EFFECTIVENESS OF VIRTUAL COLLABORATIVE TRAININGS IN PROMOTING PROFESSIONAL LEARNING COMMUNITIES AT UNIVERSITY LEVEL: A MIXED METHODS STUDY

BY

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Candidate of **Master of Philosophy** at the National University of Modern Languages do hereby declare that the thesis **"EFFECTIVENESS OF VIRTUAL COLLABORATIVE TRAININGS IN PROMOTING PROFESSIONAL LEARNING COMMUNITIES AT UNIVERSITY LEVEL: A MIXED METHODS STUDY"** submitted by me in partial fulfillment of MPhil degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

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ABSTRACT

EFFECTIVENESS OF VIRTUAL COLLABORATIVE TRAININGS IN PROMOTING PROFESSIONAL LEARNING COMMUNITIES AT UNIVERSITY LEVEL: A MIXED METHODS STUDY

In every learning activity, success depends on the honesty of participants in their pursuits, the willingness to stay interactive, and the openness to work together, as a training program helps the employees to grow professionally, boosts their productivity, and improves their performance that effects their learning opportunities. The current research study was conducted to investigate the diverse impacts of online collaboration within structured educational environments, specifically focusing on Professional Learning Communities (PLCs). This study investigated the impact of online training on professional development, administrative proficiency, and the establishment of favorable classroom environments. The research study employed a thorough mixed-methods approach, by following explanatory sequential design to incorporate qualitative narratives on the basis of quantitative data analysis. The population of the study was university professors, Lecturers from NUML, IIUI & AIOU. In respect to the present study, it required the purposive sampling technique to select sample size, in total 75 respondents were selected. A self-developed tool was used to collect the data, in form of survey form, checklist, 5-point Likert scale questionnaire and a structured interview protocol. The quantitative data was analyzed through descriptive and inferential statistics along with thematic analysis of qualitative data. The findings underscored a positive correlation between online training and enhanced leadership capabilities, cognitive skills, and promotion of teamwork within educational settings. The Shared Personal Practice was found a significant component of Collective

Creativity, emphasizing the need of acquiring knowledge from the experiences of others. The findings also underscored the significance of cultivating a supportive environment and showcasing the tangible advantages of leadership training. So, it was suggested that online education contributes to the development of the professional realm significantly. Based on the findings of the study it was recommended that this research can be utilized by educators, school officials, and policymakers to enhance the efficacy of their online training initiatives for professional learning communities (PLCs).

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LIST OF ABBREVIATION

Professional learning communities (PLC)

Collaborative Learning (CL)

Virtual Collaborative Trainings (VCT)

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UMAIR ARSHAD

DEDICATION

DEDICATED

TO

MY BELOVED

DAUGHTER

CHAPTER 1:

1 INTRODUCTION

Success in every learning activity depends on the participants' honesty in their pursuits, their willingness to stay interactive, and their openness to working together. Moreover, a successful learning experience places an emphasis on an inquiry-based approach, supports a learner's innate and automatic learning to absorb the substance of a topic in a social environment, facilitates the learner's self-assessment, and has value for the learner's potential. If a training program helps an employee grow professionally, boosts their productivity, and improves their performance, then it can be termed an effective learning opportunity (Anthony, 2020). Sharing what you've learned with others is a great way to boost your education. Collaborative training is an effective way to improve students' educational experiences. Professional learning communities (PLCs) are networks of educators who work together to improve the quality of instruction and the learning outcomes for their students (Sabbott, 2013). When professionals with outmoded methods and expertise operate in silos, the public often views them as ineffectual and dismisses them. Outcomes are what matter most in professional learning communities. Members evaluate the community's success based on their shared values. In addition to teachers, professionals from other relevant disciplines might be part of these networks ("The Power of Professional Learning Communities," 2021). These networks of experts contribute to institutional strengthening. Collaborative training is an effective means of increasing organizational capacity (The Pivot Team, 2017). The long-lasting consequences of capacity building give it a greater perceived value and relevance. For instance, Capacity

can only be improved by reducing the need for external specialists to gather data and provide solutions to problems that affect local residents. The members of the team are better able to take action locally via their own efforts rather than waiting for assistance from other sources as a result of capacity building. The members of the community benefit from capacity development because it fosters a sense of independence and self-sufficiency among them.

The long-lasting consequences of capacity building give it a greater perceived value and relevance. For instance, Capacity can only be improved by reducing the need for external specialists to gather data and provide solutions to problems that affect local residents. The members of the team are better able to take action locally via their own efforts rather than waiting for assistance from other sources as a result of capacity building. The members of the community benefit from capacity development because it fosters a sense of independence and self-sufficiency among them.

Incorporating capacity building techniques into community work, you and your collaborator can anticipate growth, learning, and change as a result of your joint efforts. Learning how to work with your neighbors politely and effectively would make you a more effective community member and help you solve local issues more quickly. The incorporation of capacity building as either an individual teacher or student or communal capacity building has been shown to greatly accelerate the pace at which positive adjustments and improvements are implemented. Aggregate levels of collective capacity building might focus on either the individual institution of learning or the entire educational system. It follows that the success of a professional learning community would improve the effectiveness of education as a whole, not just an individual learning experience.

Collective expert capacity is clearly an important and powerful component of the system transformation cocktail in the pursuit of continuously rising performance standards (McKinsey, 2010; Whelan, 2009; Crowther, 2011). Training in groups, or "Professional Learning Communities," allows us to improve the educational experience for everyone involved.

Collaborative training has a dual purpose: on the one hand, it creates a setting in which professionals may work together to learn and grow via practice and the exchange of information, and on the other, it allows students to benefit from the professionals' extensive experience and expertise.

The concept of teacher professionalism is becoming important and is being rethought. Hargreaves and Fullan (2012), in their rethinking of teacher professionalism, include social capital alongside human capital and decisional capital as essential components of professional capital. A new professional imperative, as Shirley (2016) puts it, calls for teachers to up their game in terms of professionalism. To fulfil this new obligation, educators must take the initiative to develop their own social capital by organizing and directing peer-learning networks. Peer networks and a collaborative culture among educators are included in the conceptual frameworks of the OECD's Teaching and Learning Worldwide Survey (2016, 2019) as a result of international reinforcement of this idea. According to a recent analysis of the research on social capital and educator development (Demir, 2021) we can see that it is helpful for teachers to network with one another in order to advance their careers. While formal professional development seminars can help teachers’ access knowledge, the study argues that informal social networks promote the understanding, sharing, and contextualization of that information. However, informal

professional development is a poorly studied field that deserves more attention (Evans 2019).

The evolution of IT has made it simpler to offer collaborative training by improving the learning experience by creating online platforms and designing virtual communities. In the same way that technological advancements have made collaborative training more straightforward to develop, they have also facilitated the development of interactive tools that may be used to simulate traditional classroom settings. Because of this development, collaborative training is now more interactive and dynamic, which has helped to keep participants engaged. In addition, technology has assisted by facilitating communication between experts located in different parts of the world, leading to the growth and consolidation of more extensive and diverse communities, or the formation of more focused knowledge groups. Because of technological advancements, these academic networks can now span the globe. Since then, technology has expanded the reach and efficiency of professional learning groups. By incorporating such technology advances to broaden the scope of collaborative training, we may create a more robust knowledge base by sustaining professional learning communities with a mosaic of intellectual assets from across the world.

In this study, we embark on a journey to explore the transformative potential of virtual collaborative trainings in nurturing professional learning communities at universities. At the heart of our exploration is a comprehensive need assessment—a tool that shines a light on the specific gaps and opportunities within our current educational landscape. This process is not just about identifying what's missing; it's about understanding the unique needs of our educators and learners as they navigate the complexities of digital learning

environments. By pinpointing these needs, our research aims to bridge the gap, offering insights and strategies to enhance the efficacy of virtual collaborations. This endeavor is more than an academic exercise; it's a critical step toward reshaping the future of education, ensuring it is responsive, inclusive, and equipped to meet the challenges of our time.

1.1 Rationale of The Study

Although there is a large volume of literature on the topic of Professional Learning Communities, there is still a significant knowledge gap. Not much is known about how technological developments help professional learning communities expand their horizons and foster successful collaborative training tools in a digital setting. Almost no academic inquiry has been conducted (Anthony, 2020). Improved technological resources help create an atmosphere of cooperation even in a digital one. Interactive and dynamic tools that bring in elements of the real environment to enhance the collaborative ambience are introduced to encourage collaborative training. The training is more effective with a group effort like this.

Colleges and universities play essential roles in a variety of fields, including research, instruction, and technological development. In their instructional missions, universities provide students with both the general education necessary for character formation and the specialized training for highly skilled occupations. Universities are vital in the political, economic, cultural, and legal spheres. All majors require sustainability education and training for their grads. In order to help societies overcome the challenges of sustainable development, universities can help educate the public, foster an environment conducive to well-informed decision-making, responsible behavior, and informed consumer choice, and

equip individuals with the new knowledge and skills necessary to do so. It is widely believed that universities played a crucial part in the development and alteration of human society. Their main job function is to collect highly skilled workers and analyses output to ensure the achievement of set targets. Indeed, universities play an important role in the development of unique civil cultural institutions, the emergence of novel cultural ideas, and the teaching and socialization of the next generation (Sharma, 2015). To sum up, we may say that universities are training a trained workforce that contributes to global development and wealth. By making available relevant information, this becomes a reality. Knowledge in universities originates with those actively engaged in the dissemination of information to pupils. Knowledge grows through the combined efforts of experts, hence cultivating an atmosphere conducive to productive teamwork is essential to both the development of such experts and the growth of the body of knowledge to which they contribute. When it comes to bettering the classroom setting, nothing beats training sessions that encourage teamwork. Facilitating the formation of such communities amongst working professionals is among the goals of this learning infrastructure. It is well established that learning occurs as a result of the exchange. This dialogue may occur between experts in the same or other subjects (Shirley, 2016). The cost-effectiveness and operational significance of technology as a means of closing the gap between geographically dispersed experts is a major impetus for studying this area.

1.2 Statement of The Problem

The current study has filled the void shown by the literature review. The effect of technology progress on collaborative training that boosts Professional Learning

Communities has not been studied. The focus of the current study was on relevant aspects of the topic. This investigation has examined how PLCs benefit from cooperation, as well as the connection between virtual collaborative training and PLC advocacy. Since Virtual Collaborative Trainings have such a profound impact on the success of efforts to build PLCs in higher education, research on their scope and nature is essential. Studying "Description of the Role of Collaborative Trainings through Virtual Practices in the Advancement of Professional Learning Communities" as the Problem Statement to be studied.

1.3 Research Objectives

The objectives of the study were to:

1. Investigate the level of virtual collaborative trainings at university level.

2. Assess the practices of professional learning communities at university level.

3. Identify the role of virtual collaborative trainings in promoting professional learning communities at university level.

1.4 Research Questions

Following research question was developed for the current study:

1. How do Virtual Collaborative Trainings integrate participants into institutional training management by distributing rules and vision effectively, and facilitating exchange of knowledge and experience within and across professional learning communities?

1.5 Alternative Hypothesis

H_1: There is a positive relationship between virtual collaborative training initiatives and professional learning communities at university level.

1.6 Conceptual Framework

The conceptual framework of the study was drawn up with the help of the attributes for promoting professional learning communities through collaborative trainings via virtual aspects mentioned in a book by Hord (1997) and DuFour et al., (2013).

