in-depth interview guide (that can be found in Appendix A) as well as the Draft Codebook for the data analysis stage (please see Appendix B). The suggested propositions informed the creation of a coding model with a series of deductive codes and themes. The researcher also anticipated the identification of emerging inductive codes during the data analysis stage that would strengthen the analytical model structured by the case study propositions.

Table 5. Case Study Propositions on Enablers and Barriers to E-learning Use during COVID-19 Pandemic.

Type of Capital	Proposition	Sources
1. Resource capital	The presence/lack of resource capital in the form of: • financial resources; • access to technology such as telephone or computer; • ownership of necessary devices; • time resource to meet the demands of professional, personal, and other commitments; • workplace resources (availability of devices, instructional materials, stable Internet connection at work); • availability of sufficient space and quiet environment for effective learning can support/impede e-learning use among healthcare providers.	Adapted from Bourdieu (1986; 2002); Dele-Olowu (2020); Chekijian et al. (2020); Olum et al. (2020); Sarin-Gulian et al. (2021); Roslan and Halim (2021); Deng and Sun (2022).
2. Cultural capital	The presence/lack of cultural capital in the form of: • personal education level; • specific group norms in the workplace, possibility to allocate time for online CPE; • supportive attitude towards e-learning among colleagues and managers; • cultural aspects of work and personal experiences; • personal attitude or preferences to the e-learning/Platform – can support/impede e-learning use among healthcare providers.	Adapted from Bourdieu (1986; 2002); Cocquyt et al. (2019); Chekijian et al. (2020); Dele-Olowu (2020); Olum et al. (2020); Sarin-Gulian et al. (2021); Roslan and Halim (2021).
3. Social capital	The presence/lack of social capital in the form of: • a job title and a necessity to update qualification; • related obligations or responsibilities; • mentorship from colleagues and managers on e-learning; • orientation on e-learning in the form of training by managers/educators/colleagues; • interactions with colleagues/fellow learners and managers; • support from learners and tutors on the Platform; • availability of technical support on the Platform - can support/impede e-learning use among healthcare providers.	Adapted from Bourdieu (1986; 2002); Adebisi and Oyeleke (2018); Egan (2020); Brieger (2020); Barker and Smith (2021); Ladwig et al. (2021); Carr et al. (2018); Cocquyt et al. (2019); Khan et al. (2022).

Table 5 (cont.)

4. Technical knowledge capital	*The presence/lack of technical capital in the form of* • *expertise in digital device usage;* • *digital literacy;* • *knowledge and experience with e-learning;* • *career advancement opportunity related to online course completion -* *can support/impede e-learning use among healthcare providers.*	*Adapted from Bourdieu (1986; 2002); Dele-Olowu (2020); Regmi and Jones (2020); Sarin-Gulian et al. (2021); Roslan and Halim (2021).*
5. Intrinsic capital	The presence/lack of intrinsic capital in the form of • personal motivation to engage in e-learning; • readiness to engage in e-learning; • experience that can contribute to performance in e-learning; • need for new information - can support/impede e-learning use among healthcare providers.	Adapted from Adebisi and Oyeleke (2018); Egan (2020); Brieger (2020); Barker and Smith (2021).
6. Course Design	The presence/lack of the following e-learning design components, such as: • self-directed learning with opportunities for learners to control own learning pace and approach; • experiential learning with possibility to explore real-life cases and apply knowledge to the solution of practical tasks; • sufficient interaction opportunities between peer learners and tutors – can support/impede e-learning use among healthcare providers.	Adapted from Adebisi and Oyeleke (2018); Egan (2020); Brieger (2020); Barker and Smith (2021); Ladwig et al. (2021).

Data Sources

The data sources in this qualitative exploratory single-case study included secondary data derived from the reports and Platform documentation collected during the initial desk review stage of the study. The subsequent strand of the project integrated the collection of primary data

during a series of in-depth semi-structured interviews with healthcare practitioners, who engaged in e-learning on the PHC Platform between 2020 and 2022. The availability of the PHC reports and Platform datasets on e-learning dynamics in CME of healthcare providers in Ukraine and the opportunity to conduct a set of in-depth interviews with Platform learners shaped the relevance of two study strands with a desk review and in-depth interview components, consolidated into single findings and recommendations section at the end of this dissertation project. Both strands were expected to yield exploratory findings on the perceived e-learning enablers and barriers in CPE of public health professionals shaped by the COVID-19 pandemic impact in Ukrainian context as well as articulate the options for improving users' experience in the future. The researcher had previously secured access to these data sources via the Public Health Center (PHC) of the Ministry of Health of Ukraine that was confirmed in the letter of support signed by the head of the PHC and submitted to the University of Illinois IRB in March 2023.

Sampling of Participants

The sampling strategy for the qualitative data collection in this study was purposive sampling. Purposive sampling enabled the researcher to intentionally identify and recruit a group of adult learners who articulated the perceived enabling or challenging factors that shape e-learning use in the CME of healthcare providers in Ukraine in detail (Creswell & Plano Clark, 2018). The selection of participants for the interviews was guided by the purposive sampling method with the combination of criterion-based and maximum variation approaches (Okoh et al., 2020; Patton, 2015, p. 234).

Those eligible for the in-depth semi-structured interviews were the in-service public health practitioners, who were registered users of the PHC Platform. These individuals also were the users who had taken/enrolled in two identified courses, "AstraZeneca COVID-19

Vaccination" and "COVID-19 Vaccination," between 2020 and 2022. The reasoning and justification behind the selection of these two courses on the Platform and the timeframe was described earlier in the Methodology section. To ensure the selection of informants with sufficient and relatively consistent experiences in terms of the number of courses they have completed during the identified period of 2020-2022, the additional criterion for informant selection was the quantity of courses they have finished on the Platform. The respondents eligible for interviews were those users who had completed between 1 to 5 courses on the PHC Platform during 2020, 2021, and 2022. The selection of these participants ensured that the informants possessed sufficient exposure to this solution to form a perspective about the Platform and courses while having relatively homogenous experience of moderate e-learning scope on the Platform.

All of the informants also possessed the qualification of in-service healthcare practitioners, including medical doctors, healthcare workers, nurses, and the physician or nurse assistants to be eligible to participate in an interview. The maximum variation principle for participant selection was grounded in the sampling of participants across the continuum of healthcare positions in Ukraine that integrates medical doctors, paramedics, nurses, clinic managers, health instructors, as identified in the order of the Ukrainian MoH (The List of Medical Positions in Health Care Institutions, 2002). The selection of participants with different position in healthcare enabled the researcher to capture the diverging experiences of healthcare practitioners with e-learning considering the differences in their professional training. The identification of differences in the experiences of healthcare workers related to their cadre can also refer to the characteristics of the Platform and the courses that either enable or challenge the participation of healthcare workers in online courses, as the Platform and its contents may be

more suitable for medical doctors rather than nurses with another form of professional training and expertise.

The anticipated sample size for qualitative data collection was 15-20 healthcare providers. This number of interviews in a qualitative single-case study project should generate sufficient evidence to develop context-specific and localized findings on learners' experiences with e-learning in CME in Ukraine (Marshall et al., 2013). The mentioned number of interviews was derived from the methodological recommendations for sampling in qualitative studies by Creswell and Plano Clark (2018) and Tracy (2019). Creswell and Plano Clark (2018) state their recommendation, citing other researchers, of completing interviews with 3 to 10 individuals in a phenomenological qualitative examination, though the necessary number of participants could be higher in grounded theory or collective narrative frameworks (p. 226). Based on an extensive analysis of rigorous qualitative studies, Tracy (2019) argues that sequential interviews can generate robust and sufficient qualitative evidence in 10-12 interviews (p. 175).

Finally, the researcher cooperated with the PHC team in identifying and finalizing the sample for the study after obtaining their confirmation for assistance. The PHC team facilitated the selection of informants who were registered healthcare workers, had completed the two identified courses, and had overall completed not less than 1 and not more than 5 courses on the Platform during the specified period.

Hence, the criteria for the purposive sampling of 15-20 informants for this study included the enrollment in two identified online courses (the acquisition of course completion certificate or completion of particular number of modules/hours was not required) between 2020 and 2022, the qualification of healthcare professional, and completion or enrollment in 1-5 courses on the Platform. The registered Platform users who had not enrolled in the specified two courses within

the specified timeframe, had completed more than 5 courses on the Platform, and reported their professional role as other than medical personnel of any level were excluded from the interview sample.

Participant Recruitment Procedure

The participants for in-depth interviews were recruited through the standardized e-mail invitations (see Appendix D. Recruitment Email) with the attached Special Research Project Statement (can be found in Appendix C). The researcher extracted user data from the PHC Platform with assistance of the PHC representatives and conducted a purposive sampling procedure based on previously described criteria inclusive of PHC's guidance. The e-mail invitations for interview were distributed to selected registered users who had taken or enrolled in both of the identified educational courses ("AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination") regardless of their course completion status between 2020 and 2022 and possessed the qualification of in-service healthcare providers. Given the PHC data on the number of enrolled users in both of the selected courses who reflect the mentioned criteria, the general population of learners at this stage accounted to more than 25,000 registered users. The e-mail invitations were sent to this population of users on their e-mail addresses they have used to register on the Platform.

All participants who received the invitation by e-mail had the opportunity to peruse the Special Research Project Statement with the information on the right to withdraw from the interview or decline participation at any time with no explanation necessary. The informants were assumed to possess sufficient time to develop an informed decision on their participation in the study. The participants were then expected to fill in the Google Form, the link to which was provided in the invitation email, confirming their consent to participate in the study in written

form and providing their contact information. Hence, participation in the research project was fully voluntary.

Both the Recruitment Email and the Special Research Project Statement included the note that the interviews will be completed in English. The researcher anticipated all informants to possess sufficient English language proficiency based on medical providers' competencies, requirements for education and practice, as well as overall education field in Ukraine. Additionally, the tool used to obtain consent (described below) involved a question about how comfortable the respondents would feel having a conversation with the researcher in English. In case the potential participants did not feel comfortable having an interview in English, they were able to state such preference in the form and refuse to participate in the study.

The e-mail invitations contained the Special Research Project Statement as an attached document and a link to the Google Form (see Appendix D), which was used as a consent tool in this study. The consent form comprised the first section with details about the study and a question for the provision of a written electronic confirmation to participate in the study, a second section with the number of courses they completed on the Platform in total, a third section with a question to acquire agreement to participate in an interview in English, and the fourth section for the provision of contact details for the researcher to reach these informants and schedule an interview. If the participants declined to engage in the study in the first section of the form, they automatically submitted the form with their decision. If the participants provided written consent to engage in the research, the form then proceeded to the question about the number of courses they completed on the Platform. This was a filter question for the identification of participants who have completed 1-5 courses on the Platform in total. If a respondent selected an option that indicated their completion of more or less courses, they

automatically submitted the form. If the respondent selected an option about completing 1-5 courses on the Platform in total, the form proceeded to the next section to determine whether the informants were comfortable with interviews being conducted in English. This question was another filter question for respondents who agreed to participate, and those who stated that they were uncomfortable with interviews being conducted in English automatically submitted the form. Those who provided consent to participate in the study, completed 1-5 courses on the Platform, and agreed with interviews being conducted in English proceeded to the next section of the form, where they responded to questions with their contact details for the researcher to schedule the interview.

The researcher got a total of 27 responses in the Google form, out of which 19 individuals indicated consent to participate in the research, 6 persons declined the invitation to participate in the study, one person agreed to participate but completed more than 5 courses on the Platform, and one respondent refused to participate due to being uncomfortable with interviews being conducted in English. In this case, the researcher proceeded to work with a sample of 19 Platform users who completed/enrolled in the identified two courses on the Platform within given timeframe, were in-service healthcare providers, completed between 1 to 5 courses on the Platform, were comfortable with speaking English during the interview, and provided written consent to engage in the study. The researcher then purposefully selected individuals from the population of informants who reflected all of the described criteria, contacted these people via mobile phone, and scheduled interviews. The researcher also shared electronic version of the interview guide (please see Appendix A) with the informants who agreed to participate in the interviews prior to the conversation.

Data Collection and Management Procedures

Desk Review

The desk review integrated the analysis of PHC Platform data, relevant reports, publications, other materials, as well as consultations with the PHC representatives upon agreement with the institution. All secondary data sources were de-identified during abstraction. Information was aggregated to ensure that findings cannot be linked to specific facilities or individuals to protect confidentiality when presenting results. The retrieval of all externally shared reports, manuscripts, or presentations followed these practices. The researcher will retain the password-protected data and information for three years after defense and will not use these beyond the scope of this project. This portion of the data collection process will ensure that the analysis undertaken in this project will rely on multiple data sources which will strengthen the validity of this inquiry.

Interviews with Study Participants

The researcher scheduled 15 interviews via phone calls with informants who reflected all the previously described criteria, stated their consent to participate in the study, and left their contact information in the Google form. All the interviews were conducted online via Zoom calls, as all the informants contacted by the researcher stated such a preference. The researcher conducted 15 interviews in the period of May 6 to June 14, 2023.

At the beginning of each interview, the researcher re-stated the key aspects of the Special Research Project Statement to each informant, focusing on the voluntariness of participation and the possibility for respondents to withdraw from the interview or the study at any point without explaining the reason. The researcher confirmed the availability of space for a private conversation with participants and then obtained verbal informed consent to record the interview

for analytical purposes; audio recording was turned on after this action. Each interview lasted between 30 to 60 minutes.

All interviews were conducted in English by the researcher herself using the semi-structured interview guide (Appendix A). This document served as a guiding material for the researcher to inquire about the critical e-learning experience aspects during the interviews with healthcare providers. All the items in this interview guide were used as prompts, which could have been be adapted, relocated, or excluded from the interview considering the flow of the conversation and participants' responses. The researcher also could have changed the sequence of questions/prompts based on the conversation dynamics. The detailed tables with factors/capital that could have affected healthcare providers' experience with online courses and e-learning were used as probing questions for the informants in case they were unsure about their responses.

The interview guide included six sections. The interviews started with a brief demographic information inquiry with the questions about cadre, specialty, years of professional experience, education level, age, and gender of informants. The next section involved another brief inquiry about the general perspective of informants regarding their e-learning and the PHC Platform. The third and fourth sections addressed the perceived enablers and barriers that could have affected the experience of healthcare providers with e-learning and the PHC Platform courses, considering the possible availability or deficiency of different capitals as key factors. The fifth section involved questions about the impact of COVID-19 pandemic on Platform use/e-learning experience with the aspects that informants could have found challenging or beneficial regarding the Platform during the pandemic. The final section articulated the opportunities for Platform improvement and general improvement of e-learning experience during CPD of

healthcare workers. During this part of the interviews, the informants stated their requests for support needed to improve their experience, their expectations regarding the Platform, and any additional considerations they have not reported previously.

Upon completion of all 15 interviews, the data management procedures included the storage of all audio-recordings of interviews on the password-protected computer in encrypted form and immediate de-identification of these primary filed within 24 hours after each interview. The primary files with potentially identifiable information about participants were deleted after de-identification. The researcher then manually transcribed de-identified audio recordings of the interviews verbatim, and each participant was assigned a number as well as an anonymized label, such as "Medical Doctor 1" and "Nurse 2," to ensure anonymity and confidentiality of responses. Any interview data quoted in the Results section of this dissertation paper was presented in a general manner, such as, "one interviewee stated…". When collecting data via the interviews, participants' names and specific job titles were excluded from the recordings, their responses involved only non-specific demographic data, which was collected in a de-personalized manner to retrieve possible patterns of the impact of demographic factors on the experience with e-learning solutions while maintaining participants' confidentiality. Personal information on religion and political preferences was not collected.

The researcher conducted interviews with thoughtfully selected "information-rich" (Patton, 2015, p. 230) group of 15 informants with expertise in e-learning use for their CPD. Such expertise is not obscure, the acquired data is of high quality, and the interviews were of similar format and completed sequentially. After approximately the tenth interview, the researcher recorded limited novel information, and no additional emerging codes were identified during each sequential conversation with informants. Thus, the researcher terminated the data

collection process after completing the fifteenth interview due to the attainment of the condition when "new information produces little or no change to emerging findings and themes" (Tracy, 2019, p. 174). The researcher estimated the sufficiency of 15 interviews for yielding robust results and recommendations presented in subsequent chapters of this research based on the data validation procedures described in the next section of this chapter and the design of this study being a limited-scope qualitative research (Tracy, 2019, p. 174).