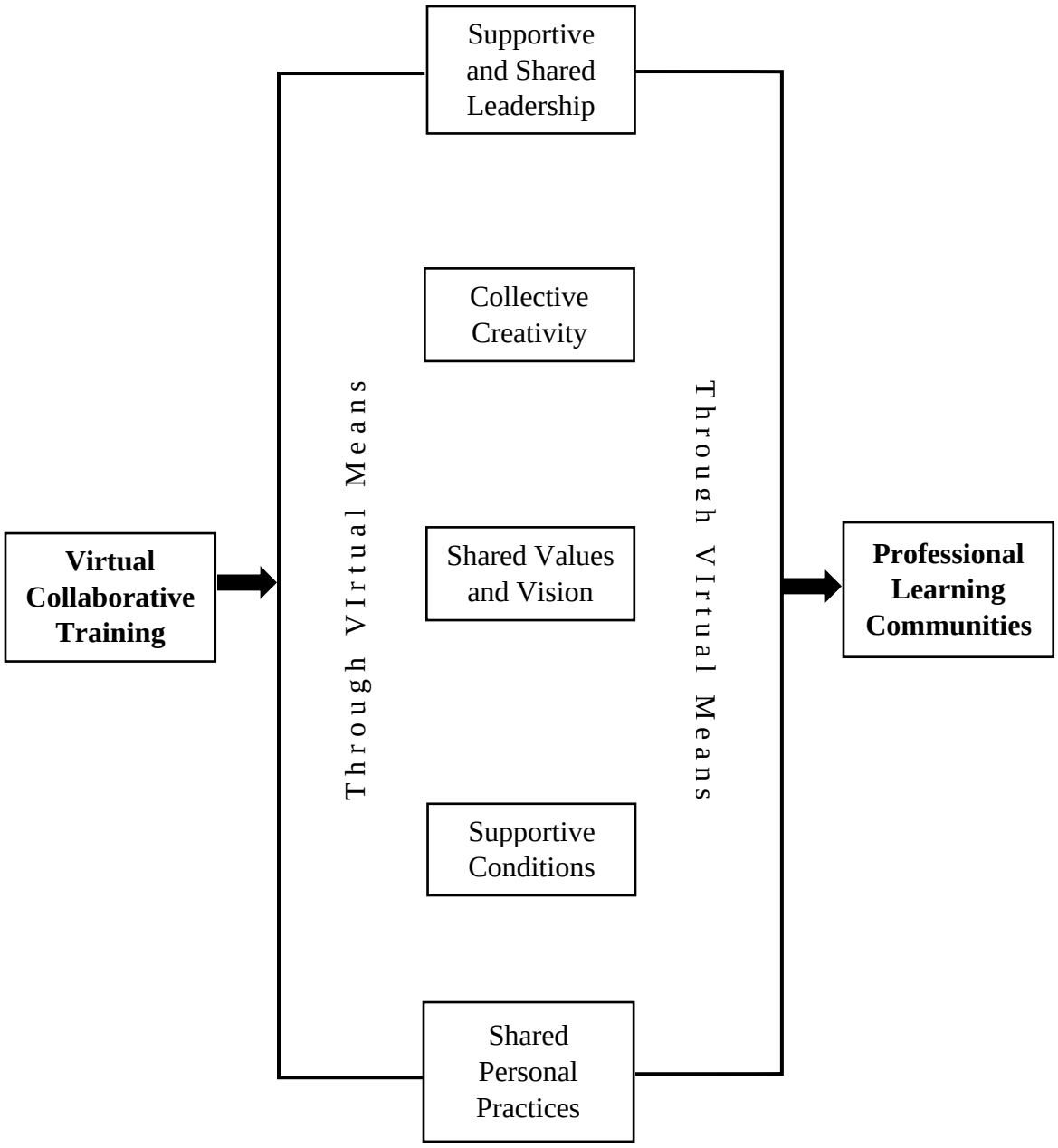


Figure 1: Conceptual Framework

1.7 Significance of The Study

Our educational system is always developing and improving. Changes in societal demands and the growth and refinement of training and education methods to keep up with new discoveries in different academic disciplines are the driving forces behind the development of new educational paradigms. The aim of the study was to investigate the level of virtual collaborative trainings at university level by assessing the practices of professional learning communities and to identify the role of virtual collaborative trainings in promoting professional learning communities. By achieving these objectives, the researcher is able to suggest that by incorporating advanced technologies and interactive methodologies the professional learning communities can foster the collaboration among educators. Universities are always toiling to create human assets that work for the betterment of their respective countries and, more broadly, for the betterment of humanity. Like many other industries, education has adapted the changing standards and needs of the market as a result of technological advancements. The people such as college students are inquisitive, connected, and eager to learn in personal and professional spheres. The creation of a digital learning environment is essential for on-going education (DMI, 2018). The study would be able to nurture the existing body of knowledge in order to sustain students' progress and achieve excellence in the field of knowledge. The current study emphasized that there is an obvious need to create opportunities for professionals to advance their skills and knowledge in order to better address the challenges that society faces on a local, national, and international scale. With the help of findings of the study, teachers would be able to have more productive discussions in their class rooms.

One of the effective strategies for establishing PLCs is the use of collaborative training. With the help of these networks, members can expand their skill sets, learn from one another, and engage in meaningful professional discussion, transforming them from students into intellectuals and contributing to the world's stock of human capital. Therefore, this study has confirmed the significance of collaborative training as a forerunner of PLCs and illuminate the significance of technology in the development and improvement of collaborative training. In addition, by incorporating a technological perspective into this study, new information can be gleaned from the current corpus of literature.

1.8 Methodology

This chapter sheds light on the research methodology that was being utilized during this research.

Research Approach

There is no specific theory on such kind of mutual relations on the given independent, dependent and moderating variables. In this context mixed methods study is more appropriate.

In addition, various types of objectives of this study require both objective and subjective viewpoints for the detailed and complex explanations to meet the objectives of the study so, mixed methods study fits into this context (Johnson, & Christensen, 2014). As quantitative perspective of the research has dealt with objective number 1,2 & 3 of the study whereas, objective number 4 requires insider views.

Qualitative research and quantitative research have their benefits and drawbacks. To cope with the drawbacks of each type of research the researcher has utilized the Mixed Method research approach so that combination of both methods can provide a better explanation

and understanding of the concepts held in research problems than either approach alone. The Sequential Explanatory Strategy was adopted as a mixed method design because the collection and analysis of quantitative data was followed by qualitative data. At the end of the process, data was being integrated from both sources during interpretation.

Advantages of Sequential Explanatory Strategy include:

- Simple owing to distinct & obvious steps
- It is simpler to analyze the competing strategies

a. Research Design

As we are studying the relationship between collaborative training and the professional learning community hence, we require investigating this relationship without altering or manipulating variables being involved. Moreover, we also require knowing the strength as well as the direction of the relation among the variables for which the researcher employed a correlation research design. This research design helped us in identifying an association between variables. It also helped us in identifying patterns among the pool of data and the relationship between variables. Correlation study is a strategic approach of research in which the researcher examines the probable connectivity among the variables.

b. Population

University teachers who have an experience of the professional learning community and virtual collaborative training programs was selected as the population of this study.

University teachers of NUML, IIUI & AIOU were the population of this study. As researcher has delimited his study to the teachers who were part of Professional Learning Communities and Virtual Collaborative Trainings from the above given universities were

selected as the population of the study only so, in total the population was of 130 teachers selected from the above-mentioned universities from faculty of social sciences only.

c. Sampling Technique

The purposive sampling method was adopted to obtain more healthy data and informative responses. Furthermore, the researcher followed the extreme sampling technique to select the participants who have a clear and in-depth understanding of the

Collaborative Trainings and Professional Learning Communities for healthy data collection (Johnson, R. B., & Christensen, L., 2014, p. 371). As the respondents with low knowledge may affect the results of this study. Moreover, it is a cost-effective and time-efficient method.

d. Sample size

University teachers of NUML, IIUI & AIOU were selected as sample of this study. In total 75 respondents were selected among the population they had a deep understanding of the virtual collaborative trainings and are an active member of the Professional Learning Communities.

e. Data Collection Tools

In this study data collection tool was of two types. As the researcher is going to conduct mixed methods study which requires both quantitative and qualitative tools. Closed-ended self-designed questionnaire with 5-point Likert Scale was used to achieve first 2 objectives of the study and open-ended questionnaire was used to achieve the last objective of the study as it requires to be addressed in more depth to understand the phenomena well.

f. Data Collection Procedure

Due to the sequential methodology employed, quantitative data was gathered and analyzed first, followed by qualitative data.

g. Data Analysis

As we are utilizing correlational analysis hence data analysis technique was based on Pearson correlation. The reason to utilize Pearson correlation is to measure the strength of relationships among the independent and the dependent variable. It has shed light and provided information on the direction of the relation among the variable. The correlation can show positive as well as negative relationships. The positive correlation shows direct relation among variables whereas the negative correlation shows indirect relationships among variables. The researcher employed regression analysis to identify the relationship between the independent and dependent variables. The electronic method was used to extract and process the information gathered. SPSS Software was being used to process the quantitative data and the researcher has interpreted the qualitative data as per the themes of the study.

1.9 Delimitation of the Study

This study was be delimited to:

1- Teachers who are part of Professional Learning Communities and Virtual Collaborative Trainings from the below given universities be the population of the study only.

2- The public sector universities of Islamabad. Following given are the three universities:

- National University of Modern Languages, Islamabad

- Islamic International University Islamabad
- Alama Iqbal Open University, Islamabad

3- The respondents of the study were selected from the faculty of social sciences only.

Further the research has not included the professors and lecturers who do not understand the Professional Learning Community and Virtual Collaborative Training programs as their input was not being backed based on their knowledge. The study has not reviewed the literature before 2010 to make the research generalized for the current situation. As there are various shifts in society related to technology and concepts after every successive decade. Because of this aspect, things that appear contextual a decade before becoming out of context in the present time. Therefore, it becomes difficult to generalize research if literature resides on very long-standing research work.

1.10 Operational Definitions

a. Collaborative Trainings

Collaborative training is a method of sharing knowledge and experiences also this is where they learn from one another at the same time. This allows the trainees to gain better expertise and understanding of the specific view point.

b. Shared Leadership Trainings

In the concept of shared leadership there is no sole leaders, however all the employees are involved collectively in decision making based on their skills and expertise. The organizational structure in shared leadership is flat.

c. Trainings on Use of ICT for Global Connectivity:

Technology has been found a rich source in connecting the global world through its various fast means. One-on-One communication, knowledge sharing, exchange of experiences and problem solving to bring the global world on board.

d. Skill Based Trainings:

Skill based trainings enhances the teaching skills and boost up their capabilities which improves their overall performance and make the teaching learning process more efficient.

e. Trainings on Strategic Management:

Trainings on strategic management introduces vast range of new knowledge regarding strategic planning and management by enhancing leadership skill. Strategic management trainings allow the employees to be part of a great network which may increase their values in their institution.

f. Learning Communities

As an approach to reorganizing university curricula, learning communities place an emphasis on student-faculty-staff collaborations and aim to remove institutional obstacles to a quality education.

g. Professional Learning Communities

What we call a PLC, or professional learning community, is a group of teachers who have committed to working together to enhance their students' education through a cycle of constant improvement.

h. Supportive Leadership

A manager who practices supportive leadership does more than hand off responsibilities and wait for results; instead, he or she backs up subordinates all the way through an assignment.

i. Collective Creativity

A technique of artistic production whereby novel, inventive, and evocative works of art are the result of collaborative efforts by a large number of people who are linked together through a network. Just What Is Group Imagination.

j. Shared Values

Values that are shared by all members of an organization are called "shared values," and they are typically created by the company's leadership and then adopted by the rest of the organization**.**

k. Shared Vision

Everyone in the organization should have the same mental picture of where they want to take the business.

l. Supportive Conditions

A professional learning community is characterized by its members' ability to learn from one another, make decisions and address problems together, and come up with creative solutions. The best learning communities take advantage of both a conducive physical location and the unique skillsets of their members.

m. Shared Personal Practices

Individual and group capabilities can be improved through shared personal practice in the form of peer evaluation and input on instructional practice.

n. Criteria of Defining Virtual Collaborative Trainings

Virtual trainings can be considered as collaborative trainings if they meet the below given criteria:

Collaborative trainings are based on methodology and strategy to share knowledge and experiences. This allows the trainees to gain better expertise and understanding of the specific view point. Each of the participants share their personal experience while learning from others at the same time.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

The more years we live, the wider our scope of understanding. We interact with many different people throughout our lives. Through this, we are introduced to new fields of study. The problem occurs when we don't know which pieces of information to priorities. What we discover could be crucial or irrelevant. Most people think they are fully informed about everything that is happening in the world. Yet, do they? Knowledge must be distinguished from the information that is consumed on a daily basis. Students of the theory of knowledge would do well to internalize the idea that certainty plays a deliberate role in deciding what counts as knowing. The term "knowledge" can be interpreted in various ways ("What Is Knowledge," 2021). It's fine if it's merely theoretical understanding. Assembling ideas and mental models into coherent wholes is what we mean when we say that something is conceptual. The term "conceptual knowledge" can refer to a variety of different things, including facts, familiarity with concepts, appreciation for principles, familiarity with models, etc. It is possible to acquire abstract knowledge through various methods, including interpretation, observation, listening, incorporating into one's own experience, and serious, reflective psychological action. Also called Declarative Knowledge. (Conceptual Knowledge, 2017).

An individual gains knowledge as a result of the conversation. Whenever teachers are actively engaged in setting off interactions that are helpful for enhancing learning and are linked with emotionally aroused support, children learn best. Through these experiences, children are able to give concrete meaning to the seemingly abstract elements of their

surroundings. For them, it's an input that prompts them to express themselves verbally in relation to those structures. And it keeps them interested in and enthusiastic about learning. Yoshikawa et al., (2013)

The level of interaction in collaborative activities is typically quite high. Collaborative learning is a method of teaching and studying in which individuals acquire skills and knowledge by working together to solve problems, complete projects, or create something entirely new. Compared to purely competitive or purely individualistic endeavors, CL has more positive effects on people's health in terms of their mental well-being, their ability to work together effectively, and their level of self-assurance. Laal and Khodsi (2012). As a result of these discussions, professional learning communities are shaped by collaborative training. Here, we take a look at what has been written about professional learning communities (PLCs), trace the concept's evolution, and "unpack" the various terms involved.

In our literature review, we delve into the rich tapestry of existing research on need assessments within the realm of virtual collaborative trainings and professional learning communities. This exploration is not merely academic; it's a journey to understand how our predecessors have navigated the intricate interplay between technology and education. We unearth studies that illuminate the effectiveness of virtual collaborations, yet we also encounter a void—a gap in understanding the full spectrum of needs that these digital platforms can address. Our research boldly steps into this uncharted territory, aiming to not only map out these unexplored needs but also to provide actionable insights that can enrich the fabric of professional learning communities. Through this endeavor, we seek to stitch

our findings into the broader academic narrative, contributing a new layer of understanding to the ongoing discourse on educational innovation.

2.1 Why Do We Need Professional Learning Communities?

Creating a Learning Community for Your Career The term "professional learning communities" lacks a universally accepted definition. Scholars from a variety of countries agree that a PLC is a group of people who work together to share and critically examine their practice on an ongoing, reflective, learning-oriented, collaborative, growth-promoting, inclusive basis. (Mitchell & Hackney, 2000; Toole & Louis, 2002). (Hord (1997, p.1, King & Newmann, 2001).) Synthesizes method and anticipated outcomes in describing a 'professional community of learners' (McGree, & Fernandez, 1993, Astuto, Clark, Read,) as one: “In which teachers at institution and its administrators continuously seek and exchange learning, and act on their learning. Their efforts are directed on better serving the students, so we might think of them as communities of continuous inquiry and progress”

As a result, the concept highlights the many ways in which stakeholders both inside and outside of an institute can work together to benefit students' education and an institute as a whole.

2.2 Origins and Evolution of the Idea

The history of PLC appears to have many beginnings. To some extent, it is related to the pedagogical practices of investigation, introspection, and self-evaluation. Educators' papers from the turn of the last century already contain some of the foundational features

of what would become today's effective PLCs. As Dewey (1929) stated, it is the educational procedures themselves that provide the information (the subject matter) that gives rise to questions for investigation. Almost a century ago, in 1975, Stenhouse advocated that teachers also act as researchers in the classroom and schools. As an influential voice, Scho n's (1983) promotion of the ‘reflective practitioner' has been crucial. A number of initiatives and programs centered on "thinking school," "problem-solving school," and, most notably, "Creative School" (Bolam, 1977) as a result of the 1970s curriculum reform movement in schools CERI, 1978). A newer school of thought emerged in the 1980s, called the self-review or self-evaluation school (McMahon et al., 1984).

Hord (1997) concludes in his comprehensive research for practitioners that the term "PLC" likely originated among professionals and education supporters. Service learning, information and communication technology, higher education, and other forms of community learning make up the bulk of 'learning community' mentions. In contrast, the field of study known as "professional community" emerged in the 1980s and has focused mostly on schools and departments as mediating settings for teaching ((Louis et al., 1995; Talbert et al., 1993)

2.3 Dissecting the Idea

It is not accidental that "learning" comes between "professional" and "community" here. Some research on the working conditions of educators have concentrated on the connections between the classroom and student learning. For instance, Rosenholtz (1989) classified elementary schools in Tennessee as either "learning enriched" or "learning poor," even though her primary interest was in the role of instruction in shaping students'

accomplishments The idea of community, however, is central to it. The growth of both teachers as professionals and students as members of a learning community are stressed. Five characteristics of a community are generally identified by current theorists. These characteristics include shared values and understandings, engagement and involvement, interdependence, care for individual and minority viewpoints ("Members of a community, although having interests and a commitment to one another, don't always agree "), and meaningful relationships. (Westheimer, 1999, p. 75). An ethic of interpersonal caring shared by educators, students, and administrators is foundational to the concept of school community (Hargreaves & Giles, 2003; Louis et al., 1995). Professionalism emphasizes knowledge and skill growth, client-centricity, and individual agency, while community involvement emphasizes mutually beneficial relationships and establishing common ideals and beliefs. This has the potential to disrupt numerous processes, including the introduction of performance-based pay structures and the management of educators' actions in the classroom. Fullan (2001) argues that we should stop focusing on people and instead foster an environment where teachers can work together effectively in the classroom. (through merit pay, career ladders, etc.) And start establishing schools as PLCs. (McMahon, 2001a, Louis et al., 1995).

More questions arise concerning the idea. How welcoming is this group? Should all employees at the institute be included, or just teachers? Huffman et al., 2003 argued that experienced PLCs include all its participants in developing a shared insight, but that this involvement is concentrated among students and teachers. In most studies, PLC participants are solely assumed to be educators (including administrators). The work of other employees, however, can be just as crucial for many institutions particularly those in

specific scenarios, those with younger children, and those with a high percentage of students with special needs (Louis & Gordon, 2006).

Furthermore, due to the structure of many educational institutions, PLCs may be functioning on a hierarchical scale. McLaughlin and Talbert (2001), for instance, studied 16 high schools and found both strong and poor departmental teacher learning communities.

2.4 Characteristics of Professional Learning Communities

All PLCs tend to have five commonalities or qualities that appear to be connected and work together (Hord, 2004; Louis et al., 1995). These include:

Consensus on a shared ideal and strategy. Billups & Borstel, 2018 found that having a common goal and strategy was crucial Teachers can't rely on each other to help them reach their goals, therefore they have to focus "their undivided attention" on the students in their classrooms, which is seen as a potential barrier to their effectiveness. (Hord, 2004, Louis et al., 1995; Newmann et al., 1995). According to Louis and coworkers (1995), a group with a common set of values can make "shared, collective, ethical decisions" together.

2.4.1 Shared Accountability

Leithwood, King (2001), Louis and Bryk (1996), Kruse (1995), and Louis (1998), Newmann (2001), all concur that stakeholders of a PLC share the load of teaching on a regular basis. The idea is that when everyone pitches in, it's easier to maintain motivation, those who don't contribute feel the weight of the group's scrutiny, and nobody feels like an outcast (Newmann & Wehlage, 1995).

2.4.2 Methods of Professional Inquiry That Encourage Self-Reflection

Reflective dialogue (Louis et al., 1995), discussions of significant educational issues or problems (Newmann & Wehlage, 1995), collaborative planning and curriculum development (Hord, 2004), the constant conversion of tacit knowledge into explicit knowledge through interaction (Hord, 2004), and the application of new ideas and information to problem solving and solutions (ad hoc) are all examples (Hord, 1997).

2.4.3 Collaboration

Staff participation in development activities with ramifications for multiple persons, beyond superficial exchanges of help, support, or assistance (Louis et al., 1995) such as collaborative evaluation and feedback is included in this category (Hord, 2004). The importance of working together to accomplish a goal is emphasized (Newmann & Wehlage, 1995). A sense of mutual dependency is essential to this kind of cooperation; for example, improving teaching methods is a goal that, without teamwork, would be impossible to realize.

2.4.4 Learning in Teams and Individually Are Both Encouraged

Teachers learn from one another in the classroom (Louis et al., 1995). When it comes to 'professional self-renewal,' in Rosenholtz and Simpson’s (1989) 'learning enriched schools,' it is more of a group effort than an individual one. Collective knowledge creation (Louis, 1994) is another form of shared learning in which students, teachers, and administrators work together to interpret and disseminate new information and data.

2.5 Cultivating Expertise in A Virtual PLC

Recent literature has focused heavily on how technology might facilitate teachers' cognitive processes in knowledge production as a response to the growing importance of social interaction in professional learning. This is what Garrison et al. (2001) call "collaborative meaning construction and confirmation," and it occurs when students work together to figure out what they've learned and then verify their assumptions. Content analysis (CA) has been used in studies evaluating the quality and quantity of knowledge construction in online settings to measure the extent to which users are actively engaged in the process. In their community of inquiry framework, Garrison et al. (1999) treat cognitive presence as a unitary factor. The cognitive presence coding schema was designed (Garrison et al., 1999) to assess how much knowledge is being built during a given stage of a learning process.

- The first stage, "triggers," centers on posts that identify the issue, while the second stage, "explanations," centers on the dissemination of knowledge.

- The third stage, "exploration," involves making new connections and coming up with original solutions to problems.

- The fourth is to Resolve: Put the solution to the test and evaluate it critically.

These stages progress from easier to more difficult, as perceived by the student. The first two is about knowledge sharing, which requires a lesser level of cognitive load, whereas the last two are knowledge building and are examples of more complex forms of discourse (Hemphill & Hemphill, 2007). Recent research has employed cognitive presence to

examine how much knowledge is being built in the context of teacher preparation. The majority of online articles, according to some research, only consist of the "trigger" and "explain" stages, while the "exploration" and "solution" stages (Redmond & Mander, 2006). As a result, numerous considerations are needed to encourage knowledge construction. Activities that encourage thought-provoking inquiries and in-depth conversation are recommended by Garrison and Cleveland-Innes (2005) to foster a setting conducive to extensive knowledge construction. Teacher knowledge can be expanded through facilitated dialogues with subject matter experts, as discovered the fourth by Zhang et al. (2017). In sum, it seems that teachers can benefit greatly from online activities that encourage a high degree of knowledge production by developing activities and encouraging dialogues that support the co-construction of knowledge.

2.6 Virtual Learning Promotes Educator Collaboration in A Professional Learning Community

Most research on professional development in online PLCs has concentrated on how teachers communicate and collaborate with one another (Zhang et al., 2017). Teachers' professional development is seen not as a linear sequence of lessons but as a complex network of relationships (Moolenaar, 2012). Researchers are increasingly turning to social capital and social network theory in order to comprehend educators' ongoing professional development. "Resources entrenched in a social system that are accessed and/or mobilized in purposeful action," as defined by Lin (2001, p.12). Knowledge sharing (Quinn and Kim, 2018) and building (Kauffman et al., 2010) are two areas where social capital has been demonstrated to have a role (Daniel et al., 2003). Pre-service educators can benefit from

the application of social capital theory by expanding their own knowledge. Most social network research focusing on teacher training employ social capital theory to deduce how educators might network for the sake of professional development (Rienties & Kinchin, 2014).