Data Analysis

Data analysis was completed concurrently with the data collection, that is typical for any type of qualitative research (Baxter & Jack, 2015, p. 554; Stake, 1995). The researcher started the qualitative data analysis process with the verbatim transcriptions of recorded in-depth interviews into word processing files. During the transcription process, the researcher evaluated the transcription for accuracy while formatting and organizing data to optimize subsequent analytical procedures. Then, the thematic analysis method was applied to the data. The researcher initially explored the information by reading through the transcripts to create a general comprehension of the interview data, including interview notes and observations, and proceeded to deductive coding process with the simultaneous identification of emerging themes with an inductive coding approach.

Scholars suggests two strategic ways to thematically analyze the data such as categorical aggregation and direct interpretation, which were implemented in the analysis of interview data in this research (Stake, 1995; Yazan, 2015). The direct interpretation allowed the researcher to interpret data based on her interaction with the informants, facilitating the inductive identification of themes during data analysis in addition to deductively stated codes and

categories (Yazan, 2015). Categorical aggregation allowed tracking down the predicted and emerging themes for the studied case as well as integrating the deductive and inductive coding into the unified and robust thematic analysis model that reflects the experiences of informants, strengthening the analytical framework generated prior to data collection. The categorical aggregation approach also enabled subjective assignment of meanings to the codes and themes based on researcher's expertise in the field, review of existing evidence, professional experiences, and the interactions between the participants and the researcher (Yazan, 2015). The researcher stated the codes and subthemes, cited participants' quotes, and used various data sources to cite multiple items of evidence to exhibit the multifaceted nature of the phenomenon or perspectives and develop a robust description of qualitative findings in subsequent chapters of this research with results and recommendations.

Coding Procedure

The core component of the described thematic analysis of qualitative data was the coding procedure, which is the crucial strategy in qualitative research as "the process of grouping evidence and labeling ideas so that they reflect increasingly broader perspectives" (Creswell & Plano Clark, 2018, p. 307). The researcher opted for manual coding for this study, considering the perceived rigor of such method as well as feasibility of data from the chosen sample of participants and number of intended interviews. The deductive coding stage included the development of predetermined codes based on the review of existing evidence and the professional or academic experiences of the researcher in the defined field (Azungah, 2018).

The draft description of codes that was used for the deductive coding process can be found in Appendix B, the Draft Codebook. Bourdieu's capital theory (Bourdieu, 1986, 2002) provided a solid framework for the development of the codes for this project and will guide further data

analysis. The researcher used this pre-developed codebook to deductively assign labels (codes) to the interview excerpts that addressed the pre-identified experiences of informants, following the mentioned direct interpretation principle. The decision to start the data analysis process with the deductive coding procedure was shaped by a consideration that the standardized coding model would ensure the feasibility of manual data analysis considering the data set of 15 interviews.

Moreover, some statements of respondents required the development of new emerging codes that have not been stated during the deductive coding preparation, and the inductive coding procedure was a practical solution for documenting these ideas (Azungah, 2018). For the inductive coding, the researcher separated the transcribed text into small units, such as phrases or sentences, assigned a new code label to each unit, and subsequently grouped these codes into broader themes, using the categorical aggregation approach. In this case, the deductive and inductive coding procedures were completed simultaneously during the data analysis stage, with a considerable analytical preparation for deductive coding before the data collection phase. The emerging codes were added to the Draft Codebook presented in Appendix B and were then used to code any relevant responses in all interviews. The researcher subsequently used the finalized coding framework with the pre-determined and emergent codes, which is presented in Appendix E, Finalized Codebook.

Validity

Validity in research implies the application of strategies and tools to generate "correct inferences and accurate assessments from the integrated data" (Creswell & Plano Clark, 2018, p. 354). The validity of qualitative research results will indicate the accuracy, credibility,

transferability, and confirmability of information obtained through the qualitative data (Creswell & Plano Clark, 2018, p. 312). Validity in a qualitative case study research will be further specified by a set of conditions as follows: content validity as a measure of correct evaluation of a specified case with research instrument, internal validity as the "adequacy of the inferences to the obtained data," external validity as the generalization of the results, and reliability as the possibility of study replication (Quintão et al., 2020, p. 277).

The author established the content validity associated with the research instruments by cooperating with experts in the field for the development of valid research design and instrument. The draft of the in-depth interview guide was submitted for review by experts in the field, who are the PHC representatives or the international experts, partnering with the International Training and Education Center for Health in Ukraine (I-TECH Ukraine), where the researcher currently serves as a Country Director. Five such experts provided two rounds of reviews pro bono. Content validation incorporated the revisions of unclear and non-functioning questions in the research instruments that were subsequently modified or discarded from the tools. The finalized validated research instrument used during the interviews can be found in Appendix A.

Another core validity aspect in this study was the replication of study procedures. The replication logic in this study was shaped by rigorous description of the case, the context of the study, research procedures, and theoretical and conceptual frameworks that underpin authors' approach in order ensure the opportunity to replicate the investigation in other environments and case conditions. The robust descriptions of these components enable the replication of this research in other settings, though the role of the researcher, the influence of the study context,

and other factors can lead to the acquisition of diverse findings in case other scholars utilize this research framework for their studies.

Furthermore, the researcher used the following validity check procedures to strengthen the internal validity of qualitative findings: member-checking, triangulation, peer examination, and reporting disconfirming evidence (Creswell & Plano Clark, 2018, p. 312; Zohrabi, 2013). The researcher conducted the member-checking process by generating a summary of findings from the interviews focusing on themes and theoretical models and contacting five informants randomly selected from the sample to review these summaries in the form of short written narrative to ensure that the results accurately reflect their experiences. Since this procedure is time-consuming and resource-intensive, the researcher decided to contact one-third of respondents selected randomly to conduct member-checking and ensure credibility, completeness, and accuracy of study results. The informants confirmed the validity and accuracy of the findings. The researcher also conducted triangulation of study results by examining the key reports in the field during a desk review stage, obtained from the PHC, engaging in consultations with the PHC team, and then comparing the information with data from interviews to ensure the validity of results.

The peer examination strategy also strengthened the validity of study results by obtaining reviews and comments on data collection, analysis, and findings from several nonparticipants in the field. The researcher requested the support of the PHC representatives and I-TECH Ukraine partners, experts in the digital education field for healthcare providers in Ukraine, to review the interview guide and interview data during coding. The plausibility of data analysis and interpretations was confirmed by these peer reviews, which significantly augmented the validity of the research. The researcher initially coded raw de-identified data using the Draft Codebook

(Appendix B). This step enabled the identification of emergent codes that were integrated into the draft coding tool, which led to the creation of a strengthened coding model – the Finalized Codebook (Appendix E). The researcher then requested another I-TECH Ukraine representative to conduct another coding round of the transcripts using the Finalized Codebook. The second coding round with the support of another coder did not produce any substantial alterations in the Finalized Codebook, implying the confirmatory nature of the process, as other coders did not suggest significant modifications regarding the Codebook. This technique labeled multi-coder analysis significantly strengthens the validity of the codebook and coding results in qualitative data analysis (Church et al., 2019).

The author also reported disconfirming evidence in the results section, highlighting the information "that presents a perspective that is contrary to the one indicated by the established evidence" (Creswell & Plano Clark, 2018, p. 312). The acknowledgment of such information demonstrated the accuracy of the data analysis because the context-specific aspects of e-learning application in healthcare education in Ukraine diverged from assumed tendencies by the researcher or similar dynamics examined in other settings.

The external validity and reliability factors were the final components of the validity procedures utilized by the researcher to ensure the trustworthiness and applicability of case study findings in this project. Andrade (2018) suggests that the terms "external validity" and "generalizability" can be utilized interchangeably, as the external validity refers to the opportunity of results' generalization to a population of setting other than the studied phenomenon. Though this qualitative single-case study can entail the limited generalization potential due to context-specific nature of the case and purposive sampling strategy, the researcher generated plausible exploratory findings that imply the possible generalizability to the

population of adult learners who use e-learning and are healthcare practitioners in Ukraine based on the rigorous procedures that ensure the quality of results.

The objective of the researcher in this exploratory single-case study was to develop analytical generalization rather than a statistical generalization, which can enable the "generalization of empirical observations into theory, rather than population" (Quintão et al., 2020, p. 279). In this context, the fundamental practices that will encompass the external validity of this project were the articulation the reasons for case selection, sufficient description of case context, and definition of patterns that will ensure the transformation of results into theoretical constructs that could be subsequently tested by other researchers (Quintão et al., 2020, p. 279).

Risks for Participants and Protection of Human Subjects

Data collection, analysis, and interpretation procedures can entail specific risks for the participants, though the risks of the proposed inquiry for the engaged individuals were limited. Healthcare workers involved in the study might have felt stress as a result of the interviews. The information collected through verbal interviews could have reflected well or poorly on the professional performance of individuals or groups. Some might have feared professional disciplinary consequences as a result of their responses or their participation. Finally, some might have felt the stress associated with the time commitment involved in participating in the research, which could have diverted them from regular job duties. Additionally, such distress could have been amplified by the ongoing war in Ukraine, especially for those healthcare workers who reside in the Eastern and Southern regions of Ukraine where the military action is taking place or who had to relocate to other areas due to military activities and are internally displaced at the moment of the survey.

While the researcher did not collect detailed demographic data on the participants of the qualitative study, apart from the participants' age, sex, role or position, as demographic characteristics are not intended to generate significant analytical potential for this research phase, those questions may have also evoked stress among the informants. The inclusion of demographic data and subsequent presentation of demographic characteristics in the research article can threaten the confidentiality of participants within a study with a small sample size (Morse, 2008). To mitigate the mentioned risks to health facility personnel, the researcher undertook the following measures:

1) not recording individual names on audio tapes and interview transcripts;
2) describing the qualitative sample in aggregated terms without the demographic data elements;
3) holding individual interviews online at the time and locations convenient to the expert;
4) storing all digital files (including audio files) on password-protected computers and servers or cloud-based servers, with access permission granted only to the researcher;
5) destroying digital files from devices used to temporarily store or transfer data files once the transfer is complete;
6) assuring that any publicly released report or presentation of the study findings sufficiently protects the confidentiality of individual informants.

Thus, no adverse events or effects on participants' health and well-being were anticipated or occurred as part of this project since it involved no investigational use of drugs, devices, procedures, or interventions.

Researcher's Role

Since the research design was a single-case study with a set of in-depth semi-structured interviews, this research project entailed brief yet personal interactions between the researcher and the participant. Marshall and Rossman (2016) argue that though such contacts are anticipated to be brief, in-depth interview studies still enter the lives of informants and potentially disrupt participants' daily routines, which is associated with a series of technical, strategic, ethical, and personal considerations for researchers (p. 234). In this case, the author of this research project addressed the technical aspects of entry into participants' lives (conducting interviews online rather than in person), ethical issues (ensuring responses' confidentiality), or personal issue of self-reflexiveness regarding personal experience as a scholar.

The researcher anticipated a relatively limited study intensiveness for informants in terms of presence in the field, as the research involved minimally intrusive data collection methods with the researcher being present in the lives of participants for a short period of time (Marshall & Rossman, 2016). However, in such a format of interaction the researcher also considered approaches and techniques to rapidly build rapport with informants during brief contacts. The previously defined research aim, questions, and case study propositions that constitute a precise research focus of this project enabled effective and considerate management of researcher's role within the available time allocated by the scholar and informants (Marshall & Rossman, 2016). The researcher also applied a self-reflexive approach and continuously examined her biases concerning the personal experiences related to this project. Although the qualitative research design and the constructivism paradigm employed in this study did not imply the complete separation of the researcher from the studied phenomenon or personal experiences, the following discussion of author's positionality established the role and the impact of the scholar on data collection and interpretation processes.

Researcher's Positionality

The researcher in this single-case study project possesses twenty-seven years of professional experience in the field of public health and adult education in the region of the Eastern Europe and Central Asia. In her current position of the Country Director of the University of Washington's International Training and Education Center for Health in Ukraine (I-TECH Ukraine), the author actively participated in advancing high-quality CPE for healthcare workers and development of medical care standards that support HIV service delivery in Ukraine since 2013. The researcher's technical areas of focus include HIV prevention and treatment; harm reduction; care and support for key populations; civil society capacity and coalition building; continuing professional education (CPE)/adult education, underpinned by a great personal passion for public health, social justice, and human rights. It needs to be stated that although the researcher currently operates in a professional position of close partnership between the I-TECH Ukraine team and the PHC of MoH of Ukraine, she does not currently serve/has not previously served in a supervisory position regarding the studied case of an e-learning system or in a supervisory role for the informants in this study.

Consistent with her professional experience, educational path of the researcher also shapes the development of an expertise and research interest in adult learning. The researcher holds a master's degree in international affairs from the Kyiv National Taras Shevchenko University, a master's degree in public administration and a certificate in nonprofit management from the University of Pennsylvania, acquired within Fulbright Fellowship. The researcher has concentrated on global education studies, e-learning, adult education, continuous professional development (CPD), as well as the influence of the COVID-19 pandemic on those areas within this Ed.D. Program.

Given the education and professional experiences of the researcher, her essential research interest includes the impact of the COVID-19 pandemic on distance learning in medical education for in-service healthcare providers in Ukraine. The researcher sought to explore the e-learning development opportunities in the public health sector and the practical, context-related, and cost-efficient strategies, tools, and tips for the improvement of practitioners' experience with the e-learning on the PHC Platform. The researcher also focused on the unique contextual factors that shape e-learning, CPE, and public health education in the low- and middle-income country (LMIC) setting of Ukraine, currently affected by a large-scale military invasion by Russia.

The researcher's personal experience of navigating the COVID-19 pandemic challenges and, later, the war in Ukraine also shaped her perspective on this research project. The author has experienced relocation due to war while advocating the efforts of the organization and its members in the local and global arenas to ensure the sustainability of I-TECH Ukraine as the critical facilitator of public health education and HIV service delivery in Ukraine. The current events in Ukraine can accelerate the transition of technical support and education for healthcare workers (HCWs) to an online model while exacerbating the challenges of e-learning in the Ukrainian context. The author examined the perceptions of providers regarding the maintenance of service delivery, the efforts to mitigate the pandemic, engagement in online CPE, and management physical personal safety or security of both healthcare service providers and patients during the war.

In sum, the researcher anticipated to develop an appropriate role in the context of this case study by adhering to strategic and ethical principles of efficient research completion. The researcher also displayed awareness of complex ethical issues experienced by both the scholar and participants, shaping a feasible inquiry into the perspectives of adult learners on e-learning.

The participation of healthcare practitioners in this study was minimally intrusive, fully voluntary, and entailed minimal risks, described earlier in this section.

Limitations

The central limitations of this dissertation relate to the study design, including the single-case study approach and sampling strategies. Following Stake's (2010) description of case study types, this research project was an instrumental inquiry for developing insight into and understanding of a specific phenomenon, which was the e-learning practice for CME of healthcare practitioners in Ukraine during the COVID-19 pandemic. Though the single-case study design was suitable for a detailed and in-depth investigation of the identified phenomenon situated within a specific context, this methodology did not ensure generalizability of results in its conventional sense of transferring study findings onto other contexts or populations.

The purposive sampling strategy that was applied to recruit 15 informants and conduct 15 in-depth semi-structured interviews, formed a relatively small sample of healthcare practitioners that may not reflect the diversity of adult learners' perspectives on e-learning in other professional environments. The perceptions of the selected participants also reflected a limited continuum of experiences with e-learning among adults, as the study solely focused on continuing professional education in healthcare sector of Ukraine. The sample in this study mostly represents the perceptions of female healthcare workers employed across the positions of nurses, doctors, and clinic heads and who have completed an average number of courses between 1-5, while underrepresenting male healthcare practitioners and those who are employed in other positions in this sector or completed a larger number of courses on the PHC Platform. Hence, the small sample size and purposive sampling strategy resulted in limited generalization possibility

and potentially decreased the relevance of acquired insights for other professional education contexts or practices.