By providing instructors with a variety of tools and the chance to put them to use, teacher networks can improve group outcomes on both a cognitive and an affective level (Fox and Wilson, 2015). Individual actions and results are thought to have causal links to one's broader web of social connections, according to social network theory (Burt, 1992). The teachers that make up a professional learning community online are the nodes of a teacher's social network, and the relationships between them are the ties. The foundation of this theory is the analysis of interpersonal relationships within a certain community (PLC). When analyzing the quality of a social network, researchers in the field of teacher education typically look at two factors: network size and diversity (Waes et al., 2018). In terms of the size of their networks, teachers who have more connections have a better chance of connecting with relevant individuals and learning about relevant resources (Moolenaar and Daly, 2012). According to Waes et al. (2015), variety is one of the most important factors influencing teachers' ability to advance their own professional development. Waes et al. (2015) argued that connecting teachers with shared passions may not necessarily lead to the development of novel approaches to classroom instruction. Further it was stated that highly effective educators tend to have extensive professional networks that span a wide range of fields and levels of skill. Teachers' professional networks was not necessarily expanded if they participate in online PLCs. To better prepare future teachers, Liou and Daly (2018) stress the necessity of cultivating a professional network of relationships

within teacher education programs. Moreover, implementing a network-based intervention is necessary to improve teachers' professional networks. Fox and Wilson (2015) and Liou et al. (2016), among others, have argued that more study needs to be done to figure out how to best facilitate the growth of professional networks among future educators in an online setting.

2.7 In What Ways Do Online Professional Learning Communities Excel?

This decade has seen an explosion of online learning communities and courses designed to help people advance their careers and educations, whether at a university (Arbaugh and Duray, 2002; Hay et al., 2004) or on the job (Jones & McCann, 2005; Tynjälä & Häkkinen, 2005). Several factors, such as the availability of high-quality programs, low costs, the growth of the internet, and a dynamic business environment, have contributed to this quick ascent, as outlined by Schweizer (2004). She also listed a number of obstacles to online education, such as skepticism from workers, insufficient funding from businesses, a dearth of applicable courses, and connectivity problems that prevent people from getting online. E-learning has several potential benefits for organizations that have difficulties with workforce development due to factors such as employees' dispersed locations and the need for them to be able to adapt to changing work schedules and environments (Jones & McCann, 2005).

People's actions in collaborative training can be broken down into three categories: those motivated by a want to be a part of the group activity, by a desire to learn, and by a need to conform to the group.

The research study of Johnsons (2009) was cited by Brown and Lara (2011), who stated that people respond to the activities of others by taking action of their own. Actions can pave the way for others to succeed. Students' interest, participation, and capacity for critical thinking can all be piqued through the use of interactivity. Online learning eliminates social interactions between students thus kids can't socialize during study breaks.

Due to their fundamental function, PLCs should be viewed and used primarily as a means of developing in-house expertise. Effective PLCs encourage a climate where teachers are comfortable with giving and receiving constructive feedback, consulting with other experts when necessary, and sharing information about their investigations into new pedagogical approaches (The Pivot Team, 2017). Interactions resulting from brainstorming and group thought produce solutions that are helpful in resolving problems in many areas of study. It follows that the success of a professional learning community was to improve the effectiveness of education as a whole, not just an individual learning experience. To demonstrate steadily rising performance standards, it's clear that the collective expertise of the professional community at large is a key resource for navigating the complexities of systemic change (McKinsey, 2010; Whelan, 2009; Crowther, 2011).

Managers must keep up with the rapid pace of technological development if they are to reap the benefits for their employees and the bottom line of their businesses. This is true across all sectors of the economy. Many companies see the release of employees for traditional face-to-face courses as excessively disruptive to the business, while others actively desire budget reductions in travel and out-of-office expenditures related with face-to-face opportunities.

Cooperation initiatives are greatly aided by technological innovations that facilitate online communication and file sharing. Because of the convenience of online training, managers may expand the number of courses they offer and respond quickly to shifts in demand. This doesn't imply they ignore the value of traditional mentoring over the phone or in person; rather, the vast majority choose a hybrid approach that combines offline and online methods. IBM's 2008 paper, the enterprise of the future, based on interviews with CEOs around the world, suggested that organizations should take steps like integrating collaborative tools like wikis into work processes that involve people dispersed in different locations in order to improve their workforce's ability to adapt to change (Effective Use of Technology in Training, 2010).

Some of the available online course management systems CMSs for e-learning provide a lot more than simply the potential to save money on things like travel costs and other miscellaneous fees. Social networking and web 2.0 applications have been shown to facilitate communication and knowledge sharing before to, during, and after class. They have the potential to encourage introspective learning, iterative project improvements, the application of newly acquired abilities, and the reinforcing of lessons gained. This can be problematic when trying to encourage interactions via digital mediums. Having someone to bounce ideas off of, gain new knowledge from, and boost one's own self-assurance are all benefits of working with others. Neither formal correspondence nor telex devices are used as frequently as they formerly were. Communication via telephone is also declining in the workplace. Since the widespread availability of Internet-based communication, digital collaboration tools have become increasingly important to the smooth running of modern workplaces.

2.8 Attributes for Professional Learning Communities Via Virtual Aspects

To be successful, professional learning communities must thrive in many areas, including those that are relevant to and facilitated by online learning and collaboration. The following are some of the most salient features that were being examined in depth during the course of this research.

2.8.1 Virtual Collaborative Training Platforms

Within the realm of virtual collaborative trainings (VCT), a variety of digital platforms have emerged as pivotal tools in the transformation and delivery of professional learning and development. These platforms, each with their distinct features and capabilities, facilitate the seamless integration of collaborative learning processes, interactive engagement, and the distribution of educational content across geographically dispersed learners. Notably, platforms such as Zoom, Microsoft Teams, Google Workspace, and Moodle have become synonymous with VCT, offering an array of functionalities tailored to enhance the virtual learning experience. These functionalities range from video conferencing and real-time collaboration on documents, to comprehensive learning management systems that support course creation, assessment tools, and forums for discussion.

The adoption and integration of these VCT platforms into the fabric of professional learning communities underscore a significant shift towards digital-first educational strategies. This transition is not merely a response to the logistical challenges posed by physical distances or the constraints of traditional learning environments but is reflective of a broader educational paradigm shift. In this new landscape, the emphasis is placed on

fostering interactive, student-centered learning experiences that transcend physical boundaries, enabling participants to engage with content, instructors, and peers in a dynamic, flexible manner. The pedagogical implications of these platforms are profound, as they allow for the customization of learning pathways, the application of mixed-methods approaches to content delivery, and the facilitation of peer-to-peer learning and support networks.

Furthermore, the versatility of these VCT platforms in supporting a wide range of educational activities—from synchronous sessions that replicate the immediacy and interactivity of traditional classrooms, to asynchronous learning modules that cater to the self-paced learning preferences of individuals—illustrates the transformative potential of technology in education. As educators and learners continue to navigate the complexities of virtual collaborative trainings, the role of these digital platforms will undoubtedly evolve, reflecting ongoing innovations in technology and pedagogy, as well as the changing needs of a diverse, global learner population. This evolution marks a significant chapter in the literature on virtual learning environments, highlighting the critical role of technology in shaping future educational landscapes.

2.8.3 Collaborative Training

Learning from one another and sharing one's own experiences is at the heart of collaborative training. Trainees are able to learn more about a topic and develop a deeper comprehension of a particular perspective in this way (Papa, P. A., Rector, C., & Stone, C. 1998).

There has been "explosive development" in the use of virtual teams to facilitate collaborations in organizations since the late 1990s, and this trend is expected to continue (Dulebohn & Hoch 2017, p. 569). The effectiveness of virtual teams can be attributed to the benefits of teamwork (Stevenson, 2017). New possibilities for collaboration and interdisciplinary work made possible by technological developments and increased internet access are altering professional practice settings (Handke et al., 2019). The ubiquitous nature of digital tools in the modern day means that all teaching and administrative teams could be viewed as "virtual" in some sense. One cannot simply "turn on" or "turn off" vitality; rather, it exists on a scale from very little to a lot (Gibbs, et al., 2017). As a result of the advantages of digital media in the business world, the phrase "virtual team" can be used to describe both traditional office settings and online-only collaborations. We expect this study to be of service to practitioners in any setting where virtual collaboration is required. The term "practitioner" is used here in a broad sense, encompassing not only classroom instructors but also non-instructional university administrators and travelling educators.

2.8.4 Shared Leadership Trainings

In the concept of shared leadership there is no sole leaders, however all the employees are involved collectively in decision making based on their skills and expertise. The organizational structure in shared leadership is flat.

Any effort to better an institution without considering its culture has been called "doomed to tinkering." According to research (Fullan, 1992), an institutions culture can affect the persons' openness to change. Schein (1985, p. 2) suggests that "the unique talent of leaders is their capacity to work with culture" and that "it is possible... that the only thing of real value that leaders do is to establish and manage culture." He argues that a learning-friendly culture strikes a good balance between the needs of all parties involved, places an emphasis on individuals rather than systems, inspires employees to believe they can affect positive change in their surroundings, prioritizes education, views problems from multiple perspectives, values collaboration, promotes open lines of communication, and positions its leaders as accessible. Shulman (1997, p. 101) makes a similar case, saying that for teachers to learn effectively.

2.8.5Trainings on Use of ICT for Global Connectivity

Managers must keep up with the rapid pace of technological development if they are to reap the benefits for their employees and the bottom line of their businesses. This is true across all sectors of the economy. Many companies see the release of employees for traditional face-to-face courses as excessively disruptive to the business, while others

actively desire budget reductions in travel and out-of-office expenditures related with face-to-face opportunities.

Cooperation initiatives are greatly aided by technological innovations that facilitate online communication and file sharing. Because of the convenience of online training, managers may expand the number of courses they offer and respond quickly to shifts in demand. This doesn't imply they ignore the value of traditional mentoring over the phone or in person; rather, the vast majority choose a hybrid approach that combines offline and online methods. IBM's 2008 paper, the enterprise of the future, based on interviews with CEOs around the world, suggested that organizations should take steps like integrating collaborative tools like wikis into work processes that involve people dispersed in different locations in order to improve their workforce's ability to adapt to change ("Effective Use of Technology in Training," 2010).

Some of the available online CMSs for e-learning provide a lot more than simply the potential to save money on things like travel costs and other miscellaneous fees. Social networking and web 2.0 applications have been shown to facilitate communication and knowledge sharing before to, during, and after class. They have the potential to encourage introspective learning, iterative project improvements, the application of newly acquired abilities, and the reinforcing of lessons gained. This can be problematic when trying to encourage interactions via digital mediums. Having someone to bounce ideas off of, gain new knowledge from, and boost one's own self-assurance are all benefits of working with others. Neither formal correspondence nor telex devices are used as frequently as they formerly were. Communication via telephone is also declining in the workplace. Since the

widespread availability of Internet-based communication, digital collaboration tools have become increasingly important to the smooth running of modern workplaces.

Technology for fostering collaboration amongst workers is becoming a must-have in many industries. In reality, these cutting-edge technologies constitute the backbone of data sharing, constant communication, project management, and task management—all crucial components of effective teamwork. We no longer live in an age where people communicate solely via fax machines and formal letters. Communication via telephone is also declining in the workplace. In the modern world of global, always-connected communication, digital workplace collaboration tools are indispensable. We use several platforms and techniques for group work cooperation. Technically, this phrase encompasses both fax machines and Morse code. Importantly, this resource has focus on innovative and developing tools for digital teamwork.

Modern technologies for teamwork are effective because they provide easier access to shared facilities and materials.

"Collaboration Technology: What Software to Use to Improve Team Collaboration," 2021. They do this by assisting in the organization of data and goals, monitoring progress, and facilitating lines of communication among workers. A video chat and collaborative workspace, Go Board can be accessed online. Anyone with access to a computer and an internet connection may set up their own personal Go Board on any learning platform, share the link with a friend, and begin working together on a single set of notes. According to Schnellmann {2018), as technology has played a crucial part in helping to bridge the gap while developing global during an era of globalization, we now have a variety of platforms

that stretch far beyond the confines of a traditional classroom. Incredibly, this link has opened up hitherto inaccessible avenues of education and social interaction for a large number of people. The ability to work together and exchange knowledge is crucial to the success of any professional learning community. Using collaborative and sharing online technologies is the first step in establishing a PLC. This exemplifies the power of technology to create a dynamic and engaging platform, "Bridging the Gap: The Digital Divide in Times of COVID-19," 2020, which can then be used to bring together professionals from all around the world to form a Professional Learning Community.

After the WHO declared the COVID-19 pandemic and it became clear that the virus posed an unprecedented threat to public health, a number of countries began implementing a variety of measures, including as social isolation, mask requirements, and lock downs (Stening, 2022).

2.8.6 Skill Based Trainings

Trainings that focus on improving teachers' talents rather than just their knowledge have been shown to improve student achievement and classroom productivity (Wearmouth et al., 2021).

2.8.7 Enquiry learning

Inquiry learning in professional learning communities (PLCs) (Hord, 1997), the forerunner to the term "reflective dialogue," is typically thought of as different sorts of conversation in which knowledge is exchanged and developed to improve understanding and problem-solving (Mercer, 2008). Using examples from their own classrooms, Horn and Little (2010)

demonstrated the value of reflective dialogues among teacher teams as a means of knowledge sharing and problem identification, analysis, and resolution. According to a meta-analysis conducted by Lomos et al. (2011) on the relationship between subject-related teacher teams and student success, a rise in the frequency with which PLCs engage in reflective discussion and collaborative activities has a salutary influence on educational outcomes. It appears that joint accountability and mutual trust are vital for thoughtful discussions, as is the perceived emotional safety to communicate personal and secret information (Admiraal et al., 2012; Hord 2004). Members of PLCs experience more uncertainty as a result of their participation, according to research by Snow-Gerono (2005). Experts like Supovitz (2002) have found that PLCs have an effect on school cultures, but that their ability to improve teacher professionalization and student outcomes is hampered by a lack of reflective conversation and collaborative activities. While it is often accepted that PLCs can benefit from reflective discourse (Vescio et al., 2008), this is generally an unexplored area of study (Stoll et al., 2006). Because of this, there is a common misconception that professional learning communities (PLCs) automatically result in in-depth, ongoing conversations about pedagogy, student learning, and growth (Newman, 1996). Researchers such as De Groot et al. (2014) argue that further research is required to fully understand the role that reflective dialogues play in the growth of PLCs.

2.8.8 Trainings on Strategic Management

Trainings on strategic management introduces vast range of new knowledge regarding strategic planning and management by enhancing leadership skill. Strategic management

trainings allow the employees to be part of a great network which may increase their values in their institution.

Training in strategic management for C-suite executives should emphasize the development of generalist managers' abilities and the implementation of company strategy across departments. This is true because general managers must have an understanding of how all aspects of a company's operations interact with one another, and not just their own. A solid strategic management program was provided you with both strategy management and leadership development. Strong leadership abilities are a boon to any profession, and they are essential for the successful rollout of any business strategy.

Strategic management allows you to take a backseat and assess how well you're leading. Executive leadership coaching and leadership exercises provide a safe and encouraging space to test out your leadership abilities and explore new ideas.

For the purposes of online education Pros can take advantage of the many networking events that was being held as a result. They'll network with like-minded professionals interested in expanding their knowledge of business practices from a wide range of departments, industries, and regions. You can improve your grasp of the business world as a whole by learning from the stories of other executives' successes and failures.

It has broadened the horizons and develop more adaptability by interacting with classmates in one’s business management class. It's possible that professionals come up with some ingenious ways to "import" strategies used in other sectors to your own.

As the study has followed the work of Hord (1997) to draw the conceptual framework, where she has discussed the attributes of professional learning communities. There are five attributes of PLCs:

2.8.9 Supportive Leadership

A manager who practices supportive leadership does more than hand off responsibilities and wait for results; instead, he or she backs up subordinates all the way through an assignment (Corporate Finance Institute, 2018).

Proponents of educational leadership say that ensuring students and teachers alike continue to make progress in their education is the job's top priority (Taylor, 2000). According to (Hall & Southworth, 1997) at least some school administrators pay more attention to students' final grades and less to how those grades were attained. "What leaders say and do conveys what they value. Principals who focus on classroom practice demonstrate via their actions that pedagogy is vital," write Louis and colleagues (1995, p. 39). If school leaders are serious about helping their communities thrive, they must priorities teachers' continued education as a crucial part of the transformation process. According to Kinjerski and Skrypnek (2006) these fosters opportunities for educators' expertise to expand. They propose ‘situated cognition' as a means of incorporating professional training into day-to-day operations.

2.8.10 Collective Creativity

A technique of artistic production whereby novel, inventive, and evocative works of art are the result of collaborative efforts by a large number of people who are linked together through a network.

2.8.11 Shared Values

Values that are shared by all members of an organization are called "shared values," and they are typically created by the company's leadership and then adopted by the rest of the organization**.**

2.8.12 Shared Vision

Everyone in the organization should have the same mental picture of where they want to take the business.

2.8.13 Supportive Conditions

A professional learning community is characterized by its members' ability to learn from one another, make decisions and address problems together, and come up with creative solutions. It has been found that learning communities are most successful when both the physical and human characteristics of the people involved are maximized (Louis & Kruse, 1995).

2.8.14 Shared Personal Practices

Individual and group capabilities can be improved through shared personal practice in the form of peer evaluation and input on instructional practice (Hord, 1997).

2.9 Virus Outbreak Makes Virtual Learning a Vital Component

Today's collaboration tools boost team output by facilitating sharing of information and physical space. They do this via facilitating the management of data and the tracking of progress toward goals, as well as the creation of channels for employee contact ("Collaboration Technology: What Software to Use to Improve Team Collaboration," 2021). Go Board is a web-based app that functions as a shared whiteboard and video chat platform. Any student can make a Go Board on any learning platform, share the link with a classmate, and work together on a single set of notes. This is according to research (Schnellmann, 2018). Since technology has played a significant role in helping to bridge the gap while expanding global during an era of globalization, we now have a variety of platforms that reach outside the confines of a classroom to facilitate this type of learning. Many people's lives have been enriched by this connection, allowing them to gain insight into other cultures and make meaningful friendships across distances. One of the most essential aspects of a professional learning community is the ability to work together and share knowledge. Making advantage of collaborative and sharing online tools is the first step in establishing a PLC. This highlights the role that technology plays in bridging the digital divide in the context of COVID-19 ("Bridging the Gap: The Digital Divide in Times of COVID-19," 2020) by providing a dynamic and interactive hub for professionals from all over the world to join and work together to promote a Professional Learning Community.

Several countries began implementing a variety of measures, such as social isolation, mask requirements, and lock downs, within a matter of weeks after the World Health Organization declared the COVID-19 pandemic and it became clear that the virus posed an unprecedented threat to public health (Stening, 2022).

When further measures to keep, people apart are implemented to stop the spread of the corona-virus, mental health professionals are warning of the psychological repercussions of missing normal social connections. This kind of work can be expensive, especially if it goes on for a while.

As the epidemic spread, more and more countries warned their populations to stay indoors and prohibited any needless travel. Institutions and businesses across the country that have gone completely digital, such as schools, restaurants, and nursing homes, were all forced to close. Social isolation has a significant impact on containing the COVID-19 pandemic ("Social Distancing Comes with Psychological Fallout," 2020). People all throughout the world had to isolate themselves from one another after the COVID 19 Pandemic, which was a terrifying catastrophe that spread like wildfire. In many cities around the globe, lawlessness has become the norm. Improvements in people's ability to maintain relationships outside of work have been made possible by technological advances in people's free time. Almost everybody has moved their social lives to the internet. "How Cloud Technology Combats Isolation," published in 2020, explains how the cloud's various platforms, tools, and gadgets are helping people interact with those in their immediate vicinity, those across the country, and those on the other side of the planet. In addition, students can learn and demonstrate mastery of complex and challenging subjects thanks to the unlimited information access made possible by educational technology. These two

powerful educational factors, when combined, may lead to the development of collaborative learning settings that promote and maintain the integration of information technology to enhance the teaching and learning experiences of both teachers and students (Garcia, 2005).

2.10 Background

Theories That Should Form the Basis of Any Virtual Learning

Due to the widespread belief that conversation is the primary vehicle via which one amasses knowledge, educational theorists and scholars have devoted a significant amount of time and energy to researching the role that conversation plays in the educational process (Sharples et al., 2006). This problem has mostly been approached in three different ways so far. According to the cognitive approach, learning takes place when students actively engage in cognitive tasks such as questioning, interpreting, elaborating on, and comparing newly acquired information to prior knowledge during dialogues with their peers. This is how learning takes place. Through participation in these activities, there is a greater chance that the information would be understood and remembered (Anderson & Biddle, 1975; Pressley et al., 1992). And second, social constructivists like Vygotsky claim that language-based social interactions are essential to the development of higher-order functions, and they base this argument on the idea that language is the medium through which humans communicate (Vygotsky, 1978). Participating in meaningful conversation and interaction with other people allows for the exchange and negotiation of viewpoints, as well as the modification of one's own interpretations of the world in response to the viewpoints of others, as well as the general improvement of one's understanding of the

world as a whole. Third, they came up with the term "community of practice" in order to emphasize the significance of social interactions within the context of the educational process. According to Lave and Wenger (1991), learning is largely a social activity in which people of a society interact with one another in order to polish their talents and abilities for use in a broader enterprise. The importance of discourse in the classroom is emphasized by all three of these points. The theoretical frameworks that are used for analyzing online discourses point to three interconnected characteristics that are the most important to virtual learning. These dimensions are a reflection of the three different views. Cognitive, interactive, and social are the three separate dimensions that make up the whole.

Cognitive discourses are those in which members are actively involved in the process of forming new ideas and exchanging existing ones (Benbunan-Fich et al., 2005; Henri, 1992). Self-reflection, brainstorming, the development of new information, and other similar activities are common examples. A small number of frameworks are able to capture the cognitive aspect of online communication, which is vital for learning but is not widely studied. To give you an example, Henri (1992) proposed that indications of learning include cognitive acts such as clarification, inference, judgement, and strategy. Research conducted by Henri (1992) and others led Newman, Johnson, Cochrane, and Webb (1995) to the conclusion that certain forms of critical-thinking processes, such as justification and critical assessment, are necessary for the process of education.

The participant discourses that take place during the process of the interactive component's reciprocal generation of shared knowledge and understanding make up the interactive component (Benbunan-Fich et al., 2005; Henri, 1992). The expression of agreement and disagreement, the linking of distinct ideas to one another, the expansion upon ideas that

have already been articulated, etc. are all instances of typical examples. Gunawardena et al (1997). The co-construction of knowledge is broken down into five steps, as outlined by 'S interaction analysis model. When it comes to explaining the interactive aspect of online discourse, this model is one of the most popular and commonly utilized frameworks there is.

a) discussion of meaning and co-construction of knowledge;
b) the finding and examination of discord or disagreement among ideas, concepts, or claims;
c) the finding and investigation of conflict or disagreement among ideas, concepts, or claims;
d) agreement statement(s)/application of newly produced meaning.
e) "Testing and revising intended synthesis or co-construction" (p. 414).

The social component of content-based online collaborative learning that is based on conversation does not involve the production and development of ideas linked to the subject matter. Instead, it places an emphasis on activities such as community development, socialization, support demonstration, and facilitation. Despite the fact that it is not directly connected to education, community development is an important part of the educational process.

The majority of the aforementioned frameworks were developed by analyzing student discussions that took place in online, formal educational settings. These discussions took place while students worked together to complete collaborative learning assignments or to develop their understanding of course material. Learning through informal online

communities has only been investigated by a limited number of researchers (Author, 2017; Greenhalgh & Koehler, 2017). Because the aforementioned three characteristics are considered to be essential for learning, it is worthwhile to investigate whether or not and how online learning that incorporates each of these dimensions affects users' commitment to professional online communities. [Citation needed] [Citation needed] The findings of this study would help us gain a better knowledge of how to persuade educators to make use of virtual learning for the purpose of professional development.