Nonetheless, the limited capacity to generalize study findings onto other populations associated with the single-case study design was addressed by the possibility of analytical generalization of the results, previously described in the Methodology section (Quintão et al., 2020). The researcher was able to transfer the study results onto the theoretical frameworks, contributing to the advancement of evidence on learners' experiences with e-learning and potential individual- or institutional-level governance strategies in the field of e-learning for CPE of medical practitioners (Bourgeault et al, 2013, p. 81). The investigation of the single case of e-learning on online CPE Platform in Ukraine could improve theory on adult learning and the response of LMICs to the healthcare crises (such as the pandemic) and other emerging challenges (large-scale war, policy changes, different health burdens of the population). Moreover, the further completion of multiple case studies of similar e-learning systems as the directions of future knowledge creation should address the suggested limitations of the case study format.

Another limitation of the study was the conflicting ontological and epistemological issue of data collection. Galdas (2017) argues that that case study design can integrate a tendency regarding researcher's bias towards verification of assumptions and preconceived notions during the inquiry, which can be derived from the review of existing evidence and the influence of researcher's professional experience on this research project. However, the researcher addressed this limitation by utilizing the member-checking validation technique after collecting qualitative data to enable participants' review of preliminary data and results. This strategy ensured that the researcher develops valid interpretations of participants' experiences that represented their views

correctly (Creswell & Plano Clark, 2018). The reflexivity and transparency regarding the researcher's perspective addressed in the previous section, the Researcher's Role, also strengthened the critical and self-reflective approach of the author towards personal preconceptions, relationship dynamics, and analytic focus that could have shaped data collection, analysis, and presentation in this project (Galdas, 2017).

More urgent limitation of this project was dictated by Ukrainian reality of the past eighteen months with the continuing full-scale war launched by the Russian Federation against Ukraine in February 2022. Despite unique resilience of Ukrainian nation in general and its healthcare workers in particular, who continue serving their patients at the front lines despite all the atrocities of this war since the first days of invasion, the war has been taking its physical and psychological toll on all Ukrainians, including informants of this study. It was challenging to control for the impact of war on informants' recollections in regard to their experiences with the e-learning on the Platform and the selected two online courses, despite the carefully selected and defined case and designed tools. Another limiting aspect of the war in this research was the influence of the war on the study population in terms of physical relocation, evacuation, or psychological distress that could have prevented the informants from fully participating in this investigation. As the timeframe of this research and the constraints of the case study included the period of the COVID-19 pandemic from 2020 to 2022, it is impossible to separate the experience of informants associated with the pandemic during the past three years from the large-scale war that broke out in February 2022. Thus, this investigation focused on the experience of e-learning use for in-service healthcare providers during the pandemic, acknowledging the complex burdens and changes in care provision and professional education associated with the war in Ukraine.

Overall, this inquiry comprised a set of limitations that referred to the study design and context. The researcher attempted to address the identified limitations by ensuring the rigorous completion and description of study procedures that enhanced the quality and trustworthiness of research results. Specific validation strategies and acknowledgement of study scope as well as case study propositions also minimized the influence of the addressed limitations on the findings of this research project.

Conclusion

This chapter illustrated the theoretical rationale for using qualitative case study methodology and the exploratory single-case study design to examine the case of the Public Health Center (PHC) online Continuous Professional Education (CPE) Platform of the Ministry of Health (MoH) of Ukraine. The chapter provided the explanation of the methods and procedures used for data collection, analysis, and validation processes. Since the objective of this dissertation is adding is the articulation of perceived enabler and barrier that shape e-learning experience among healthcare providers during the pandemic and the war in Ukraine, as well as developing recommendations for improved e-learning application in this setting, the qualitative case study allowed the identification of specificity in participant perceptions. This dissertation is also an exploratory study that should strengthen the body of evidence in this context-specific field. In the next chapter, the researcher will address the characteristics of the group of study participants and study results on the perceived enabling and challenging factors in e-learning of Ukrainian healthcare providers acquired through interviews and desk review strands.

CHAPTER 4: CASE STUDY RESULTS

Introduction

This chapter of the dissertation details the results of the qualitative data analysis process delineated in the previous chapter. The information obtained from interviews and pertinent documents displays the experiences of Ukrainian healthcare providers with e-learning on the PHC Platform and CPE during the COVID-19 pandemic and the Russian-Ukrainian war between 2020 and 2022. The purpose of this chapter is to articulate the specific perceived factors that either facilitated or hindered experience of the informants with online courses on the Platform and identify Platform improvement recommendations, focusing on the expanded study setting of Ukrainian CPE. This chapter comprises sections with the information about study participants, the general perspective of informants on online courses and the PHC Platform, the perceived enablers and barriers that shape the use of the PHC Platform, the impact of the COVID-19 pandemic and Russian-Ukrainian war on the experience of healthcare providers with online courses on the PHC Platform and e-learning in general, as well as expectations and requests of informants concerning the improvement of their experience with the PHC Platform and alleviation of challenges with CPE in the described context. This chapter tracks the mentioned factors that influence e-learning experience in consistency with the concepts adapted from the Bourdieu's capital theory.

Study Participants

The researcher conducted 15 in-depth interviews with 15 registered users of the PHC Platform who are in-service healthcare practitioners employed in different positions across the

healthcare sector, ranging from junior patient care nurse, regular nurse, family physicians (family medicine doctors), doctors from the specialized care sector (such as pediatric immunologist or psychiatrist), and heads of the clinics. In this case, the study covered healthcare providers in diverse positions from junior professionals to high-level managerial staff, such as clinic heads (The Ministry of Health of Ukraine, 2002).

The sample included individuals with specialist and higher education, whose workplace experience as healthcare providers ranged from 1.5 months to 42 years. The participants included 11 women and 4 men, whose age ranged from 24 years to 65 years old. Individuals who provided consent to participate in the study were mostly women. According to the most recent governmental statistical publication about the structure of employment and social protection in Ukraine, women constitute 82% of the total estimated healthcare workforce in Ukraine (State Statistics Service of Ukraine (SSSU), 2020, p. 119), which demonstrates that men could be underrepresented in the total population of healthcare workers as well as in the purposively developed sample of informants who reflect a set of identified criteria in this study.

All of the informants met the following criteria:

1) are registered users of the PHC Platform;
2) are in-service healthcare providers employed by the MoH of Ukraine;
3) completed from 1 to 5 e-learning courses on the Platform in total;
4) completed/were enrolled in the two selected courses on the Platform ("AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination") between 2020 and 2022;
5) stated that they were comfortable with English-language interviews;
6) provided written informed consent to participate in this study.

The complete description of the sample, participant demographic data, and number of courses they have completed on the PHC Platform can be found in Table 6 below. The information about the number of courses informants completed in total on this solution was retrieved from the Platform with assistance from the PHC representatives. The collected data and study scope do not enable to capture regional differences or any other forms of cultural diversity in the experiences of healthcare providers across Ukraine.

Table 6. Demographic Information on Study Participants from Interviews and Platform Data.

№	Cadre	Age, full years	Gender	Education level, highest degree	Professional experience, years	Number of courses completed on Platform
1	Family physician	37	female	Higher	11	1
2	Junior patient care nurse	24	female	Specialist	2 months	1
3	Nurse	28	female	Specialist	8	1
4	Family physician	32	female	Higher	14	1
5	Family physician	65	male	Higher	42	1
6	Family physician	26	male	Higher	1.5 months	1
7	Pediatric infectious disease Medical Doctor	50	female	Higher	30	1
8	Head of the clinic/ Family physician	63	female	Higher	37	4
9	Head of the clinic/ Family physician	34	female	Higher	9	2
10	Pediatrician	36	female	Higher	11	5
11	Family physician	40	male	Higher	26	4
12	Family physician	29	female	Higher	1	1
13	Pediatric immunologist	57	male	Higher	33	4
14	Family physician	30	female	Higher	3	3
15	Psychiatrist	41	female	Higher	13	3

Case Study Results on Perceived Enablers and Barrier to E-learning Use in CPE of Healthcare Workers

General Experience of Participants with E-learning and the Platform

All participants shared a positive overall experience with the PHC Platform, stating that they are "*satisfied with the platform, it is very convenient and user-oriented*" (Medical Doctor 1). Practically all informants also reported general satisfaction with the Platform. Multiple informants named convenience, ability to develop a flexible learning schedule or learn on the go, easy navigation, brief presentation of materials, as well as informative courses as key factors of their satisfaction. 11 participants stated that they have not contacted technical support on the PHC Platform due to the absence of any problematic questions that required assistance from technical support. However, some respondents contacted technical support due to registration/authorization issues and were satisfied with the resolution of their problems.

The informants have not received any specific formal or informal training or orientation before or during the use of the Platform. However, some were already aware of e-learning Platforms and had a general understanding of electronic systems operations, as Medical Doctor 7 claims that, "*My first experience was when we were taught to work in the health electronic system; we were taught to code diseases*." The participants relied on personal capacity to learn how to navigate a new e-learning Platform that has become a critical tool in their CPE during the pandemic. Two respondents stated that some instructional materials available on the Platform, such as links to YouTube videos created by the PHC on how to set up an account on the Platform, were exceptionally relevant for their introduction to this system and its navigation. However, five respondents noted the necessity of additional training before or during the use of

the Platform that should improve user experience of learners, especially focusing on introduction to the Platform operations for new users and appropriate search strategies: "*If there will be a total update of the Platform, then yes, I believe that some online instructions are necessary for people to quickly understand where to click*" (Nurse 2).

All of the healthcare providers interviewed in this study claimed to use multiple online education resources along with the PHC Platform. The CPE of these professionals typically included attendance of the national- and foreign-based online conferences, completion of e-learning courses on different platforms, regular explorations of journal articles within their fields of expertise on different scientific platforms. The informants used an array of other e-learning solutions in their CPE in addition to the PHC Platform, such as the platform of the National Health Service of Ukraine (NHSU) (NHSU Academy), Medplatforma, WHO Academy, Pfizer Academy, MedExpert, BMJ Learning, MedEvents, Accemedin, Medvoice, Hippocrates, as well as Coursera and Prometheus.

Perceived Enablers of the Platform Use

After the collection of basic demographic data and the general perspectives of informants on the PHC Platform and their e-learning experience, the interviews proceeded to the inquiry about the factors that could have contributed to or facilitated e-learning among healthcare providers. As described in the Methodology chapter of this dissertation, the capital theory by Pierre Bourdieu served as a core theoretical framework for the analysis of both enablers and barriers to e-learning use in CPE of healthcare workers in Ukraine. The section Case Study Propositions in the previous chapter details the sense of each capital category, translated into interview prompts displayed in Appendix A, that could presumably impact learners' experiences

with the PHC Platform and e-learning in general. The following narrative delineates the responses of informants regarding each of the defined capital forms.

In the first capital type, which was the resource capital, the resource term served as a level-one code to identify the resources that enable informants' use of e-learning in their CPE and a series of level-two codes that signified different resource types, such as financial resources, devices, time, location/space, and Internet access or amenities. Considering the role of financial resources, money was not frequently reported by informants as a critical factor that supported their ability to use e-learning for CPE. Only two respondents mentioned finance as a significant factor of improved e-learning use. For instance, Head of Clinic 9 articulated an expectation that clinic management or other administration could cover some expenses for paid training events:

> *"There's a law somewhere that says that partial payment for courses should be covered by management. So far, it's not being discussed, and there are enough free training courses to use. I hope that someday the management system changes, and they sometimes send us links to conferences, courses that they would like us to take."*

Medical Doctor 5 stated that, "*It's cheaper, much cheaper, no need to travel to *City*, look for accommodation or food, very convenient*," referring to cost-efficiency of e-learning as compared to attendance of training events in-person with all associated travel and accommodation expenses.

In terms of availability of devices for engagement in e-learning as a fundamental enabler to such practice, almost all respondents mentioned that they have available devices (computers, laptops, headphones, microphones) for e-learning either at their workplace or at home or both, which pimples that device availability was a significant enabler to the use of e-learning in CPE of healthcare workers. Similarly, multiple informants stated that they had an adequate

location/space to study and complete e-learning courses, either allocating such space in their workplaces or at home.

The researcher also focused on time as a critical resource in the practice of healthcare workers which they allocate to completion of professional duties and personal commitments, including e-learning as an essential component of their CPE. Time was frequently mentioned as a resource in this sense, and multiple informants articulated the lack of time related to excessive workload and other issues as a barrier to e-learning use, which will be further described in the next section of this Chapter. In the case of time, time management capacity and adequate doctor/patient ratios contribute to e-learning use by healthcare workers, and they attempt to balance different commitments in their daily routines, incorporating e-learning into their schedules:

> *"I don't find it particularly problematic, when the courses are not very lengthy. I believe it's manageable to take them gradually. As I mentioned before, I can sometimes even watch these courses while I'm at work. Spending three hours sitting and watching these courses doesn't make a problem for me; I can simply allocate time whenever I have any free time slots during my day."* (Medical Doctor 14)

> *"We try to plan the week. I plan my week, I have all the moments scheduled, where I am at what time. If I need to allocate online learning, it's usually well in advance. I hear that there is a conference somewhere, and I already adjusted my schedule/appointment with my patient today for that. I approach this on case-by-case basis, so to speak, to find time."* (Medical Doctor 4)

Internet access was mentioned as an enabler to e-learning use by one informant who argued that Internet access, speed, and connectivity significantly contribute to effective e-

learning, including the cost and availability of extensive data plans from mobile service providers. This respondent compared the cost and accessibility to advanced Internet access service plans in Ukraine and Romania, being temporarily relocated there due to war launched by the Russian Federation against Ukraine. She suggested that Romanian plans were cheaper and Internet connectivity was of better quality which improved her experience with e-learning using the PHC Platform:

> *"Internet access plans are also a relevant issue because during the war I was displaced in Romania, where the Internet connection is better, it's actually cheaper to pay for the larger plan with more free gigabytes, and the Internet coverage is better. So, I think the Internet connection also plays a huge role in overall experience."* (Medical Doctor 1)

Social capital represents the second significant type of capital that reinforces e-learning use among the interviewed healthcare workers in Ukraine. During the interview guide development stage and after the review of this guide by other experts in the field during the content validity check procedure, the guide and case study propositions that initially included the two separate capital categories of social and cultural types introduced by Bourdieu (2002) were modified with the integration of the social and cultural capital categories into one social capital category. The similarities and interconnectedness of aspects in both categories shaped the integration of these two forms into one category of social capital that included the subcategories of support from managers of colleagues, the acquisition of CPD points by providers as a factor that contributes to healthcare workers' qualification and the requirement of e-learning course completion for conducting specific clinical practice interventions. Here, the respondents frequently noted communication with and support from colleagues and administration as vital aspects that facilitated their experience with e-learning on the Platform. 14 informants out of 15

people interviewed in this case study reported some form of support or communication with these stakeholders. The respondents communicate with other colleagues, who take the course, and administration, sometimes create chats on social media platforms (Viber, WhatsApp) to exchange experiences and knowledge related to e-learning courses. The informants stated that:

> *"The management is completely satisfied with my learning progress. Sometimes, when the director sees me studying, she praises me, saying, "Well done, that's impressive." In fact, I recently convinced one of our doctors to participate in the online training, so we did it together, completed the course that I have recommended.*" (Medical Doctor 14)

> *"We have various meetings, discussions, and lectures. When COVID-19 emerged, family medicine doctors were initially uninformed, confused, we needed discussions and guidance. Meetings, discussions, lectures, and training courses were organized to address these matters. We actively attended and participated in diverse training courses, exchanging our knowledge with doctors from various specialties, as well as teachers and daycare workers."* (Medical Doctor 15)

> *"We constantly communicate because if there is something interesting, say, there is a group of doctors on Viber. If there is anything interesting, they share different facts, information, practices, and announcements."* (Medical Doctor 7)

One respondent noted the critical role of the management as leaders in the introduction of new practice and implementation of innovative learning solutions, such as e-learning, who serve as guides for their subordinates in using e-learning for CPE, stating, "*If the management knows how to work with a keyboard, then everyone around them also learns; you have to start with the chief doctors/heads of the clinics*" (Medical Doctor 5).

The necessity to acquire a specific number of CPD points annually by attending different training events, including completion of e-learning courses, was another essential social capital factor that served as an enabler to e-learning use among healthcare workers. The acquisition of CPD points for personal portfolio and the necessity to attain annual CPD goals in healthcare facilities were the incentives for healthcare provider and clinic managers to engage in e-learning on the Platform, as this solution offers state-approved CPD training possibilities and courses, for the compilation of which healthcare providers accumulate CPD points: "*I registered with the Public Health Center because I needed to submit points for professional development to my personal portfolio in order to continue my practice*" (Medical Doctor 4); "*earning CPD points is another incentive; it becomes important to be interested in accumulating a certain number of points by completing courses that are a part of CPD*" (Medical Doctor 15). In sum, 8 respondents mentioned the necessity of obtaining CPD points as a factor that facilitated their e-learning use of the Platform.

The informants described situations from their professional experience, when they were required to complete e-learning courses before they could practice specific clinical interventions, such as COVID-19 vaccination. For example, Medical Doctor 10 stated, "*It was mainly the initiative of the management; we received certificates to be able to vaccinate people*." In this case, the requirement to complete online courses to practice was another social enabler to e-learning use among informants, reflecting a regulatory requirement as a component of social setting for the practice of healthcare providers. In total, five informants described this aspect as a factor to their engagement in e-learning courses on the Platform.

Technical knowledge refers to the third critical capital form that was an enabler to e-learning use among healthcare workers in Ukraine. The informants frequently (11 respondents

out of 15 people interviewed) reported possessing sufficient technical knowledge, technology management skills, or digital literacy levels to effectively use e-learning for their CPE. The informants mentioned that they were familiar with computers and information management systems, some stated they were familiar with other e-learning systems and solutions having prior experience with online education and e-learning, described in the previous section of this Chapter.

> *"If we have already figured out how to prescribe available medicines and electronic medical certificates via new electronic health management system, it is not difficult to navigate the Public Health Center's Platform."* (Medical Doctor 1)

Intrinsic capital was the fourth essential category that enabled e-learning use among healthcare providers in Ukraine. The sense of this capital form and the evidence base behind the formulation of this type were described in the Case Study Propositions section of the Methodology Chapter. This form of capital was adapted from Bourdieu's capital theory and other scholarly interpretations of this framework, signifying internal resources, psychological capacities, motivation, or resilience of informants that could have facilitated their e-learning use for CPE. Respondents reported significant internal motivation to engage in e-learning related to the intrinsic need to acquire new information considering the constantly-evolving nature of the medical science and healthcare fields:

> *"Because diseases also evolve, symptoms change, and treatments change. It also concerns me as a mother because I have a child, and if something needs to be treated, I need to know how to treat it and what to protect my child from. And of course, it's also important for my position because medical professionals need to update their knowledge in their own field so that they know how to help people in different situations."* (Nurse 3)

"It's not about the CPD points. As a Medical Doctor, I am more interested in the up-to-date information provided by the speakers. I want to help people. I am a family Medical Doctor; I have patients, whom I want to help." (Head of Clinic 8)

"Medicine is a science that constantly requires improvement. It does not stand still, it moves forward. Therefore, I believe that every medical Medical Doctor who is a conscious responsible professional, who wants to help their patients correctly, should not only be able to learn, but must learn daily even with limited opportunities. ... So, it's about self-improvement. And the variety of topics is also very good, because as a family Medical Doctor, my practice touches upon practically everything, every disease or condition." (Head of Clinic 9)

"In my situation, since I specialize in pediatrics, as I said, I have to stay on top of all the advances in my field. I'm feeling compelled to do so, I have to treat my patients right, it's my responsibility to treat them safely." (Medical Doctor 13)

Course design was the final, fifth form of capital that was an enabler to e-learning use among healthcare workers. This category included the consideration of e-learning course design on the Platform as well as general Platform characteristics that could have facilitated the use of this e-learning solution in the group of informants. The informants repeatedly reported the user-centeredness, convenience, and ease of use within the Platform which contributed to their use of e-learning courses.

"And with all these courses that are in a format like PowerPoint presentations, it's convenient to take them and fit that into your schedule. And with presentations, it's very convenient and easier to find time for them than for some synchronous conferences, video calls. ... Basically, the design of our Ukrainian official services lately is great. Their

design is sometimes better than of those courses offered by private companies. Everything is convenient, there only problem is the diversity of information, the amount of information, the support that is missing sometimes." (Medical Doctor 6)

"Well, [the courses on the PHC Platform][2] are broken down into blocks with short videos, and you have to do something interactive, it's good. I can find what I need. I had some questions at first, but if you use it regularly and periodically, there are no problems. They're not difficult. And there's never enough materials for those who want to dig deeper. But they do raise questions, which if you want, if you need to go further, then you look for answers to those questions somewhere." (Medical Doctor 12)

The respondents did not identify any new capital categories or factors that enabled their use of e-learning in CPE in addition to those types and prompts identified by the researcher that could have been coded as "Enabler-Other" and subsequently used to expand or strengthen the analytical framework in this study.

Perceived Barriers to the Platform Use

The researcher used the analogous capital types with relevant codes and sub-codes to analyze barriers to e-learning use in the CPE of healthcare providers in Ukraine as compared to the analysis of enablers described earlier in this section. The first form of capital, resource capital, included the availability or lack of financial resources, devices, time, location/space, and Internet access or amenities as factors that could hinder the use of e-learning by informants. Similar to the limited reports of money being a potentially enabling factor to e-learning use,

[2] *Here and in subsequent quotes: the comments in brackets [] are the notes and clarifications from the interviewer.*

financial resources (or their lack) have not been a frequently mentioned factor that challenged e-learning in the experience of informants. Some of the interviewed healthcare workers (three informants) noted that the lack of money could have prevented them from completing specific paid courses or obtaining certificates of course completion if such an option required additional payments. Yet, these reports referred to other e-learning systems or resources, as courses on the PHC Platform are offered to healthcare providers free of charge:

> *"Well, on Accemedin (https://accemedin.com) or Hippocrates (https://hippocrates.org.ua) there are a lot of paid events, as well as on a few other platforms. There are a lot of interesting events, but you have to pay to participate. Then, there are also various events at hospitals in *other regions of Ukraine*. They are also very interesting, but they are also not free of charge. And, you know, it's not so much that I'm reluctant to spend the money. It's just that I don't have the time. And there are also deadlines for registering for these events, so that's why they are paid. Moreover, now even more paid online events are being introduced."* (Head of Clinic 8)

Time capital as a resource that potentially hindered e-learning use was frequently stated as a critical factor in the group of respondents. The lack of time for e-learning course completion on the PHC Platform was a central issue that was reported by healthcare providers, as multiple respondents labeled excessive workload ("*I don't think I have a concept of a day off. There are phone consultations and so on. There is no time off for doctors ever,*" Medical Doctor 4) and the lack of ability to allocate time to e-learning during the workdays as the reason behind this is lack of time:

> *"The difficulty was that conferences were mostly during working hours. You didn't have the opportunity to watch the conference online, while seeing your patients. If the event is*

scheduled on weekend, there is no issues, it is great. But in reality, all conferences start around 9-10 a.m., which is also the peak time for patients' admission. Especially during the COVID-19 pandemic, when the number of appointments increased exponentially, and there were constant duty calls, it became truly difficult to attend training and other events." (Head of Clinic 9)

The informants also shared their challenges with meeting the demands of professional duties, personal life commitments, and incorporating e-learning into their schedules:

"But when lectures start at 9 a.m. and I have to go to work, I can't attend them, I have patients to see. ... There are also household chores, there is a garden with tomatoes, cucumbers, potatoes. There is also a vineyard and an orchard. These also require time. And then, when it's dark, I sit at the computer and study medical materials. There are difficulties, but the online learning option is very good." (Medical Doctor 5)

Moreover, family medicine doctors who were interviewed during the data collection process also mentioned that they have disproportionately experienced the impact of burdens of the COVID-19 pandemic, the war, and current reforms in the healthcare sector of Ukraine. The necessity to respond to the COVID-19 pandemic dynamics, address new healthcare needs of the population and challenges during the war, and adjust to the on-going healthcare reform process dramatically increased the workload of the family medicine doctors, which deprived them of the essential resource of time to complete online courses.

"You understand perfectly well that family medicine doctors are burdened with a lot right now. And not only that, practically all medical specialists have moved to the state diagnostics centers, they are consulting doctors now. That is, they do not issue sick leave, only provide advisory opinions/consultations. That is, they provided a consultation, and

then you have to deal with all that (prescriptions, patient management etc.) as a family Medical Doctor." (Medical Doctor 11)

The availability of devices also constituted notable barriers to e-learning use among healthcare workers, as seven informants mentioned some issues with devices or their availability, the following statement serves as an example of those reports: "Our management cannot provide computers to all employees who need them" (Nurse 3). The availability of location/space conducive for e-learning course completion was not reported as a critical barrier that challenged e-learning among respondents, and only one person, Nurse 2, described a challenge with finding space to complete e-learning courses due to relocation related to hostilities during the war launched by the Russian Federation against Ukraine:

*"I am always trying to find it [space]. I use spaces like cafes. If possible, I ask my family, with whom I am currently living, to go for a walk outside. My little brother goes to the playground or we go shopping somewhere. I say that I cannot go because I need to focus on my studies. My family is understanding, and they accept this factor of my development. ... More events take place in *City*. I'm in this city now, it's easier for me, but for people who are from other cities, they won't have to spend time and money on travel, and they too can be present."*

The problems with electricity supply and Internet access or connectivity were not frequently mentioned as factors that hampered e-learning use among informants, though five respondents mentioned different kinds of challenges with Internet access and connectivity which prevent them from effectively using the PHC Platform or complete e-learning courses:

"If there is a war going on, during possible disconnections of the Internet, electricity, then, of course, there are no opportunities. Mobile internet is poor, but it is there, but it

does not work as well as wired internet or Wi-Fi. Or even if it is available, it may be poor. The opportunity to learn is not always there." (Nurse 3)

This tendency of limited reports of power supply outages or Internet access issues displays that the Ukrainian energy system has been restored quickly after Russian military attacks on civilian infrastructure since early 2022.

Considering social capital as the potential barrier to e-learning use for CPE of healthcare workers, here the researcher has not identified additional sub-codes as opposed to social capital category in the analysis of enabler to such practice. The responses of informants regarding social capital that impacts their experience with e-learning primarily focused on the lack of interactions with peer learners/instructors during the completion of e-learning courses and the insufficient or the absence of feedback concerning their performance.

"The main issue is communication. There is a problem with direct interaction with instructors and other participating doctors. In a conference, for example, I can ask questions and engage in discussions, but with these online courses, communication is often these text forums, if they are available at all, sometimes not. It is making it harder to receive feedback or ask for additional guidance or clarification on confusing issues." (Medical Doctor 14)

The respondents also mentioned that such a lack of communication and interactions during online courses generates a perception of disconnectedness and isolation from other professionals, medical community, or people in general due to the necessity to study alone in front of a device.

"You can contact the colleagues from time to time, but, otherwise, you do online courses all by yourself." (Medical Doctor 11)

"Of course, compared to offline events, there's a coffee break, and there's interaction among the colleagues who participate. When, for example, you haven't seen a colleague in years and meet them at a conference, during the break you can exchange experiences and some news, professional and personal. But online, you're one-on-one with your computer, and it distances you a bit from community, from the medical community. There is no human touch. Also, sometimes, the one who teaches the course is somewhat disconnected from what's happening in practice, in real world, and you cannot comment on that." (Medical Doctor 1)

The lack of support, direction, or general communication with management or administration of the healthcare facilities where the respondents worked were the significant components of social capital that constituted a barrier to e-learning use. In this case, the insufficient support of e-learning and the training of medical personnel from the administration of healthcare institutions was a perceived barrier to e-learning use that related to the inadequate social capital.

"The management directs these studies, but they only direct some individual cases. Well, when you want some new information, new methods, not to go along with all those old-fashioned techniques, there is no source to get information from." (Medical Doctor 6)

"There are no encouragements or allocated time specifically for online learning. We just have to come and do it. There are no special incentives or time allocations. … Well, offline learning is also useful because there is live communication, which is also more

informative than online, in terms of being able to ask questions, have discussions, and debate contentious issues." (Medical Doctor 10)

Proceeding to the analysis of technical knowledge as a form of capital that can impact e-learning use among healthcare workers, although multiple informants have mentioned that they had sufficient technical knowledge that was an enabler to their experience with e-learning. Nine respondents stated some problems with technical aspects during their use of the Platform. Some of these informants referred to the challenges their older colleagues encounter when engaging in e-learning due to the lack of expertise with the use of electronic devices, management of electronic data storage systems, low digital literacy levels, or limited experience with e-learning systems.

"I don't know, there are just older doctors and healthcare workers, who may find it more difficult. Usually, for something like registering for courses, they ask for help. Quite often." (Medical Doctor 6)

Nonetheless, some providers also reported personal struggles with using technology for online course completion, which was a barrier to e-learning use for CPE. The respondents mentioned helping their older colleagues to engage in e-learning or reported requesting and acquiring assistance from younger colleagues.

"And I'm not a very good IT user. It's hard for me to register, I always forget my password, that's the problem, I couldn't log in. Now I use my Google account to log in, it remembers all my passwords. At first, I was a bit confused." (Medical Doctor 1)

"The hardest part was the technical aspect, to be honest. As you understand, I'm of an age where I finished studying back in 1984, so you understand that I didn't have a great

relationship with technology, especially computers. For us, who learned to work with computer technology later during our career, it is not that easy. I understand from my colleagues and our doctors that even those who graduated later than me, they don't use computers themselves, their subordinates help them." (Head of Clinic 8)

"The only thing I don't like is, how to say, authorization, for example, in your personal account on your platform. It seems too complicated to me. I lost my password, and the nurse restored it for me. So, it seems to me that this could be done in a better, simpler way. I only had a problem with authorization." (Head of Clinic 9)

The informants also described the necessity of digital literacy skills for healthcare providers, which is a central aspect of service provision optimization and improvement, articulating the relevance of some training for the advancement of their technology management skills and digital literacy.

"It should be periodic, but with what frequency, I can't tell you right now. But it should be face-to-face, specifically face-to-face. This is when, you know, when you listen, but for me, for example, I look at my colleagues when they practically see the material, question something, discuss. Because at the moment, in working with the electronic health management system, there are many moments that, from our point of view, are not entirely logical. Well, we are also regular humans, and we are not technical savvy IT people." (Head of Clinic 8)

The intrinsic capital the respondents possessed was another issue that could be a barrier to e-learning use for CPE. Excessive workload and inability to balance the demands of professional and personal commitments described in this section as causes of the lack of time for course completion also affected personal capacity/motivation of providers to engage in e-

learning. The physical and emotional burdens of the pandemic and the Russian-Ukrainian war had a toll on Ukrainian healthcare providers. They mentioned complex emotional state, exhaustion, lack of energy to cope with daily activities.

> *"It turns out that now the learning conditions are slightly more difficult, emotional conditions, so it's a bit more difficult to learn. So, everything depends on how much interest and burnout you have, ... and sometimes you are too exhausted to do anything else rather than lay down after work."* (Medical Doctor 7)

> *"Well, sometimes you can [study], you are capable of doing it physically and mentally, and sometimes you can't."* (Medical Doctor 12)

Course design was the final significant factor that could have challenged the use of e-learning Platform in the CPE of healthcare providers. Respondents reported that the lack of interactive components in the courses on the Platform substantially challenges their e-learning experience, as they are dissatisfied that they cannot communicate with other learners or instructors and they do not acquire feedback on their performance. In the questions about the design of courses and the Platform, the informants mentioned that the system and courses frequently do not allow users to download presentations from lectures, which challenges learning because healthcare providers could have used these materials to study after course completion and reference them if necessary. Some respondents mentioned the insufficiency of thematic diversity of online courses on the Platform: "*The only thing missing is that the Public Health Center focuses on global issues like HIV and COVID-19, but we need more narrow and specific topics/courses*" (Medical Doctor 7).

Two respondents (nurses) also mentioned that the PHC Platforms and e-learning course that they have completed in this system were more suitable for doctors rather than nurses. After

being asked to expand on that perception, they have identified the complexity of materials and the dominant thematic orientation of courses on the expertise of doctors as the factors that contributed to this perspective. The considerations of these nurses are displayed below.