2.11 Framework

2.11.1 Grasping the Idea of Virtual Education

In order for schools in the United States to continue operating after the COVID-19 outbreak, administrators made the decision to transition to an online education model. A little over 21 percent of public K–12 schools in the United States offered online classes in 2017–18, before the epidemic began. The National Center for Education Statistics has compiled this data and found that. More research is needed to draw firm conclusions about how instructors and students perceive online coursework and elements of virtual educational experiences (Hierdsfield et al., 2011; Holmes & Prieto-Rodriguez, 2013). Nonetheless, there is evidence from some studies that undergraduates value the flexibility and convenience of virtual learning, the availability of educational resources in electronic formats, and the affordability of video-recorded lectures by the instructor. When developing online courses, instructors are need to take a number of considerations into account, including the following: the proportional significance of individual versus group work; students' capacity for self-regulation; and their own roles as instructors and

facilitators (Norton & Hathaway, 2008). This conclusion is drawn on the basis of data acquired from individuals who have taken part in online courses. Synchronous digital sessions are often viewed as one of the least important parts of mixed courses, according to the findings of a study that was conducted in 2018 by Holmes and Rodriguez. This consensus was reached by both students and teachers. On the other hand, statistical research revealed that students placed a higher value on the option to examine recorded lectures from live classrooms than did the instructors (Holmes & Prieto-Rodriguez, 2018).

Educators have recognized a number of benefits of online education, some of which include the convenience of not having to travel to a physical classroom, more options for students who learn best through digital means, livelier classroom debates, and more students who otherwise might be disengaged from the material. Online education also allows educators to reach more students who would otherwise be disengaged from the material (Hierdsfield et al., 2011). Students in grades 6-8 say they learn more from viewing videos than they do from books they read, and they want more online and digital video games to be part of classroom instruction, according to recent nationwide research (Evans, n.d.). However, the results of the survey show that there is a clear preference gap between print and digital media among students, with roughly 46% of respondents favoring print papers or books and 42% favoring digital reads. In surveys taken before the outbreak, a similar percentage of middle school students (55%) reported using the internet to access their schoolwork (Evans, n.d.).

It has been determined that knowledge with computers and expertise in many technological fields are significant criteria for the development of effective online educational experiences (Holmes & Prieto-Rodriguez, 2018). The emergence of better and more

complete technology materials has given students in today's classrooms an advantage over their virtual counterparts. This advantage can be attributed to the fact that students in today's classrooms have a leg up on the competition (Beach, 2012). In recent years, there has been a significant rise in interest in blended learning, which combines traditional classroom instruction with online or virtual instruction. Blended programs are becoming increasingly popular as a result of their successful combination of the most beneficial aspects of traditional classroom instruction with those of online study. According to Keengwe and Kang's (2013) review of 23 blended courses offered to preservice teachers, these classes assist students in overcoming some of the challenges that come with learning in both online and in-person settings (by, for example, fostering classroom communities and conversations that continue online). They acknowledge the numerous advantages of blended learning, but they also point out the difficulties associated with the online environment, such as the fact that students in the online setting are inactive and can only take part in a limited number of classroom activities. According to Keengwe and Kang (2013), students are more likely to be engaged in these blended settings if they are given opportunities to build and construct new types of technology. This is because students are more likely to have ownership over their learning experiences. Because to the quick growth of COVID-19, schools all over the world have been forced to close, which has caused school systems to speed the transition to online education and ensure that all kids have equitable access to computers. For students in sixth through eighth grade, for instance, there was a significant jump in the percentage of students using Chromebooks provided by their schools, from 56% before the pandemic to 80% after it (Evans, n.d.). On the other hand, approximately one fifth of students in these grades were required to use their own

tablets or computers during regular school closures. This disparity was most pronounced between schools that had a majority of kids of color (44%) and those that had a majority of White students (65%). (Evans, n.d.).

Throughout COVID-19, evolving concerns have had an impact on a variety of aspects of classroom education. Students experience a transition in the educational landscape from the fifth to the ninth grade, which corresponds to the middle grades. If students' bus schedules change, for example, teachers at the fifth-grade level may be required to convert from the more normal 45-minute blocks of instruction to 90-minute blocks that are taught every other day (Will et al., 2020). It is challenging for many educators to use online formats to encourage students to participate in whole-class learning events and small-group conversations while also adopting culturally responsive attitudes and tailoring instruction to students' individual experiences, knowledge bases, and interests outside of the classroom. Online formats include things like wikis, blogs, and discussion forums. As a consequence of this, it is important and acceptable to provide instructors with ongoing opportunities for culturally relevant professional development, as well as coaching and mentoring on both an individual and group level, within the context of a virtual learning environment.

2.11.2 Virtual Learning for PLCs with an Emphasis on Cultural

In the same way that they do in the real world, teachers in virtual classrooms employ strategies that are culturally sensitive in order to assist their pupils in feeling comfortable within the context of their diverse avatar representations (Gay, 2013). Students in virtual classrooms frequently do not have access to the technological resources they require to

learn in an efficient manner. This may be the case for a variety of reasons, including the fact that some students do not have internet access, others are forced to share a computer at home, or other considerations. The role of the teacher in a diverse online classroom change from "passive individuals in their instruction to co-constructors who are responsible for building their own learning paths as they navigate an educational surroundings" (Woodley et al., 2017, p. 470). Because there is less direct monitoring from teachers in an online context compared to a traditional classroom, students have a larger responsibility for their own education. In order for teachers to be culturally responsive in the digital classroom, they need to acknowledge the digital literacies that their students already possess from their homes, as well as the ways in which those students use those literacies to build upon and expand their existing bodies of knowledge (Mackay & Strickland, 2018, p. 2). The most important thing that culturally responsive online teachers do is develop relationships with their students by having them participate in activities that confirm their past knowledge.

To begin, culturally responsive educators who teach students through the internet verify their students' understanding by drawing on their own past knowledge and experience (Morong & DesBiens, 2016; Woodley et al., 2017).

Second, excellent educators constantly push their pupils to do better in their own learning. Students are not treated differently based on their socioeconomic level or their academic performance; nevertheless, inequalities in access to technology are sometimes taken into consideration.

In conclusion, teachers who are sensitive to students' cultural backgrounds create an atmosphere in virtual classrooms that encourages creative uses of technology (Scott et al., 2015). In view of the impact the epidemic has had on students' access to electronic devices, teachers have a responsibility to ensure that students utilize the technology they have at home in order to successfully complete their tasks. One of these actions is helping children with their homework by utilizing technology that is already available to them at home, which is typically a mobile phone in the case of most children. Teachers that are sensitive to the cultural backgrounds of their students has made the necessary adjustments for their pupils to ensure that students from all cultural backgrounds are able to succeed in online courses.

Teachers that are culturally responsive in virtual classrooms advise students to reject deficit thinking and instead concentrate on growing their strengths while also tailoring the curriculum to reflect the specific requirements of individual students. Despite the fact that they are faced with obstacles that they do not encounter in more traditional classrooms, these educators are forced to be culturally competent in their online contexts due to the discrepancy in the availability of technology.

2.11.3 Perspectives on Professional Advancement

Because of the rapid rate at which technological advancements are made, it is absolutely necessary for all educators to consistently refresh their abilities and information in order to successfully incorporate new technologies into their lesson plans (Bishop & Harrison, 2021, p. 38). It is essential to uphold the fundamental principles that define a good middle school, such as the employment of educators who have received specialized training for

teaching in middle schools and who are aware of the significance of their part in influencing the lives of young adolescents (Jackson & Davis, 2000; NMSA, 2010). As a consequence of this, the professional development opportunities available to middle school teachers should reflect the instructional strategies that are essential for middle school teachers to be effective.

According to Mikel (2010), "Educators whose professional development is ineffectual do not increase their skills, and as a result, student learning suffers." This was an observation made by Mikel (2010). (p. 6). This is true in general, but it is especially true at the middle school level due to the rapid development that takes place in preteens and teenagers. This is true because of the rapid transition from childhood to adolescence. Teachers need to be prepared to interact with students in a holistic approach rather than a developmental one so that they may take advantage of the majority of the professional development opportunities that are focused at middle school. Middle school educators are tasked with "engaging in critical debates regarding bias and racism" and "reflecting on how their identities may differ from those of their children." Both of these activities are required of middle school educators (Bishop & Harrison, 2021, p. 50).

2.11.4 Virtual Learning for Professionals

According to DuFour (2004, 2007), a professional learning community (PLC) is an environment in which educators are able to reflect on and improve their own methods of education. As teachers get more familiar with the methods used in other classrooms, they become better able to modify their own teaching methods to meet the specific requirements of their own student populations. Previous studies had the goal of assisting those who have

taught one day in middle schools to adopt a culturally sensitive mindset and method of instruction (Stormer et al., 2019). At the end of the study process, it became abundantly evident that they required further assistance in order to effectively train pupils in a manner that was sensitive to the cultural backgrounds of the students. During an interview that took place following a classroom observation, one participant stated that she had received minimal assistance from other teachers and administrators, pointing out that, "There are many individuals who are eager to provide a hand but are unable to do so for various reasons. Accordingly, contrary to what we were taught at the university, not a single person at the school possesses a culturally relevant attitude, and not a single person at the school is conducting culturally responsive instruction."

On the presumption that many students in middle schools in the midst of a pandemic might require relief from the stresses associated with being economically impoverished and BIPOC (Black Indigenous People of Color), the PLC might be held virtually via a platform such as Zoom, Skype, Microsoft Teams, or Google Hangouts. This is due to the fact that BIPOC (Black Indigenous People of Color) experience the consequences of economic disadvantage at a higher rate than other groups (Cosby et al., 2018). Culturally relevant practices (CRP) across the curriculum (Ladson-Billings, 2006), critical reflection (Howard, 2003), classroom instruction (Gay, 2018), and CRP across curricular areas (Dodo Seriki, 2018) are just a few of the topics that PLC leaders should recommend to their members. Culturally responsive lessons can be developed without an in-depth familiarity with a group's cultural norms, and culturally relevant pedagogy is an attitude formed by teachers in response to the pupils they have in their classrooms (Stormer et al., 2019).

2.12 Utilizing Experienced Professionals as A Means to Encourage Learning and Networking Among Future Educators

Preservice teachers could benefit greatly from the input of practitioners like experienced in-service teachers. Pre-service teachers benefit from their presence because it helps them integrate into professional groups and become more invested in their own professional development as educators. Learning results are enhanced, and students are more invested in the learning process, as reported by Li et al. (2014). According to Liu (2005), pre-service teachers can benefit from talking to veteran educators in order to hone their own cognitive and collaborative abilities. According to Alebaikan (2016), students had greater freedom to interact with professionals online than in person because they could pose questions at any moment.

Although the benefits of expert practitioners' participation in online PLCs for pre-service teachers' learning have been acknowledged, empirical research measuring their efficacy has been lacking. Practitioners assisted preservice teachers' reflective practice in an online professional learning community, as reported by Wearmouth et al. (2004). According to a poll conducted by Dorner and Kumar (2016), both novice and experienced educators have positive impressions of the contributions made by their more seasoned colleagues in online learning environments. One of the drawbacks of these prior research is that they didn't investigate the pattern of collaboration, such as the number of relationships that pre-service teachers developed, or the engagement of network members across departments. To add to this, only two studies (Hemphill & Hemphill, 2007; Redmond & Mander, 2006) looked at the impact that practitioners' experience had on their interactions with future educators in

virtual classrooms. Research shows that exposure to veteran educators improves pre-service teachers' ability to construct knowledge. When it comes to high-level cognitive discourse, however, Redmond and Mander (2006) discovered that practitioners' lack of online collaborative experience may be a limiting factor. This means that prior experience facilitating online communication is essential, in addition to expertise in the subject area. Dorner and Kumar (2017) argue that the experts' involvement should be taken into account when planning the activity. However, neither of this research included a control group, making it hard to isolate the role performed by the practitioners, and neither of the studies prepared the practitioners to promote the knowledge production of pre-service teachers. This research aims to improve practitioner participation by helping professionals acquire or hone online facilitation abilities.

From what has been said above, it would appear that the vast majority of studies do not address the question of how pre-service teachers become invested in their own education. Consistent with what Costello (2012) discovered, no research has looked at how the presence of online experts affects community engagement. Liet al. (2014) suggest investigating how students interact with professionals as a subject of future research.