> *"As a junior nurse, sometimes the information seems difficult because it's intended for practicing doctors, and I need to analyze this information more deeply to fully understand it."* (Nurse 2)

> *"But, as I understood, distance learning [on the Platform] is more suitable for doctors than for nurses. Also, someone mentioned that this course certificate is more suitable for doctors of all different specializations."* (Nurse 3)

Four interviewed healthcare providers reported difficulties with authorization to the Platform, which were exemplified by the statement of the Head of Clinic 9:

> *"The only thing I don't like is authorization, for example, in your personal account on the platform. It seems too complicated to me. I lost my password, and the nurse restored it for me. So, it seems to me that this could be done in a better, simpler way. I only had a problem with authorization."*

Other respondents reported challenges with navigating the Platform and its contents, emphasizing the large volumes of information and course suggestions they encountered: "*The most important thing with this system is not to get lost and choose your topic because now the influx of information is quite large, and personally, I get a bit lost in the number of topics and courses available*" (Medical Doctor 4). One person articulated the issue with post-training testing, highlighting a problem in the presentation of test answers that are divided into two parts

and continue on another webpage, which refers to possible discrepancy in the design of testing function on the Platform:

> *"I had some questions about the post-course testing. So, you had to complete a sentence broken with some response options. For example, the sentence starts, and the answers offered include option A, B, and the sentence from option B is divided in two parts that continue on the next page. And you don't know which of these options to choose because it was somehow inconveniently divided into more options."* (Medical Doctor 12)

By analogy with the analysis of enablers to this practice, the respondents did not identify any new capital categories or factors that hindered their use of e-learning in CPE in addition to those types and prompts identified by the researcher that could have been coded as "Barrier-Other" and subsequently used to expand or strengthen the analytical framework in this study.

Impact of COVID-19 Pandemic on Platform Use and General Experience with E-learning

The emergence of the COVID-19 pandemic has substantially altered the CPE of healthcare providers, primarily affecting the format of training with the transition from offline in-person events to online education format. Some respondents mentioned the positive implications of transition from offline to online CPE during the pandemic in their experience, accentuating the convenience, flexibility, and user-centeredness of e-learning systems, including the PHC Platform: "*It was quite easy to transition since we worked online. It was quite quick and interesting, and it is still relevant. You can come to any course at any time without any effort. You can just work, travel, or do whatever you did before*" (Medical Doctor 15). Nonetheless, the adaptation to e-learning in the CPE of healthcare workers during the pandemic entailed ambiguous implications for different providers, as some informants reported quick and non-

problematic transition to e-learning solutions, and others have mentioned challenges they experienced during this process. Many respondents agreed that the changes in their CPE and related adaptation due to the pandemic were rapid: "*It changed very rapidly. Some aspects of learning became more convenient because there were more opportunities for information exchange and a more flexible schedule for learning. That is, tasks can be completed with a longer deadline*" (Nurse 2). One Medical Doctor presented a prominent story of adapting to online CPE requirements during the start of the pandemic.

> *"It wasn't easy because I started as a Medical Doctor in a mobile outreach team. We started working in April 2021. We were among the first ones. In order to work in a mobile outreach team, we had to take online training. And it was like this: at 11 p.m. we were sent a link to the online course, and we had to take it, pass the test, and get our certificates by 6 a.m. the next day. Since we already knew a lot, we went through it, listened, were told things, so I passed my test with a decent grade. And then, on the second night, I sent my first certificate to the supervisor. And, basically, we started working the next day. It was a shock, a somewhat shocking first encounter with the online Platform."* (Medical Doctor 7)

When asked about the most useful aspects of PHC Platform use or e-learning in general that the healthcare providers experienced during the COVID-19 pandemic, the informants' responses focused on the convenience and user-centered nature of the Platform:

> *"With an online platform, you adjust it to your own schedule in real time, and you can plan ahead. Secondly, when you have access 24/7, you can be there at 2 in the morning. And at 7 in the morning, you can review, reread, clarify, and get your grades, knowledge, and screenshots when it's convenient for you."* (Medical Doctor 4)

"Mostly just the ability to study online whenever and wherever you want, you can listen to courses at work or at home or in transport, and it's very easy, interesting and convenient." (Medical Doctor 13)

Other informants commented on PHC courses as short-termed, succinct, concise, yet saturated with relevant data and references to national laws, guidelines, as well as global innovative practice standards. In general, the respondents preferred online education and e-learning as a more convenient and diverse learning modality as compared to in-person training, which is consistent with other investigations regarding the use of e-learning for CPE of healthcare workers during the pandemic (Callinan, 2020; Regmi & Jones, 2020).

During the discussion of the most challenging aspects of the PHC Platform and e-learning courses as the core system and tools for CPE during the COVID-19 pandemic, the interviewed healthcare providers named the lack of interactions/communication among learners and instructors as the central problematic aspect of their e-learning experience during CPE. The Head of Clinic 9 argues that e-learning "*is not the same as in-person communication. When you come [to offline events], when you see your colleagues, their eyes, their smiles, you can talk, exchange experiences, talk about something, even about yourself; offline meetings can't be replaced with anything else*." Others have focused on the characteristic of the PHC Platform and courses, which lack extensive thematic diversity or may contain irrelevant content:

"And at the Public Health Center [Platform], there is less up-to-date information available. Well, probably, yes, thematically there is nothing that is currently relevant to me. Certain courses are available for a certain period of time. It's a bit difficult to catch up when those courses are available. You don't always have time to pay attention to the

fact that there is an interesting course, but then it's too late to take it." (Medical Doctor 6)

"Sometimes they [courses] can have slightly outdated content. I noticed that when I took a course on COVID-19 testing. Some of the information provided was not very relevant and did not align with the situation at that moment. While it would be good to update the course, it still remains interesting and relevant. For the most part, the information is still of high quality. It would be beneficial to update these courses regularly and also make nurses and doctors able to update the certificates they get, so that they can take courses multiple times, rather than just once." (Medical Doctor 14)

Impact of Russian-Ukrainian War on Platform Use and General Experience with E-learning

Although the scope of this study did not cover the influence/role of the Russian-Ukrainian war on the experiences of medical practitioners with e-learning, and the interview guide did not include a question about this issue, the respondents still shared their accounts of how the wartime could have affected their perspectives and e-learning practice during the conversation. The participants referred to their perceptions of war and how the conflict impacted their lives when they felt like it was relevant and significant during the interview. Considering that multiple respondents mentioned the influence of war on their e-learning experience and that the experience of wartime could not be separated from the pandemic, this section will focus on the effects of the war on e-learning and PHC Platform use among healthcare providers in Ukraine.

The large-scale unprovoked war that the Russian Federation started with an attack on Ukraine's sovereignty in February 2022 has produced multiple complex effects on the Ukrainian

society, including the healthcare sector, and more specifically the CPE of healthcare workers in Ukraine. Although this research study has focused on the influence of the COVID-19 pandemic on the experience of healthcare providers with continuing education, the experience and recollections of war and its impacts were exceptionally intertwined with the dynamics associated with the pandemic. In this case, since this study covered the experiences of healthcare providers with CPE during the three years of 2020, 2021, and 2022 (including the whole first year of large-scale Russian-Ukrainian war), the discussion of war implication on the CPE of healthcare workers could not have been separated from other aspects addressed in this study. Hence, this section will delineate some of the impacts the war has generated on the experience of healthcare workers in Ukraine, which the informants have mentioned during the conversation with the interviewer.

Firstly, the war of the Russian Federation with Ukraine has substantially de-stabilized internal processes in Ukraine, challenging the operations of legislative and normative sectors in general and causing the stagnation of e-learning field development. While prior to the large-scale invasion of the Russian Federation into Ukrainian territories in 2022 the PHC representatives emphasized the rapid development and increased regulatory potential in the field of e-learning used in CPE of healthcare workers, the war hampered these processes, as the country lifted the requirement for the healthcare providers to accumulate certain amounts of CPD points each year and the related norms regarding the share of e-learning and offline training events in the annual CPE achievements of these professionals. In this case, the informants in this study reported the lack of clarity in regulations regarding their CPD, which caused frustration, misunderstanding, and insufficient motivation to engage in e-learning courses:

"During wartime, our credits and CPD points are frozen, limited. Currently, with quite a few years of experience, I cannot improve my qualifications, courses are not held. We are documenting this; we are creating our portfolio. We are all waiting for it to end. According to the latest recommendation of the Ministry of Health, this rule will be removed. That is, this limitation in terms of points will no longer exist. But this is still an assumption." (Medical Doctor 4)

"Before the pandemic, it was regulated that online courses could only give you up to 15 CPD points, I don't remember exactly. There was some maximum number of points that could be earned on online platforms, and everything else had to be done offline. Then it was lifted during the pandemic. Now, as far as I know, it has not been reinstated, because if it's not the pandemic, then we have a war going on." (Medical Doctor 1)

Other healthcare providers shared similar perspectives on the unclear regulatory setting regarding CPD and e-learning in Ukraine due to the war and described their view of de-prioritization of CPE in general and e-learning in their professional development, including the approach of the management:

"For example, during COVID-19 pandemic, they [management] constantly urged us to take courses, but now they do not require it anymore. It's because of the war, you know, it's not a priority, so to speak. Maybe when all this is over, there will be encouragement from management again." (Medical Doctor 1)

"That is, in addition, due to the situation in Ukraine, our priorities are slightly different. For example, national defense and everything else. Or maybe you can ease your requirements a little bit. Let's start making some reformed changes after the war." (Medical Doctor 11)

Secondly, the informants mentioned the significant burden the war generated on the healthcare sector associated with the loss of healthcare facilities on occupied territories, evacuation and relocation of medical personnel, healthcare workforce shortage, and emerging complex healthcare needs of the population.

> *"Currently, hospitals, as you may understand, are overloaded. They have been transformed into centers for providing medical assistance to military personnel. As a result, they have reduced non-emergency hospitalizations and mostly deal with emergency cases. All planned procedures are either referred to family medicine doctors or carried out in outpatient clinics. This makes things complicated because there is a lot of workload, and it took some time for us to come up with algorithms and clear boundaries for who does what - family medicine doctors, specialists, and hospitals all have their roles."* (Medical Doctor 11)

The personal challenges of healthcare workers related to relocation, evacuation, subsequent lack of access to appropriate devices, absence of space for engaging in e-learning courses ultimately caused by the Russian attacks on Ukraine were described by two respondents, who mentioned leaving their home cities and Ukraine fleeing from the atrocities of the war:

> *"During the war, I was abroad. During the first part of that time, when I returned to Ukraine, I did not have the opportunity to have a personal computer or laptop, so I had to do everything from my phone, and it was not so convenient. And if I had the opportunity to have a laptop, like I do now that I left again and took my equipment with me, it would have been easier."* (Medical Doctor 12)

Thirdly, Russian military attacks on Ukrainian civilian infrastructure that started in October 2022 caused significant damage in the Ukrainian power supply system, which resulted

in frequent power supply outages, absence of amenities, such as heating or water supply, Internet access and connectivity challenges in all regions of Ukraine throughout October 2022-March 2023 *("Internet connectivity has really been a problem these past months, due to war and all that shelling,*" Medical Doctor 13). The interviewed healthcare provider shared the experiences of these challenges with disrupted power supply and Internet:

> *"But if there is a war going on, during the disconnections of the Internet, electricity, then, of course, there are no opportunities [to study/learn]. Mobile Internet is poor, but it is there, yet it does not work as well as wired Internet or Wi-Fi."* (Nurse 3)

Nevertheless, one informant mentioned a beneficial implication of the war on their engagement in e-learning for CPE, reporting the increased availability of various learning materials and CPE resources, the access to which (often free of charge) was granted to Ukrainian healthcare workers and students as a form of support from international partners and supporting countries and in an effort to alleviate challenges in education sector during the war. Yet, this respondent also shared a perspective that this access granted for Ukrainian students and practitioners is temporary:

> *"Now, in Ukraine, they take everything, as availability of free international resources increased because other countries had granted access to courses and materials, but it will not last forever, access for our doctors to certain resources will disappear, and that's it. It is free now, but no one knows how long it will last."* (Medical Doctor 7)

Opportunities for the Platform Improvement

During the discussion of opportunities for Platform improvement and ultimate enhancement of user experiences with the Platform and e-learning, most respondents claimed to

intend to use the Platform in the future, emphasizing its sustainability and convenience. The informants emphasized that the asynchronous format of the courses was highly beneficial to them, as they were able to select the most convenient learning pace and time for their schedules, considering their substantial workload, personal commitments, and burdens of the pandemic and war on their professional and personal lives.

Respondents also suggested a set of minor changes to be conducted within the Platform that could improve their experience with this system, such as increasing thematic diversity of e-learning courses offered on the Platform and including courses on narrow specialist topics, as on different diseases:

> *"I am a pediatric infectious disease specialist, so maybe some narrower training courses on specific diseases would be helpful. As medicine is continuously developing, I would like more opportunities for professional information. That is, to expand the platform's capabilities and not stop it."* (Medical Doctor 7)

The respondents also frequently mentioned the possibility to integrate interactive features to e-learning courses to promote communication and discussion between learners and instructors. The interviewed healthcare providers requested the creation of formal or informal chats with other learners and instructors on the basis of social media platforms, discussion forums or other interactive options:

> *"I think something like a professional chat could be done, where you could ask some questions to the lecturer and also share experiences with each other on how it works in practice. So that you can express your opinions in this chat, ask colleagues, and discuss something in parallel."* (Medical Doctor 1)

"There should have been a way to ask some questions because there are different controversial issues, different comments. It would be good if there were discussions or even some with the instructors so that questions could be asked and then get some explanations, answers." (Medical Doctor 15)

Another respondent indicated that the Platform does not generate reminders or e-mail notifications for its users regarding the availability of e-learning courses or other news or updates.

"First of all, the platform itself is not pushy or intrusive. It doesn't remind you of itself. I would like this platform to remind me of itself more often. It's up to the doctors to use it, but it should remind us more often. It is so shy. Other platforms will bombard you with notifications if you mention them once." (Head of Clinic 8)

In this case, the integration of a reminder feature to notify users about changes, additions, or new courses on the Platform could be a relevant improvement direction. Other requests of providers regarding Platform improvement included enhancing Platform orientation option, improving the registration/authorization feature to prevent inconsistencies in Platform operations and ensure easy management and storage of user authorization data, as well as developing a feature that allows to download/save reading materials, presentations, and lectures from the courses on personal devices of users.

The respondents noted that the integration of online and offline CPE formats would be an appropriate solution, as both modalities entail beneficial aspects that could be optimized in a blended learning model.

"I think 50/50 would be great. Firstly, live communication cannot be replaced. Therefore, live communication is live communication, and it has its advantages. If you have the opportunity to attend offline or online training, then, of course, I would choose offline. And when there is no time, but it's necessary, then, of course, online learning would be an option." (Medical Doctor 10)

One informant also shared a specific expectation regarding Platform improvement, stating that this system could have adopted some features of other international e-learning solutions, such as the BMJ platform, BMJ Learning - a system that offers online courses for healthcare workers. The focus of their statement was on the integration of clinical case data in e-learning courses on the Platform: "*There doctors receive interesting information, have access to clinical cases, and study clinical experience more professionally. We would like to have something similar in our format, but with quality information, evidence-based information from adequate sources*" (Medical Doctor 7).

Furthermore, the respondents shared their expectations regarding the required support necessary for improved experience of Platform use and e-learning in their CPE. Some informants have articulated the necessity to introduce additional training events on technology skills, device management, or digital literacy in the format of offline or online training for healthcare providers, which could be "*some helpline with a consultant who would answer your questions; or maybe also practical courses with people coming to your workplace and practically showing you how to do things on your computer"* (Medical Doctor 13). Another interviewed medical doctor highlighted that this training should be based on the needs of specific healthcare providers who may have limited experience with using computers in general or e-learning solutions,

whereas the introduction of significant updates or changes on the Platform also implies the necessity to provide additional short orientation/training for all users:

> *"This is more of a learning experience for those who are new to the PHC platform, when they don't know how or where to access certain things. If something new, like new feature, is being implemented, then short introductory courses would be useful. Maybe some introductory courses explaining how to search correctly, and possibly addressing this issue of doctors inputting incorrect search terms."* (Medical Doctor 10)

Another form of required support that could have contributed to their improved experience of Platform use addressed by the informants was different interventions and strategies employed by their management/administration. Multiple healthcare workers noted the necessity of formal and informal support from management regarding their engagement in e-learning, describing the relevance and significance of inspirational interpersonal communication between clinic managers and healthcare workers.