During research, interdisciplinary groups work together to generate ground-breaking insights that could spur future breakthroughs in the field of innovation. Knowledge is where higher education's research and innovation should begin and end. Collaboration, on the other hand, is known as a data-centric activity in which all disciplines combine to share their useful knowledge in the form of information with other such fields in order to construct a mutual model, in contrast to integration, which places knowledge at the center of its activity and necessitates that all fields contribute towards generating knowledge. To

integrate, as opposed to cooperate, people must divulge their knowledge to one another. Knowledge integration is the process of integrating multiple knowledge models and points of view into a working business model. Integration depends on people sharing their expertise and perspectives. Reforming higher education is now a key priority because it is crucial to the success of the global social, political, and economic revolution. On the other hand, there needs to be institutional cooperation in higher education for the sake of sharing knowledge and defining standards that would guarantee a high level of instruction. Evidence Gathered From: Collaboration in a developing region is intrinsically linked to efficiency, wherein information integration is of paramount importance for the propagation and improvement of a learning society. In order to effectively address complex global issues, it is crucial to integrate diverse bodies of knowledge. Countries, or groups of countries sharing a common history, should collaborate to create innovative strategies that respect the historical and cultural traditions of their respective regions. So that we may better collaborate and integrate our knowledge, we need to draw on our collective experience and expertise. In order to facilitate a more connected approach and the management of new concerns, some national platforms can be set up to launch new initiatives in this direction. This should be done with the knowledge that collaboration, whether regional or international, would always be crucial for achievement. These initiatives would increase knowledge integration by fostering the creation of new methods for integrating data from other disciplines, as well as the creation of new standards, applications, and guarantees of collaboration. There is a close relationship between knowledge, cooperation, integration, innovation, and tertiary education (Tayseer Al-shanableh, 2013).

2.13 Enhancing Professional Learning Communities through Virtual Collaborative Trainings

In the exploration of virtual collaborative trainings and their impact on Professional Learning Communities (PLCs) at the university level, the integration of diverse and equitable academic communities emerges as a pivotal theme. Varghese et al. (2023) delve into the design and execution of a virtual training program targeted at early career researchers, particularly from the Global South, amid the challenges posed by COVID-19. This initiative underscores the transformative potential of virtual collaborative environments in fostering inclusive academic spaces that nurture the professional development of researchers across a spectrum of disciplines. Such programs not only facilitate collaborative learning experiences but also offer unique opportunities for networking and skill acquisition in the peer-review process, thereby contributing significantly to the cultivation of dynamic and inclusive professional learning communities.

Furthermore, the creation of virtual collaborative learning communities, as discussed by Meirinhos and Osório (2017), highlights the integration of blended learning (b-learning) approaches aimed at achieving collaborative learning outcomes. These communities are instrumental in promoting a culture of lifelong learning, essential for navigating the demands of an increasingly digital society. According to Jadallah et al. (2023), the emphasis on developing distance interaction competencies within these virtual communities aligns with the broader objectives of enhancing professional development and fostering a collaborative ethos among educators and professionals.

Qutab et al. (2016) extend this discourse by examining the utilization of Virtual Learning Environment (VLE) tools by professional library associations for career development. Their study illuminates how traditional face-to-face pedagogical approaches are being supplemented with eLearning platforms, thereby expanding the horizons of professional development and knowledge acquisition beyond geographical constraints. This transition towards virtual learning environments exemplifies the broader shift in professional learning communities towards embracing digital technologies to foster collaborative career development, networking, and community building across the globe.

Lastly, the study by Khasawneh et al. (2023) offers an insightful examination of teacher collaboration within PLCs and its correlation with collaborative teaching practices. By employing a mixed-methods research design, the study highlights the significance of teacher collaboration in enhancing professional growth and improving student academic achievements. The findings advocate for the provision of adequate resources, supportive leadership, and sufficient time for collaborative activities within educational institutions, underscoring the critical role of PLCs in bridging the gap between technology integration and effective professional development.

These studies collectively underscore the pivotal role of virtual collaborative trainings and environments in enhancing the effectiveness of professional learning communities. They highlight the transformative potential of digital technologies in facilitating inclusive,

equitable, and collaborative professional development opportunities, thereby contributing to the advancement of academic and professional excellence in the university context.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

This research utilized a mixed-methods approach to examine the “effectiveness of virtual collaborative trainings in promoting professional learning communities at the university level”. According to Creswell and Tashakkori (2007), the mixed method design is a blend of the qualitative and quantitative approaches for data collection and analysis. In recent years, it has become common practice in research to integrate qualitative and quantitative methods (Bryman, 2006). This is due to the fact that mixed method design can provide detailed and comprehensive data, which is necessary in order to accomplish the research objectives and provide answers to the research questions.

This chapter provides an in-depth discussion of the research strategy, research environment, sampling, research instrument, research technique, analysis, and data processing.

3.1 Research Approach

There is no particular theory that can explain this kind of reciprocal relationship between the independent, dependent, and moderating variables that are being considered. An investigation using a combination of approaches is preferable in this setting.

Mixed methods research is appropriate in this context because the study's multiple types of goals necessitate the inclusion of both objective and subjective points of view for the development of detailed and intricate explanations in order to achieve those goals; therefore, mixed methods research is appropriate in this context (Johnson, & Christensen, 2014). Mixed methods research involves qualitative and quantitative data collection and analysis approaches within the same study (Creswell, & Clark, 2017). There are four different sorts of mixed method study designs, according to Teddlie and Tashakkori (2009), and they are as follows: the first is triangulation, the second is embedded, the third is explanatory, and the fourth is exploratory. This study made use of the explanatory sequential, which calls for quantitative data gathering to come first, followed by qualitative data collecting. This was the most appropriate method to use. This approach was taken in order to obtain a more distinct picture from the quantitative data, and then to make use of the qualitative data in order to provide a better understanding and explanation of the study that was under discussion. According to Creswell and Clark (2007), the explanatory design is a two-stage mixed method design. This design is sometimes referred to as the explanatory sequential design. This plan starts with the gathering and analyzing of quantitative data, and then it moves on to the gathering and analyzing of qualitative data. In a quantitative strand the numeric data are collected and analyzed, followed by a qualitative strand in which textual data are collected and analyzed. Both qualitative and quantitative research have advantages and disadvantages depending on the specific situation. Mixed Method research approach was used so that the combination of both methods can provide a better explanation and understanding of the concepts held in research problems than either approach alone can provide. This allows the researcher to

compensate for the drawbacks that are associated with each type of research. Because the collection and analysis of quantitative data was followed by qualitative data, the Sequential Explanatory Strategy was selected as a mixed method design. The reason for this is given in the previous sentence. At the conclusion of the process, the data from both sources was combined and interpreted together.

The Sequential Explanatory Strategy has many benefits, including the following:

• It is easy to understand because the processes are clear and distinct.

• Comparing and contrasting the various competing techniques is now much simpler.

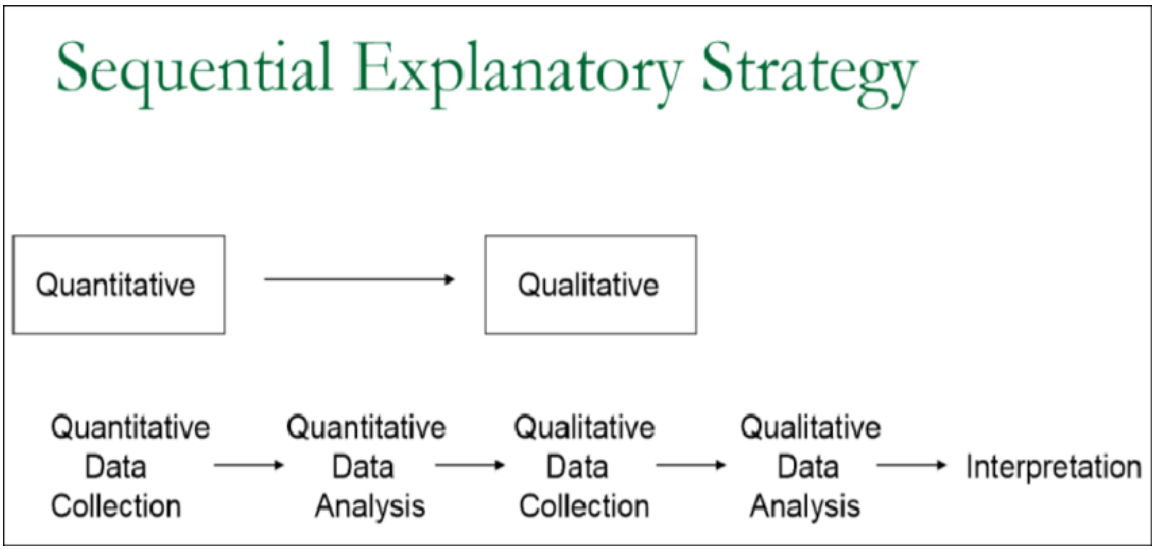


Figure 2: Explanatory Sequential Design

Figure 3.1 provides a visual representation of the specifics of the research approach that was utilized for the current investigation.

The quantitative aspect of the research addressed objectives number 1 & 2 of the study; nevertheless, objective number 3 calls for the consideration of insight perspectives.

3.2 Research Design

The research design of the current study was correlational research design. Correlational research is a type of research design commonly used in the social and behavioral sciences. Correlation study is a strategic approach of research in which the researcher examines the probable connectivity among the variables. It measures the relationship between two or more variables. The researcher used this design to look at the relationship between collaborative training and the professional learning community hence it was aimed to investigate this relationship without altering or manipulating variables being involved. Moreover, the study also required to know the strength as well as the direction of the relation among the variables for which the researcher employed a correlation research design. This research design helped in identifying a relationship between variables. It also helped in identifying patterns among the pool of data and the relationship between variables.

3.3 Population

The participants who made up the population of this study were the university teachers who have prior participation in both the professional learning community and virtual collaborative training programs. On the basis of study's requirement only those public sector universities in Islamabad were selected where virtual collaborative trainings and professional learning communities were being practiced.

The participants who made up this study's population were university professors, lecturers from NUML, IIUI, and AIOU. Since the researcher has restricted the scope of his investigation to only include teachers from the aforementioned educational institutions

who were participating in Professional Learning Communities and Virtual Collaborative Trainings, the total population of the study was estimated to consist of one hundred and thirty educators from the aforementioned educational institutions. The population of the study was selected in two phases, in first phase the population was selected to conduct a survey so to get exact figure of the respondents required by the study. In second phase of the study the researcher has found that there were one hundred and thirty-one teachers who were involved in virtual collaborative trainings.

Table 3.1

Population of the study

Universities	Number of Teachers
NUML	**57**
IIUI	**30**
AIOU	**44**
Total	**131**

3.4 Sampling Technique

In regard to the current study, it required the purposive sampling technique to select the sample size of the study. Purposive sampling technique is also known as non-probability sampling, intentional sampling or qualitative sampling, was necessary for the present study since it allows the sample size to be determined. In this kind of sampling strategy, it

requires particular units or cases based on a specific purpose rather than random selection. In addition, the researcher used the extreme sampling which is a type of purposive sampling, used to focus on cases that are special and highlight notable outcomes. It was useful to select participants for healthy data collection who have an accurate and comprehensive understanding of collaborative trainings and professional learning communities. It was done in order to maximize the likelihood of accurate results (Johnson, & Christensen, 2014, p. 371). It is possible that the outcomes of this study would be affected by the respondents who had a poor level of understanding. In addition to these benefits, it is a way that saves both money and time.

3.5 Sample Size

The sample size of the study was drawn with the help of purposive sampling technique, where only university professors, lecturers from the faculty of social sciences of NUML, IIUI, and AIOU were selected as the respondents of this study. A total of seventy-five respondents made up the sample selected from the population of the study.