> *"When your management supports you in your endeavors, so to speak, then it certainly gives you spirit, strength, desire, aspiration to go through this training, improve your qualifications, grow, develop. And when management is indifferent to you and does not even contribute to this, then, of course, you don't want to do anything."* (Nurse 3)

Another respondent described the similar request for support from management, focusing on the role of managers in orientation and navigation of e-learning opportunities for their subordinate workers.

> *"I think there should be motivation from the leadership. That is, if the manager is aware, they should inform us that there are such courses available. We don't constantly log in,*

but we need to go to the platform and check it out. You live constantly in the flow. And when someone tells you something from the side, you need to check it out, there are great courses, you need to come and learn, this is what we need for work. This motivates and pushes us towards the platform, so to speak." (Head of Clinic 9)

As the informants have accentuated their excessive workload as the barrier to their use of e-learning for CPE, some healthcare provided also articulated the need for changes in their workplace policies that could include the recognition of e-learning as the formalized form other CPE which requires the allocation of time during the workday. Medical Doctor 10 reported needing "*a separate time slot for this [e-learning], so that it doesn't interfere with the main work activity, when patients are waiting at the door, and so that no one bothers you during this time*." Medical Doctor 12 stated a similar request - "*I need more time; it is difficult to find room for online learning in my schedule, though I am not in the worst place with the number of patients, and maybe sometimes motivation as well*."

Finally, financial support was stated as a necessary resource for the improvement of healthcare providers' experiences with e-learning in their CPE. For instance, Medical Doctor 7 claimed, "*We lack the financial resources that we do not receive, if you want to go to a conference during COVID-19 pandemic or during the war, it would be great to have the opportunity, because some trips require financial resources.*" Although CPE of Ukrainian healthcare practitioners has been conducted primarily through online training during the COVID-19 pandemic and the war, the interviewed healthcare workers have continuously stated the need and preference to attend offline training events, considering the possibility of interpersonal contact and communication, live discussions of relevant issues, and learning about practice aspects that could not be sufficiently addressed in online courses: "*People go to offline*

conferences or events because there are topics that require something to be seen or touched, not just heard, but sometimes just listening is enough" (Medical Doctor 12).

Conclusion

Overall, this section developed an overview of interview analysis results acquired with qualitative data analysis methods described in the previous chapter of this dissertation, presenting the perspectives of interviewed healthcare providers on their use of e-learning for CPE during the COVID-19 pandemic and the war in Ukraine. The researcher analyzed 15 interviews with in-service healthcare workers in different positions across the continuum of healthcare cadres in Ukraine, who were aged between 24 years to 63 years old, possessed from 1 month to 37 years of professional experience, and were of different education levels.

The informants shared an overall beneficial perspective on the Platform, its contents, functioning, and format, reporting sufficient online education experience with this system and other solutions. The healthcare providers articulated a set of perceived enabling factors that shaped their experience with the use of the e-learning Platform in the defined period, focusing on the availability of resource capital, such as finance, devices, time, space, Internet access, sufficiency of social support and interactions with colleagues and administration, intrinsic capital, adequate technical knowledge, and beneficial aspects of Platform and course design that helped them to effectively use this system, and engage in e-learning courses. Nonetheless, the lack of the mentioned capital forms also constituted barriers to effective e-learning use, according to the perspectives of the respondents. The interviewed healthcare providers reported the lack of resources, such as finance, device, time, or amenities, insufficient communication with management and colleagues, lack of technical knowledge, challenges with intrinsic capital,

and some Platform or course design deficiencies that detrimentally influenced their experience with e-learning on the Platform. The defined types of capital, the presence or absence of which accounted for perceived enabling or challenging factors in healthcare workers' e-learning, stemmed from both individuals' experiences or circumstances and systemic aspects.

The COVID-19 pandemic has substantially affected the e-learning experience and the practice of Ukrainian healthcare providers, causing the transition of practically all of CPE initiatives into the online format. This change required rapid adaptation of healthcare workers to the increase burden on healthcare, personal challenges, and transformed CPE. Simultaneously, the unprovoked war inflicted by the Russian Federation on Ukraine created frustration and lack of clarity or motivation among the respondents regarding their engagement in e-learning courses due to the de-stabilization and inconsistency of regulatory requirements regarding their CPE and personal challenges due to evacuation, relocation, or increased workload.

The suggested improvement directions for the PHC Platform and the courses, described by the interviewed healthcare practitioners, involved specific Platform design changes, such as the integration of interactivity features, enhancement of registration/authorization feature, or the implementation of possibility to download course materials. The essential support forms that were mentioned by the informants as necessary factors for the improvement of their experience with the Platform and e-learning integrated the conduct of technology skills and digital literacy training, introduction or change of workload policies to allocate time to e-learning during the workday or in other periods, provision of formal and informal support from management and administration, as well as provision/allocation of financial resources for accessing paid online training events or attending offline training.

CHAPTER 5: CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This research project utilized an exploratory case study methodology with a desk review and a series of fifteen semi-structured interviews with the comprehensive goal to explore the perspectives of in-service healthcare providers in regard to the enablers and barriers that influenced their e-learning in the continuing professional education (CPE) during the COVID-19 pandemic in Ukraine, which also was later impacted by the invasion of Ukraine by the Russian Federation.

The case for this study represented the e-learning solution - the Online CPD Platform of the Public Health Center (PHC) of the Ministry of Health (MoH) of Ukraine (the Platform). It is a unique and novel governmentally-approved and managed CPE system that offers educational courses in an online mode and relevant governmentally-required certification for all medical practitioners in Ukraine. The study focused on adult learners' perspectives on the factors that impact the dynamics of e-learning use in CPE of public health practitioners within a LMIC context through the prism of users' personal perceptions, experiences, and beliefs. This case study was bound within the fundamental dimensions of the context, place, time, and activity presented in the following statement: the experience with the use of two selected online courses (activity), namely: "AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination," offered on the PHC Platform (place) within the CME system in Ukraine (context) between 2020 and 2022 (time) (Yazan, 2015).

The study addressed four research questions, exploring (1) perceived enablers that affect adult learner experience and e-learning application among in-service healthcare providers in

Ukraine; (2) perceived barriers that affect adult learner experience and e-learning application among in-service healthcare providers in Ukraine; (3) perceived impact of the COVID-19 pandemic and, later on, the Russian-Ukraine war on user experiences with e-learning and its application in CPE of in-service healthcare providers in Ukraine; as well as (4) the perceptions of in-service healthcare providers in Ukraine on possible improvements of the online Platform of the PHC of the MoH in Ukraine at personal and institutional levels.

This dissertation project comprises five chapters. It starts with an overview of the problem, its context, and its relevance offered in Chapter 1, with Chapter 2 providing a review of literature related to the field of professional education for healthcare providers, particularly online education, as well as displaying the gaps in the body of related literature, emphasizing study relevance and novelty. Chapter 3 articulates the methodological framework and the procedures for this exploratory single-case study, and Chapter 4 demonstrates the case study results from the analysis of the fifteen qualitative in-depth interviews that address the four research questions identified earlier. Finally, Chapter 5, the last chapter of this paper, summarizes essential findings from this study, addresses the academic and practical implications of this dissertation, specifies further research directions, as well as offers conclusions on this research project.

Interpretation of the Study Findings

The researcher held fifteen in-depth semi-structured interviews with fifteen registered users of the PHC Platform, all of whom were in-service healthcare practitioners, as part of this case study. A detailed description of the study sample, including participants' demographics and other characteristics, could be found in Chapter 4 under the section Study Participants.

Two fundamental theories that guided this research project included a well-known theory of adult learning by Malcolm Knowles (2015), labeled *andragogy*, and a *capital theory*, introduced in 1986 by French sociologist and public intellectual Pierre Bourdieu. Bourdieu introduced five core forms of capital such as economic, cultural, social (1986), symbolic, and technical (2002). The researcher sought to integrate capital theory in this dissertation project in its unconventional sense, using the capital framework as an impartial conceptual network that facilitated the conceptualization of factors that affect experiences with e-learning among respondents and guided the design of the data collection tool with the subsequent analysis of findings. Hence, the findings of this study will be summarized and visualized in the sections below, based on the Bourdieu's capital framework and per each capital domain.

Predominant Positive General Experience of Users with the Platform

Predominantly all the informants in this study acknowledged overall positive general experience while using the online Platform of the PHC and were satisfied with it. Eleven out of fifteen participants never experienced any technical issues and/or contacted the technical support. The remaining four did interact with the service and were satisfied with the resolution of their individual issues as well as the timing and quality of response.

Most of the interviewed users relied on their previous personal experiences with other online learning platforms or resources while navigating the Platform for the first time that helped them to master the Platform quite easily. Two respondents mentioned instructional videos and guides shared by the PHC on the Platform that helped them in the process, while five informants stated that additional technical orientation/training prior to accessing the Platform could be beneficial, especially for users who do not have vast experience of using such resources/training modalities in the past.

Summary of the Perceived Enablers of the Platform Use

The availability of different resources, such as financial, devices, time, space, Internet access, social support and interactions with colleagues and administration, intrinsic capital in terms of personal motivations and capacities, sufficient technical knowledge, and specific characteristics of course and Platform design facilitated the use of e-learning in the CPE of healthcare workers in Ukraine. The essential factors that motivated the informants in the study to use e-learning and engage in online courses on the PHC Platform included the need to acquire CPD points for accreditation and qualification maintenance; employers' request/requirement to complete specific courses and get certificates; the necessity to complete courses to subsequently provide healthcare services; intrinsic tendency to constantly learn something new and develop expertise in different areas; and the desire to learn about and use the most innovative, novel, and beneficial care approaches and tools to provide best services for clients in clinical practice.

Summary of all identified perceived enablers of the Platform use by the capital domain is presented in the Table 7 below:

Table 7. Perceived Enablers to the Use of the PHC Platform and E-learning in CPE of Healthcare Providers Based on Interview Data.

Enablers by Capital Type	Description
Resource capital	
Devices	Availability of devices for learning (computers, laptops, headphones, microphones) at home or at the workplace, or both, supported the use of e-learning and the PHC Platform.
Time	Time was a critical resource for e-learning and PHC Platform use; healthcare providers balance commitments in their daily routines, incorporating e-learning into their schedules.

Table 7 (cont.)

Location/space to learn	**Availability of adequate location/space for learning and e-learning course completion supported the use of e-learning and the PHC Platform.**
Financial resources	A few reports of money being a critical factor that supported the use of e-learning for CPE; however, e-learning was more cost-efficient than offline training due to the elimination of travel and accommodation expenses.
Internet connection	One informant mentioned that Internet access, speed, and connectivity significantly contribute to effective e-learning use for CPE.
	Social capital
Communication with managers/peers	Communication with and support from colleagues and administration were vital aspects that supported e-learning and the Platform use.
The need to collect CPD points	The requirement to acquire a specific number of CPD points annually by attending different training events, including through e-learning courses, supported e-learning and the Platform use.
Course completion is required for practice	The requirement to complete e-learning courses before healthcare providers could practice specific clinical interventions also supported e-learning and the Platform use.
	Technical knowledge capital
Familiarity/skills of device and information management	Sufficient technical knowledge, technology management skills, and digital literacy levels, also obtained from earlier use of other online platforms and tools, reported by informants, strengthened their ability to use e-learning for their CPE.
	Intrinsic capital
Internal capacities, motivations, tendencies of healthcare providers	Respondents mentioned significant internal motivation to engage in e-learning along with the intrinsic need to acquire new information which supported their use of e-learning in CPE.
	Course design
E-learning course and Platform design features	User-centeredness, convenience, and ease of use within the Platform contributed to the use of this system and e-learning in CPE of healthcare providers.

Summary of the Perceived Barriers of the Platform Use

The central barriers that challenged the experience of healthcare providers with e-learning during CPE related to resource, social, intrinsic, and technology knowledge capitals, as well as to the characteristics of online course and Platform design. Considering the resource capital, financial resources (or lack of such) have not been a frequently mentioned factor that challenged e-learning in the experience of informants. The lack of time for e-learning course completion on the PHC Platform was a central issue that was reported by healthcare providers, as multiple respondents labeled excessive workload as the key factor in their inability to meet the demands of professional duties, personal life commitments, and incorporate e-learning into their schedules. Family medicine doctors accentuated the disproportionate influence of burdens of the COVID-19 pandemic, the on-going war, and current reforms in the healthcare sector of Ukraine on their workload, which in turn deprived them of the essential time resource for e-learning use. The lack of devices and location/space conducive for learning were not reported as critical issues that challenged the use of e-learning among informants. Some informants mentioned the problems with electricity supply and Internet access or connectivity as factors that hampered their e-learning use.

The social capital or its absence was another significant barrier to e-learning and Platform use, as the respondents argued that the lack of interactions with peer learners and instructors, insufficient or absent feedback on individual performance from the latter, lack of support, direction, or general communication with their managers/supervisors, as well as the complexity of courses for medical personnel other than doctors challenged the use of e-learning and the Platform. The barriers to e-learning use included the insufficient technical knowledge capital manifesting in the lack of expertise with electronic devices, management of electronic data

storage systems, overall low digital literacy levels, or limited previous experience with e-learning systems. The intrinsic capital of the informants was hindered by excessive workload, inability to balance the demands of professional and personal commitments, physical and emotional burdens of the COVID-19 pandemic and the Russian-Ukrainian war. Resulting physical exhaustion and the lack of energy also was a barrier for the described e-learning use for CPE of healthcare providers. Barriers to Platform use and e-learning in general for CPE of medical staff, associated with the course design and mentioned by informants, varied from the lack of interactive components in the courses offered via the Platform, insufficient thematic diversity of online courses on the Platform to inability to download course materials and difficulties with authorization or navigation within the Platform.

The perceived barriers of the Platform use identified in the course of this study are summarized by the capital domain in the Table 8 below:

Table 8. Perceived Barriers to the Use of the PHC Platform and E-learning in CPE of Healthcare Providers Based on Interview Data.

Barriers by Capital Type	Description
	Resource capital
Devices	Lack of devices for learning (computers, laptops, headphones, microphones) at the workplace challenged the use of e-learning and the PHC Platform.
Time	Lack of time significantly hindered e-learning and PHC Platform use; excessive workload and the burdens of the pandemic and war challenge the ability of informants to meet the demands of professional duties, personal life commitments, and incorporating e-learning into their schedules. These burdens were especially urgent for family medicine doctors.

Table 8 (cont.)

Location/space to learn	Absence of location/space for learning as the factor that hampered participants' use of e-learning and the PHC Platform (specifically relevant for providers who evacuated/relocated to safer regions due to war).
Financial resources	Money was not reported as a critical factor that challenged the use of e-learning for CPE as the researched courses were offered for free. However, some informants noted that the lack of money could have prevented them from completing some e-learning courses not on the PHC Platform but via other platforms that charge for their services.
Internet connection	The problems with electricity supply and Internet access or connectivity moderately challenged the use of e-learning and the PHC Platform.
Social capital	
Communication with managers/peers/instructors	Lack of interactions with peer learners/instructors during e-learning courses and insufficient or absent feedback on individual performance were reported as barriers to e-learning and Platform use, along with the lack of support, direction, or general communication with/from managers/direct supervisors.
Technical knowledge capital	
Familiarity/skills of device and information management	Some providers mentioned challenges with the use of electronic devices, management of electronic data storage systems, low digital literacy levels, or limited experience with e-learning systems that were the barriers to e-learning and Platform use.
Intrinsic capital	
Internal capacities, motivations, tendencies of healthcare providers	Physical and emotional burdens of the COVID-19 pandemic and the Russian-Ukrainian war, exhaustion, lack of energy, excessive workload, and inability to balance the demands of professional and personal commitments hindered e-learning and Platform use among healthcare providers.
Course design	
E-learning course and Platform design features	The lack of interactive components in the courses on the Platform, insufficiency of thematic or professional (targeting specific areas of expertise) diversity of online courses on the Platform, difficulties with authorization to the Platform, and inability to download course materials challenged e-learning and Platform use for informants.

Impact of COVID-19 Pandemic and the Russian-Ukraine War on Platform Use and General User Experience with the Platform

The war inflicted by the Russian Federation on Ukraine has generated multiple complex impacts on Ukrainian society with an exceptional burden on the national healthcare sector and the evident challenging implications for the personal and professional experiences of Ukrainian healthcare providers. Although the focus of this dissertation is the influence of the COVID-19 pandemic on experiences with e-learning in CPE of Ukrainian healthcare workers, the influence of war on the practitioners and their perceptions is another significant factor that shapes the use of e-learning and perceived enablers or barrier to this practice. The war has led to the destabilization of the regulatory climate regarding e-learning in CPE of Ukrainian healthcare workers, which generated frustration and lack of clarity or motivation among the respondents regarding their engagement in e-learning courses. The war has also challenged personal lives of informants, as many of these practitioners fled their home cities or even the country in order to escape the atrocities of Russian military attacks on civilians or territory occupation. While the efforts of Ukraine's international partners may have assisted healthcare providers to access some CPE materials globally for free, the access to these resources can be terminated or limited soon.

User Suggested Opportunities for the Platform Improvement

All interviewed healthcare practitioners illustrated their appreciation and satisfaction with Platform use and e-learning courses while suggesting a series of design and content improvements that could have enhanced their experience with the use of this e-learning system. The respondents mentioned the preferred combination of learning modes in their CPE, stating that the simultaneous use of online and offline learning formats considering their current needs

and scheduling requirements could be an improvement direction in terms of their experience with CPE during the COVID-19 pandemic and the war. The required forms of support necessary for enhanced experience with the use of the Platform and e-learning courses include the introduction of technology skills and additional digital literacy training for healthcare practitioners, especially those with no earlier experience of e-learning; workload/time management opportunities to allocate time to e-learning during the workday or in other periods; formal and informal support from management and administration; as well as provision/allocation of financial resources for accessing paid online training events or attending offline training beyond the scope of courses offered via the PHC Platform.

Recommendations for Future Practice and Future Research

The COVID-19 pandemic that emerged in early 2020 as an unprecedented global healthcare challenge tested the resilience and rapidly transformed multiple societal systems, including education, causing crisis-reactive, immediate, and at-scale transition from traditional face-to-face modalities of teaching and learning towards online forms of such, particularly e-learning. Medical education, most notably continuing professional education (CPE) targeting healthcare practitioners already working in the field, was no exception. Initial restriction of all forms of physical interaction, including group gatherings and travel, in order to mitigate the COVID-19 pandemic forced all CPE and continuing medical education (CME) activities and events migrate into the online realm with some events being postponed or canceled (Shah et al., 2020). In Ukraine, which also exemplifies the LMIC context, such a trend was further advanced by the outburst of the brutal full-scale invasion and war launched by the Russian Federation in February 2022, resulting in enormous economic, infrastructural, and human destruction and loss

accompanied by significant population movement and displacement with an estimated 10-12 million individuals of all ages and genders being currently internally displaced or acquiring the status of war refugees. In a matter of days, all educational activities in Ukraine at all levels of education were frozen and, later on, transferred into online format. While mostly fully restored as of September 2023, majority of educational programs, ranging from primary school to graduate and post-graduate levels currently remain to be offered primarily online due to the constant war-related safety and security hazards that Ukrainian civilians continue experiencing on daily basis.

Globally, the rapidly expanded and almost exclusive application of e-learning in education, involving the education of medical students and professionals during the COVID-19 pandemic, produced robust evidence and practical implications with evident benefits and barriers that affect the experience of educators and learners or the dynamics in the healthcare sector (Shah et al., 2020). This study sought to extend the line of such research, focusing on adult learners and their perceived enablers and barriers to e-learning in continuing medical education in the LMIC context, more specifically Ukraine. These experiences in the context of COVID-19 pandemic were further exacerbated by the Russian invasion and the following large-scale war that started in February 2022.

The findings of the study suggest that all participants shared overall positive experience and expressed general satisfaction with the online CPE Platform of the PHC of the MoH of Ukraine (the Platform). They valued convenience of the tool, flexibility of the learning schedule, easy navigation on the Platform, concise outline of the educational materials, and the depth of the technical information offered. Perceived enablers identified during this research project include affordability of this specific educational resource, the Platform, with courses offered free

of charge; availability of personal or work-provided technical devices to engage with it; ability to find space to study at home or at work; time management skills/capacity and adequate doctor/patient ratios; consistent high-speed Internet access; communication with and support from other colleagues/peers and their supervisors in the process of learning; formal requirements to acquire CPD points; sufficient personal technical knowledge and skills, also obtained during the use of other online learning platforms and tools; personal drive and motivation to self-improve; as well as the learner-centered, simple, and convenient design of the educational programs they took. Key perceived barriers outlined as a result of this study comprise the lack of time, often due to excessive workload and inability to juggle work and personal commitments along with the training; insufficient number of available technical devices/laptops/computers provided at work for all who want to study; consistent Internet access and connectivity problems, primarily due to power supply shortage as a result of war.

One of the major barriers most cited in the domain of social capital included lack of interaction with peers and the instructor and insufficient or absent feedback on students' performance that is in line with most of the literature reviewed for this study. These, in turn, generate as a sense of disconnectedness and isolation and raise concerns around inclusivity, also highlighted in previous research. Finally, the lack of or absence of support and encouragement from the clinic management or their direct supervisors also was mentioned by healthcare practitioners as a significant barrier under this domain. Course design targeting primarily medical/infectious disease doctors, lack of interactive components in the courses on the Platform, insufficiency of thematic diversity of online courses on the Platform, difficulties with authorization of access to the Platform, and inability to download course materials; inadequate digital literacy levels among healthcare professionals, particularly of older age, or skills to

navigate the Platform; as well as excessive workload and emotional and physical impact of the war were listed among other barriers.

COVID-19 pandemic and following war launched by Russia against Ukraine exacerbated many of the factors listed above, resulting in extreme workloads, shrinking healthcare infrastructure, and unimaginable toll on physical and mental health of healthcare workers participating in online learning activities.

The presented study has several limitations resulting from the exploratory qualitative single-case study design itself; the possible ontological-epistemological conflict in the process of data collection and interpretation; and, finally, more recent impact of the war on the study participants and impossibility to separate their experiences associated with the COVID-19 pandemic and the war as a result. Nonetheless, the researcher attempted to thoroughly address the identified limitations, as described in detail in the previous chapters, and believes that these findings allow her to formulate a set of recommendations that could be of use to both future researchers and practitioners in the field as well as policymakers and funders seeking to advance different modalities of virtual learning in LMICs, particularly within the area of adult professional/continuing professional education in the field of global health.

In terms of *the further practice*, this study demonstrated a reassuring confidence and overall satisfaction with which adult learners used the Platform and appreciated the benefits of e-learning, particularly in the given LMIC context. It seems to be feasible to invest more resources into digital literacy as well as orientation and technical support offered via the PHC Platform on any other online e-learning platform, especially targeting novice and/or older e-learners. One specific suggestion, offered by the study participants, was to have a live consultant, who could be

reached in real time via e-mail or phone and provide technical and other types of support for the online students.

In the short-term perspective and for the PHC specifically, it would be important to get clarity on the final set of requirements to CPD/CME, as the absence of such decreases motivation of and frustrates the users of the PHC Platform. Further diversification of training materials, market segmentation of the audiences, and following targeting of specific e-learner groups such infectious disease doctors vs. nurses vs. family doctors/general practitioners could lead to enhanced user satisfaction and higher overall program impact. Adding specific and relevant clinical case studies to all programs was mentioned as a desired improvement direction by informants as well. Similar to findings in most of other sources reviewed as part of this research project, absence or lack of direct interaction with the instructors and peers, also, resulting in missed student performance feedback as well as missed opportunities to exchange experiences and network with the peers were of major concern to all respondents. Hence, finding opportunities to enhance interactivity elements in the courses and provide more structured and individualized learner support and feedback seem to be important, though the implementation of these changes may increase the overall cost of education program design. One of the more specific suggestions in this realm offered by a number of study participants was to create a system of regular notifications and updates via email in regard to the new CPE courses offered on the PHC Platform or updates introduced to the courses offered earlier. Many participants also brought up an idea of combining online and offline modalities, giving strong preference to blended learning modality as a possible solution in addressing their strong sense of detachment and isolation.

Another suggestion, resulting from Ukraine's new reality of a full-scale war with massive destruction of the infrastructure and displacement of its population, was to optimize the course content and offer shorter, more concise training, considering growing workloads of healthcare providers and technical challenges associated with power and Internet supply. Finally, enhanced communication with all types of healthcare facilities in Ukraine, advanced comprehensive and professional marketing and promotion of training programs offered by the PHC in comparison to their competition, and networking with the chief doctors/leaders at such healthcare facilities may be helpful in addressing another major concern of the adult learners engaged with the PHC Platform, such as the lack of understanding and following support of their training needs and processes on the end of the clinic management or their direct supervisors.

The decolonization of Ukrainian e-learning practice also remains as a critical further practice recommendation, as Ukraine continues to utilize online course format, materials, other aspects developed abroad. The PHC has excelled at developing high-quality concise yet saturated online courses for Ukrainian healthcare workers integrating the expertise of diverse experts and adapting materials and e-learning modality to the needs and requests of Ukrainian practitioners. Nonetheless, further decolonization process of Ukrainian medical education with e-learning is consistent with the agenda argued by Downer et al. (2018), which integrates the focus on digital skills and literacy of Ukrainian healthcare professionals, growing advocacy and marketing of Ukrainian medical online courses, interpretation and adaptation of foreign study materials to the local context, and strengthening the leading capacity of local actors (online course administrators, CPD providers, facility heads and administration) to implement and improve e-learning solutions for medical personnel in Ukraine.

This dissertation project also helped to highlight a few directions for *additional research in the future*. As it was already highlighted in previous chapters, the connection between e-learning and learners' capital is still not a well-studied phenomenon in e-learning scholarship. Adaptation of the capital theory introduced in 1986 by French sociologist and public intellectual Pierre Bourdieu for this research project produced an optimal, well-structured, and easy-to-navigate conceptual framework that helped generating insights into the role of different types of such capital as the predisposing factors to the e-learning implementation and the experience of adult learners with this learning framework. Additional and, perhaps, larger-scale and mixed methods research applying such conceptual framework is encouraged and could enable the development of specific and practical recommendations for further improvement of e-learning user experience.

While all participants of the study expressed overall satisfaction with the Platform, including the fact that all courses are available free of charge, many voiced the need to enhance course interactivity, were frustrated about their individual isolation as part of the learning experience, and highlighted strong preferences towards blended learning modalities. Related scholarship also echoes these concerns, especially in regard to online education in the several specific fields of human practice, such as medical, and state that the future of this approach in medical education can involve "a hybrid approach of blending digital with face-to-face experience" while requiring sufficient regulatory guidance for the creation of "safe, secure, and user-friendly" e-learning and digital communication solutions for healthcare practitioners (Shah et al., 2020, p. 1). Long-term implications of e-learning use among medical care providers during the COVID-19 pandemic, which has lasted for over two years, are yet to be seen. Colaceci et al. (2020) display that while "an online approach to in-service education is effective at improving

practices and attitudes" of healthcare providers in an immediate arrangement, further practice and research interventions should focus on knowledge transition and retention among medical staff in long-term perspective (p. 254). Hence, additional research on e-learning with a focus on knowledge transition and retention among medical staff in long-term perspective along with the comparison of offline, online, and blended learning effectiveness or efficiency seems to be important.

Finally, in line with the study findings, a vast body of literature confirms that e-learning represents a crucial transformative framework in modern education that with the emergence of the COVID-19 pandemic was chosen as a prevalent education strategy for the continuity of such under the associated travel restrictions or social distancing measures and as a cost-efficient educational opportunity, especially in low- and middle-income countries (LMICs). LMICs with limited resources and healthcare system capacity struggled with the adaptation to the COVID-19 outbreak and the simultaneous management of chronic non-communicable diseases, the healthcare workforce shortage, and the inaccessibility of medical training due to associated mitigation measures. E-learning has represented the appealing and feasible educational but also economic solution in the healthcare environments of LMICs. A the same time, such countries with low-resource healthcare settings, affected by the COVID-19 pandemic challenges, frequently encountered inadequacy of digital skills among practitioners, insufficiency or redundancy of equipment, and inappropriate instruction models derived from conventional face-to-face education, which deteriorated the possible beneficial potential of e-learning for healthcare professionals (Regmi & Jones, 2020) and exhibited ambiguous implications of e-learning for the individuals and systems of care provision in LMICs. The body of literature focusing on the contextual nuances of implementation of e-learning in LMIC remains to be limited in general

and is almost non-existent specifically for Ukraine. Ukraine represents a unique case of LMIC whose healthcare, economy, infrastructure, and other systems were first significantly impacted by the COVID-19 pandemic and, later on, as of February 24, 2022, by full-scale war that was launched by the Russian Federation against Ukrainian nation. Hence, Ukraine represents a unique and understudied context for e-learning and other aspects of education research, including impact of war research field, and could offer unprecedented depth of data and knowledge to future researchers.

Conclusion

The study proves the claim that the practicality, cost-effectiveness, versatility, or time-saving opportunities of e-learning solutions for clinicians are likely to maintain the significance and prevalence of e-learning during the post-COVID era. All study participants clearly stated their overall profound satisfaction with their e-learning experience specifically for the mentioned reasons. Study informants also outlined a few barriers and suggested several areas for further improvement, the most important of which included additional technical orientation, digital literacy skill training, and technical support; improved education program design for targeted well-segmented audiences; and further prevention of a shared sense of detachment and isolation among e-learners that could be achieved by multiple means. The latter may vary from increasing interactivity with instructors and peers and enhancing individual performance feedback to considering blended learning modalities that would effectively combine both offline and online teaching and learning.

E-learning remains to be a particularly relevant solution in medical education, especially for the continuing professional education (CPE) of medical personnel in low- and middle-income

country (LMIC) contexts, where local practitioners, authorities, or international entities encounter notable discrepancies in healthcare structures, health workforce shortages, and resource insufficiency, reinforced by the healthcare and social crisis of the COVID-19 pandemic. LMIC setting was well exemplified by the context of Ukraine in this study. In addition to the COVID-19 pandemic that posed an unprecedented challenge to all education systems globally, Ukraine and its national and local education systems have been dramatically impacted by the full-scale war that was launched by the Russian Federation against Ukrainian nation on February 24, 2022. Affordability and accessibility of digital medical education for healthcare providers, especially those already serving in the field and also on the front lines, have become even more relevant for capacity building and CPE in the time of war.

The conceptual framework developed for this particular study was based on two fundamental theories - a well-known *andragogy* theory of adult learning by Malcolm Knowles (2015) and a *capital theory* by Pierre Bourdieu (1986) – that helped to frame the data collection and analysis processes by five major domains: resource capital, social capital, technical knowledge capital, intrinsic capital, and course design. Future research is encouraged to employ this consistent and easy-to-navigate conceptual framework in other contexts while applying it towards more complex large-scale research projects.

Finally, despite the acknowledged limitations of this qualitative exploratory single-case study project, the researcher was able to formulate a number of recommendations to both practitioners and future researchers. With quite limited body of literature available in regard to Ukrainian education field in general and medical education particularly, along with additional challenges that both educators and students at all levels have faced in Ukraine in the past eighteen months as a result of the full-scale war, Ukraine could offer the substantial depth and

breadth of data and knowledge to future researchers and educators. Ukraine is already in desperate need of such data and knowledge itself with daily hopes and prayers of all Ukrainians going towards the end of this brutal, violent, and unjust war, and the emerging apprehension of the new needs and new challenges in the context of post-war reconstruction and recovery.

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APPENDIX A. IN-DEPTH INTERVIEW GUIDE

The following list of questions are a guide for in-depth semi-structured interviews. The researcher will articulate the Special Research Project Statement (see Appendix C) to the informants prior to the start of each interview.

All the items in this interview guide constitute prompts for the interviewer to use during the conversation with informants, which can be included or excluded from the interview considering the flow of the conversation and participants' responses. The detailed factors/capital aspects could be used as probing questions for the informants in case they are unsure about their responses to the main questions.

NOTE: Audio recording will be started after participants provide verbal consent to participate. No participant names or other personified identifiers will be recorded.

Participant Information/Brief Demographic Information

1. What is your healthcare cadre?
    - Medical Doctor
    - Nurse
    - Clinic manager
    - Physician assistant
    - Other _____
2. Please specify your specialty, if applicable:
    - Infectious disease Medical Doctor
    - Epidemiologist

- Physiatrist
- Obstetrician/Gynecologist
- Urologist
- Pediatrician
- Family physician
- General therapist
- Other _____

3. How many years of professional experience do you have? ____
4. Please specify the highest education level you have completed:
    - Secondary education degree
    - Higher education degree (Bachelor's, Junior Specialist's, or Specialist's diploma)
    - Specialist with primary or secondary specialization
    - Postgraduate education degree (Master's Diploma, Candidate of Medical Science, Medical Doctor of Science)
5. Please indicate your age: ___
6. Please indicate your gender:
    - Female
    - Male
    - Other ____
    - Rather not say.

Introduction: General Experience with E-learning and the Platform

1. Please describe your overall experience with the e-learning Platform.

- *How satisfied or dissatisfied are you with your experience with the Platform? Why?*
- *Have you ever received formal or informal training on using the Platform? Please describe this training or instruction.*
- *Have you used other e-learning systems before? How do they compare to the Platform?*

Perceived Enablers of Platform Use

1. To your view, what helps/enables you to engage in online CPE on the Platform?

   These factors could be:

resources	*money, access to technology such as telephone or computer, you owning those, time to meet the demands of professional, personal, and other commitments, workplace resources, availability of space*
cultural	*cultural norms and perceptions that impacted your experience, group behavior that impacted your experience, supportive attitude towards e-learning, your level of education, your personal attitude or preferences to the e-learning/Platform*
social	*social obligations, your status, title, necessity to update qualification, mentorship from*

	managers/tutors, support from peer learners, colleagues, managers, orientation on e-learning during training, your connections, availability of tech support, emotional factors
technical knowledge	*your knowledge or skills to use technology/the Platform, digital literacy, opportunity to obtain degree or move with career/authority*
Intrinsic	*personal motivation to engage in e-learning, readiness, experience that can contribute to performance in e-learning, need for new information*
course design	*self-directed learning, experiential learning, sufficient interaction opportunities with other learners and tutors, availability and perspicuity of materials*

2. What was the primary motivating factor that pushed you to participate in the two discussed online courses on the Platform?

Perceived Barriers to Platform Use

1. Have you experienced any barriers that have impeded your participation or performance in online courses on the Platform? What were those? What prevents you from using the Platform effectively?

   These factors could be:

resources	*money, access to technology such as telephone or computer, you owning those, time to meet the demands of professional, personal, and other commitments, workplace resources, availability of space*
cultural	*cultural norms and perceptions that impacted your experience, group behavior that impacted your experience, supportive attitude towards e-learning, your level of education, your personal attitude or preferences to the e-learning/Platform*
social	*social obligations, your status, title, necessity to update qualification, mentorship from managers/tutors, support from peer learners, colleagues, managers, orientation on e-learning during training, your connections, availability of tech support, emotional factors*
technical knowledge	*your knowledge or skills to use technology/the Platform, digital literacy, opportunity to obtain degree or move with career/authority*
Intrinsic	*personal motivation to engage in e-learning, readiness, experience that can contribute to performance in e-learning, need for new information*

course design	*self-directed learning, experiential learning, sufficient interaction opportunities with other learners and tutors, availability and perspicuity of materials*

Impact of COVID-19 pandemic on Platform use/e-learning experience

1. Has your CPE using the Platform changed during the COVID-19 pandemic? If yes, how?

2. What have you found to be the most useful about the Platform as the tool for CPE during the COVID-19 pandemic?

3. What have you found to be the most challenging about the Platform as the tool for CPE during the COVID-19 pandemic?

Opportunities for further CPE/Platform Improvement

1. Please indicate the aspects you would like to improve in the Platform in order for you to effectively use it in the future.
    - *What resources are needed for you to effectively use the Platform?*
    - *Who can provide support for you to effectively use the Platform?*

2. What do you think about the future of CPE and the Platform?
    - *Do you intend to use the Platform in the future?*
    - *What personal factors will affect your CPE and use of the Platform?*
    - *What contextual factors will impact your CPE and Platform use?*

- *Please describe any expectations you have about the Platform/online courses/CPE in general in the future?*

3. Is there anything else you would like to share about your experience with the Platform or online courses you have taken?

APPENDIX B. DRAFT CODEBOOK FOR DEDUCTIVE CODING PROCESS

Level-1 Theme	Level-2 Theme	Level-1 Code	Level-2 Code
Experience with e-learning and the Platform	General perspective	GEN-PERSPECTIVE	
	Satisfaction with the Platform	PL-SAT	
	Requirements concerning training to use Platform and engage in e-learning	TRAINING	
	Experience with other solutions	ONLINE-ED-EXP	
Enablers to Platform use	Resource capital	ENB-RESOURCE	DEVICE
			TIME
			LOCATION
			FINANCE
			INTERNET
	Social capital	ENB-SOCIAL	MANAGER/PEER
			CPD POINTS
			REQUIRED TO PRACTICE
	Technical knowledge capital	ENB-TECH	
	Intrinsic capital	ENB-INTRINSIC	
	Course design	ENB-DESIGN	
	Other	ENB-OTHER	
Barriers to Platform use	Resource capital	BAR-RESOURCE	DEVICE
			TIME
			LOCATION
			FINANCE
			INTERNET
	Social capital	BAR-SOCIAL	
	Technical knowledge capital	BAR-TECHNICAL	
	Intrinsic capital	BAR-INTRINSIC	
	Course design	BAR-DESIGN	
	Other	BAR-OTHER	
Impact of the COVID-19 on e-learning and Platform use	Changes in providers' CPE and Platform use	COVID-CPE	
	Benefits of Platform during pandemic	COVID-BENEFIT	
	Challenges with Platform during pandemic	COVID-CHALLENGE	

Improvement opportunities for e-learning on the Platform	Improvements in the platform and e-learning for future use	PL-IMPROVE	
	Required support for improved Platform use	IMPROV-SUPPORT	
	Expectations regarding Platform and e-learning development in Ukraine	IMPROVE-EXPECT	
	Other	IMPROVE-OTHER	

APPENDIX C. SPECIAL RESEARCH PROJECT STATEMENT

RESEARCH TITLE

In-Service Healthcare Providers' Perceptions of E-Learning Enablers and Barriers in Continuing Professional Education (CPE) during COVID-19 Pandemic: A Qualitative Case Study of Online CPE Platform in Ukraine.

PURPOSE

You are invited to participate in a voluntary research study. We are conducting this research project with the purpose of identifying enablers and barriers to in e-learning application for the continuing professional education (CPE) of medical practitioners in Ukraine, which exemplifies a low- and middle-income country (LMIC) context, during the COVID-19 pandemic through the prism of providers' perceptions, experiences, and beliefs. This exploratory qualitative single-case study of a e-learning platform launched by the Ukrainian Ministry of Health involves a series of in-depth interviews with adult learners for the identification of their perspectives on the successes and limitations in online CPE. We are collecting views and experiences related to the Public Health Center (PHC) Platform of Ministry of Health (MoH) from adult and in-service healthcare providers, who have participated in two online courses offered by the PHC, namely "AstraZeneca COVID-19 Vaccination" and "COVID-19 Vaccination."

We are interested in gauging your experiences with that type of CPE offered over the PHC Platform. Although you may experience stress associated with the time commitment regarding involvement in the research, reinforced by the ongoing war in Ukraine, we would appreciate you sharing the experiences of online CPE activities. This information will help us understand the strengths and weaknesses of the online training system and identify practical ways to design and deliver such courses in the future to the highest satisfaction of participating healthcare workers.

EVALUATION PROCEDURES

As part of this project, you are asked to participate in one-time in-depth semi-structured interview to be conducted by an experienced researcher. The researcher will ask you questions about your opinions and experiences through an online meeting conducted via Zoom or in person at the location of your choice during a meeting scheduled at a time convenient to you. The interview may take 40-60 minutes. Please note that the interviews will be completed in English. You will not be offered reimbursement for being in this study. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time. You have the option to not participate in this study by declining the invitation without any additional argumentation. This option will not entail any consequences for your professional or personal life.

USE OF INFORMATION COLLECTED DURING EVALUATION

The data collection is being carried out by Anna Shapoval, University of Illinois (the Researcher), with the support from the Public Health Center of the MoH of Ukraine. All the information obtained will be kept strictly confidential and anonymous. We are not collecting any personal identifiers. Hence, no organization or individual will be identified in any report of published findings. The interviewer will not disclose any information given by any participant to other participants. No third party will have access to primary data of interview recordings or de-identified data in the future. However, when required by law or university policy, identifying information (including your consent email) may be seen or copied by: a) The Institutional Review Board that approves research studies; b) The Office for Protection of Research Subjects and other university departments that oversee human subjects research; or c) University and state auditors responsible for oversight of research. Any interview data presented in the dissertation will be presented in a general manner. All identifiable data and primarily digital files from

devices used to temporarily store or transfer data files will be completely destroyed within 24 hours after each in-depth interview was recorded once the transfer of de-identified data to the password-protected computers in encrypted files is completed. Findings will be published in the form of a Medical Doctoral dissertation. Presentations and journal articles may be prepared on the basis of the dissertation and shared in local, regional, national, and international contexts.

OTHER INFORMATION

All participation is voluntary. You may decline to participate, also, at any stage of the interview, and this will have no effect on your job or professional duties. Information about whether or not you participate in the evaluation will not be shared with your supervisors or colleagues. We do hope you will be able to assist us in this important exercise and would like to thank you in advance for your input.

YOUR RIGHTS AS A PARTICIPANT

If you have any questions about your rights as a research subject, including concerns, complaints, or to offer input, you may call the Office for the Protection of Research Subjects (OPRS) at 217-333-2670 or e-mail OPRS at irb@illinois.edu. If you would like to complete a brief survey to provide OPRS feedback about your experiences as a research participant, please follow the link here or through a link on the OPRS website: https://oprs.research.illinois.edu/. You will have the option to provide feedback or concerns anonymously or you may provide your name and contact information for follow-up purposes.

If you have any concerns, need clarification, or wish to withdraw from this project, please, contact Anna Shapoval at gannas2@illinois.edu or PHC's Dmytro Stolyarenko at d.stoliarenko@phc.org.ua.

APPENDIX D. RECRUITMENT EMAIL

This email text will be sent to participants during the recruitment process. The email will contain the following text as well as the attached Special Research Project Statement.

Dear Sir/Madam,

Anna Shapoval, the Medical Doctoral student at the University of Illinois, USA, is conducting a research study on "In-Service Healthcare Providers' Perceptions of E-Learning Enablers and Barriers in Continuing Professional Education (CPE) during COVID-19 Pandemic: A Qualitative Case Study of Online CPE Platform in Ukraine."

You are invited to participate in this research project as a respondent. You are asked to participate in an in-depth semi-structured interview to be conducted by an experienced researcher (Anna Shapoval). The researcher will ask you questions about your opinions and experiences with e-learning on the Public Health Center (PHC) Platform through an online meeting conducted via Zoom or in person at the location of your choice during a meeting scheduled at a time convenient to you. Please note that the interviews will be completed in English. The interview may take 40-60 minutes.

We would appreciate you sharing your experiences of online CPE activities. This information will help us understand the strengths and weaknesses of the online training system and identify practical ways to design and deliver such courses in the future to the highest satisfaction of participating healthcare workers.

Please see the attached document labeled Special Research Project Statement with the detailed information on the study, your possible participation, and confidentiality measures to ensure your privacy.

If you are willing to participate in this study as a respondent, please click the link below and fill in a brief Google Form, which will include study information and a question to provide a written consent to participate in this study or decline participation. The Form also includes questions with your contact details for the Researcher to reach out to you and schedule an interview in case you agree to participate.

https://forms.gle/XxZxc4JxVtRLXT798

If you decide to participate, you are free to withdraw your consent and discontinue participation at any time. You have the option to not participate in this study by declining the invitation without any additional argumentation.

You can contact Anna Shapoval for any clarifications, concerns, or questions regarding this study or your possible participation at phone number of +380504115556 or email **GANNAS2@ILLINOIS.EDU**.

Thank you for your time and looking forward to your response,

Anna Shapoval,

Medical Doctoral student at the University of Illinois, USA

+380504115556

GANNAS2@ILLINOIS.EDU

APPENDIX E. FINALIZED CODEBOOK FOR DATA ANALYSIS

Level-1 Theme	Level-2 Theme	Level-1 Code	Level-2 Code
Experience with e-learning and the Platform	General perspective	GEN-PERSPECTIVE	
	Satisfaction with the Platform	PL-SAT	
	Requirements concerning training to use Platform and engage in e-learning	TRAINING	
	The experience of informants with tech support on the Platform	TECH-SUPPORT	
	Experience with other solutions	ONLINE-ED-EXP	
	Adaptation of providers to changing CPE format/mode	ADAPTATION	
Enablers to Platform use	Resource capital	ENB-RESOURCE	DEVICE
			TIME
			LOCATION
			FINANCE
			INTERNET
	Social capital	ENB-SOCIAL	MANAGER/PEER
			CPD POINTS
			REQUIRED TO PRACTICE
	Technical knowledge capital	ENB-TECH	
	Intrinsic capital	ENB-INTRINSIC	
	Course design	ENB-DESIGN	
	Other	ENB-OTHER	
Barriers to Platform use	Resource capital	BAR-RESOURCE	DEVICE
			TIME
			LOCATION
			FINANCE
			INTERNET
	Social capital	BAR-SOCIAL	
	Technical knowledge capital	BAR-TECHNICAL	
	Intrinsic capital	BAR-INTRINSIC	
	Course design	BAR-DESIGN	
	Other	BAR-OTHER	
Impact of the COVID-19	Changes in providers' CPE and Platform use	COVID-CPE	

on e-learning and Platform use	Benefits of Platform during pandemic	COVID-BENEFIT	
	Challenges with Platform during pandemic	COVID-CHALLENGE	
Improvement opportunities for e-learning on the Platform	Improvements in the platform and e-learning for future use	PL-IMPROVE	
	Required support for improved Platform use	IMPROV-SUPPORT	
	Expectations regarding Platform and e-learning development in Ukraine	IMPROVE-EXPECT	
	Other	IMPROVE-OTHER	
Impact of War on informants' e-learning experience	More available resources with the help of partners	IM-WAR-RESOURCE	
	De-prioritization of e-learning due to war	IM-WAR-DE-PRIORITIZE	
	Relocation of informants	IM-WAR-RELOCATION	
	Lack of amenities	IM-WAR-AMENITIES	
	Burden of war on healthcare	IM-WAR-HEALTHCARE	

APPENDIX F. INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Office of the Vice Chancellor for Research & Innovation
Office for the Protection of Research Subjects
805 W. Pennsylvania Ave., MC-095
Urbana, IL 61801-4822

Notice of Approval: New Submission

April 4, 2023

Principal Investigator	Allison Mary Witt
CC	Ganna (Anna) Shapoval
Protocol Title	*In-Service Healthcare Providers' Perceptions of E-Learning Enablers and Barriers in Continuing Professional Education during COVID-19 Pandemic: A Qualitative Case Study of Online CPE Platform in Ukraine*
Protocol Number	23987
Funding Source	Not funded
Review Type	Expedited 6, 7
Status	Active
Risk Determination	No more than minimal risk
Approval Date	April 4, 2023
Expiration Date	April 3, 2028

This letter authorizes the use of human subjects in the above protocol. The University of Illinois at Urbana-Champaign Institutional Review Board (IRB) has reviewed and approved the research study as described.

The Principal Investigator of this study is responsible for:

- Conducting research in a manner consistent with the requirements of the University and federal regulations found at 45 CFR 46.
- Using the approved consent documents, with the footer, from this approved package.
- Requesting approval from the IRB prior to implementing modifications.
- Notifying OPRS of any problems involving human subjects, including unanticipated events, participant complaints, or protocol deviations.
- Notifying OPRS of the completion of the study.