Table 3.2

Sample Size

Universities	Number of Teachers	Rate of Return
NUML	**33**	**44%**
IIUI	**19**	**25.3%**

AIOU	**23**	**30.7%**
Total	**75**	**100%**

3.6 Research Instrument

Self-Designed Checklist and Questionnaire with a 5-Point Likert Scale:

Design: The researcher demonstrated meticulous attention to detail in the construction of the questionnaire and checklist. The utilization of a checklist may have served as a mechanism for systematically monitoring and documenting particular occurrences of behavior, events, or conditions over a period of time. Furthermore, the questionnaire had a 5-point Likert scale to enable participants to assess their degree of agreement with a range of assertions. The questionnaire and checklist were self-developed based on the related literature review and findings of the previous studies. The researcher has constructed the questionnaire by keeping in view the following steps:

1. Extensive review of the relevant literature and similar studies (Kim & Kim, 2013: Olivier, Hipp, & Huffman, 2010: Domingo-Segovia et al., 2020).
2. Revision of the items suggested by the two field experts and
3. The instrument went through a pilot testing phase.

Quantitative Focus: The tool employed in this study primarily adopted a quantitative approach, aiming to gather numerical data pertaining to participants' perceptions of several factors such as leadership attributes, intelligence, and the classroom environment's quality. Participants have the opportunity to express their level of agreement or disagreement by utilizing the Likert scale, which provides a standardized framework for this purpose.

Open-Ended Questionnaire:

Design: The participants were instructed to provide comprehensive qualitative responses through an open-ended questionnaire. Open-ended questions do not impose limitations on respondents by providing a predetermined set of options, as opposed to closed-ended questions. The objective of this design choice is to obtain comprehensive and detailed information pertaining to the phenomena being investigated.

Qualitative Focus: The utilization of an open-ended survey implies the adoption of a qualitative approach to examine and gain a comprehensive understanding of the phenomenon under study. The third and ultimate purpose of the study, which necessitates a nuanced and contextual comprehension, is highly compatible with this methodology.

Rationale for the Mixed-Methods Approach:

Comprehensive Understanding: The researcher endeavored to address the knowledge gaps pertaining to the research concerns by employing a combination of qualitative and quantitative methodologies. Quantitative data exhibits discernible patterns and statistical facts, but qualitative data provides contextual insights and enables individuals to express their perspectives in their own verbiage.

Triangulation: The process of methodological triangulation is strengthened through the utilization of data collection from three diverse sources, namely a checklist, a Likert scale questionnaire, and an open-ended questionnaire. The trustworthiness and validity of findings are enhanced when results obtained through different methods are independently corroborated.

In summary, the researcher employed a mixed-methods research design, using a self-developed checklist and questionnaire. The quantitative aspect of the study utilized a 5-

point Likert scale, while the qualitative component involved an open-ended questionnaire to get in-depth views.

3.7 Validity of the Instrument

Face validity of the instrument was done by the field experts following are the item numbers which were amended form theme 1, theme 2 and theme 5, Item 2 and 5 from theme 1, item number 3 and 4 from theme 2 and item number 2 and 4 from theme 5 were amended as per the experts' suggestions.

Construct validity of the instrument was assessed by the teachers who were involved in the course of leadership and professional development.

Q – Sorting Technique was used to organize all the items in a logical and sequential order.

T – Sorting Techniques were used to organize all the themes in a logical and sequential order.

3.8 Pilot Study

Prior to conduct the data for actual study, a pilot study was conducted in order to check the questionnaire in terms of suitability of content and easily understandable by the stakeholders. Adaptive trail design was opted to conduct the pilot study. The sample for pilot study was selected on the rule of thumb and only 20% of the sample was selected from the population. The sample selected for pilot study was not included in the actual study. The Cronbach alpha for questionnaire was 0.759 having 25 items. Hence, the reliability of questionnaire was good.

3.9 Data Collection

Since the study has followed explanatory sequential method, the first step was to collect and analyze quantitative data and then gather and explore qualitative data. There were two phases of data collection, in first phase the research has identified specific quantitative findings that require more explanation. In second phase, the researcher collected qualitative data from participants who were able to help explain the findings of the quantitative study in order to be able to investigate the quantitative data in greater depth. The quantitative features have given the utmost importance in this study's primary focus. According to Creswell and Clark (2007), the explanatory design is widely regarded as being the simplest and most straight-forward of all the mixed method designs. They continued their explanation of the benefits of the explanatory research design by stating the following: Because the researcher employed the two methodologies in separate stages and collected just one kind of data at a time, the structure of the project, which was divided into two stages, made it simple to put into practice.

The conclusion of the report can be broken down into two sections for easier comprehension by the reader, who can then more readily draw conclusions based on the results. Consequently, employing both approaches result in more extensive and detailed data as well as interpretations of this data. The rate of return of the current study was 100%.

3.10 Data Analysis

Because of using correlational study, the method that was used to analyze the data was based on the Pearson correlation. The Pearson correlation is a statistical technique that is used to evaluate the quality of correlations between two variables, one of which is

independent of the other. Furthermore, the direction of the relation among the variables is illuminated, as was the relevant information regarding it. The correlation may demonstrate positive or negative associations depending on the context. The direct relationship between the variables is shown by the positive correlation, but the indirect relationship between the variables is shown by the negative correlation. In addition to this, we make use of regression analysis in order to determine the nature of the connection that exists between the independent and dependent variables. The information that has been acquired is extracted using the electronic approach, and then it is processed. In order to process the quantitative data, SPSS Software was utilized, and the researcher is responsible for interpreting the qualitative data in accordance with the themes of the study.

Cronbach's Alpha

The case processing summary for the reliability analysis using Cronbach's Alpha reveals that 75 cases were considered, and all of them are valid for the analysis, with no exclusions. The approach employed is listwise deletion, implying that any case with missing data for any variable in the analysis was entirely excluded. This method ensures that only complete cases contribute to the reliability assessment. While listwise deletion aids in maintaining the integrity of the data used for Cronbach's Alpha calculation, researchers should be mindful of the potential reduction in sample size and the associated implications on the generalizability of findings.

Table 3.3

Case Processing Summary

Case Processing Summary

		N	%
Cases	Valid	75	100.0
	Excluded	0	.0
	Total	75	100.0

a. Listwise deletion based on all variables in the procedure.

The reliability statistics presented indicate that Cronbach's Alpha, a measure of internal consistency, is calculated to be 0.759 for the set of items under consideration. This coefficient is a numerical representation of the extent to which the items in the dataset are interrelated, with higher values indicating greater internal consistency. In this context, a Cronbach's Alpha of 0.759 suggests a moderate to good level of reliability for the set of 25 items.

Table 3.4

Reliability statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.759	25

Researchers commonly use this statistic to assess the consistency and dependability of a scale or measurement instrument, where values above 0.70 are often considered acceptable. The inclusion of 25 items in the analysis provides a comprehensive overview of the reliability of the entire set, offering valuable insights for the interpretation of results in the given context.

Chapter 4:

Data Analysis

In this section, we get down to the core of our research and conduct a thorough analysis of the gathered data in order to develop solid findings. In this chapter, we first provided the findings from quantitative analysis, then those from qualitative analysis, and finally draw connections between the two sets of data with a thorough discussion.

4.1 Quantitative Analysis

We move from quantitative findings into the qualitative portion of our investigation. Quantitative data from our surveys and questionnaires provide support for the qualitative conclusions. We use statistical methods to investigate the data for hidden structures, associations, and tendencies. Here, we incorporate statistical analysis into our study for a more well-rounded grasp of the subject at hand.

Results

Table 4.1

Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	MPhil	20	25.6	25.6	29.5
	MS	4	5.1	5.1	34.6
	PhD	48	61.5	61.5	96.2
	Post Doc	3	3.8	3.8	100.0

Total	78	100.0	100.0

The study included a total of 78 participants, and the table provided below illustrates the breakdown of their educational qualifications.

Twenty individuals, which accounts for 25.6% of the total, possess a Master of Philosophy degree. This substantial proportion indicates that 25% of the participants in study had successfully finished graduate-level coursework, which could potentially influence their perspectives on online group projects and other types of collaborative learning.

Out of the total number of individuals, 4 people, which accounts for 5.1% of the population, hold a degree in Masters of Science (MS). The most prevalent category consists of 48 individuals, accounting for 61.5% of the total. The prevalence of individuals holding a significant number of PhD degrees indicates that the study mostly relies on the perspectives of individuals possessing extensive academic knowledge. This can be valuable in comprehending the dynamics of collaborative learning.

Approximately 3.8% of the overall population have successfully completed postdoctoral studies, which amounts to three individuals. The subset of participants in this study is expected to possess extensive knowledge of the research issues due to their competence and high degree of education.

To summarize, the individuals included in your study exhibit a diverse range of academic qualifications, with a predominant representation of individuals holding a Doctor of Philosophy (PhD) degree. Virtual learning and collaborative professional learning can benefit from the different perspectives that this range provides. A key indication of a

comprehensive understanding and nuanced viewpoint on these topics is the extensive level of education possessed by the majority of those involved.

Table 1.2

Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Assistant Professor	23	30.7	30.7	30.7
	Associate Professor	19	25.3	25.3	56.0
	Lecturer	33	44.0	44.0	100.0
	Total	75	100.0	100.0	

Out of the entire group of responders, 30.7% are assistant professors, which corresponds to a total of 23 individuals. This substantial subset of the dataset is representative of a significant group of young academics. The insights provided by individuals are crucial when attempting to comprehend existing and future attitudes and trends pertaining to virtual learning environments.

The composition of our research group comprises 19 associate professors, which accounts for 25.3% of the whole total. The seasoned academics possess a vast wealth of knowledge and potentially more well-founded judgments on collaborative strategies in professional learning. Their perspectives are crucial in order to mitigate the risk-taking behavior exhibited by their less experienced colleagues.

Lecturers constitute the largest group in our study, comprising 33 individuals, which accounts for 44% of the total. Lecturers, being actively engaged in the management of the class, provide significant insights into the challenges and practicalities of using virtual and collaborative learning strategies.

Overall, our study offers a comprehensive viewpoint on the subject due to the diverse academic backgrounds of its participants. The data includes insights from both research and classroom experience, providing a comprehensive understanding of the current state and potential future directions of virtual learning and collaborative professional learning.

Table 4.3

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	1-3 years	19	24.4	24.4	28.2
	10+ years	47	60.3	60.3	88.5
	4-6 years	5	6.4	6.4	94.9
	7-10 years	4	5.1	5.1	100.0
	Total	75	100.0	100.0	

We conducted a data analysis of 75 participants in our study on online and group professional development, considering their previous academic achievements. 24.4% of individuals possess 1-3 years of experience, enabling them to contribute fresh perspectives. 60.3% have over 10 years of experience, granting them the ability to offer significant

historical and developmental insights. 6.4% have 4-6 years of experience, allowing them to provide a combination of innovative and established practices. Lastly, 5.1% have 7-10 years of experience, enabling them to bridge the divide between newer and more experienced educators. By including diverse perspectives from various backgrounds, we may gain a more comprehensive understanding of the extensive impact that online and collaborative learning have on academic careers of different scales and stages.

Table 4.4

Faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	SS	75	96.2	96.2	100.0
	Total	78	100.0	100.0	

In the analysis of faculty, it is observed that all 75 respondents belong to the "SS" category. This means that the entire sample consists of individuals from this specific faculty.

Table 4.5

Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	History & Pak.St	17	21.8	21.8	25.6
	Educational Sciences	32	41.0	41.0	66.7
	Media Studies	3	3.8	3.8	70.5

	Pakistan Studies	3	3.8	3.8	74.4
	Politics & IR	20	25.6	25.6	100.0
	Total	78	100.0	100.0	

The scope of our study encompasses various academic disciplines, with a particular emphasis on Educational Sciences. We can acquire knowledge about online and collaborative learning in a variety of subjects, including history, Pakistan Studies, politics, and international relations, due to the different backgrounds of those involved. In order to comprehensively comprehend the subject matter, a high level of comprehension is necessary, which is precisely provided by the different academic backgrounds of the participants.

Table 4.6

Regular/contract/visiting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		7	8.5	8.5	8.5
	Contract	17	20.7	20.7	29.3
	Regular	58	70.7	70.7	100.0
	Total	82	100.0	100.0	

In this thesis, we examined several types of employment, with a specific focus on "Contract" and "Regular" jobs. The presence of contractual employment was significant, with the "Contract" category representing 20.7% of the cases, or 17 out of 82 occurrences. The "Regular" group, in contrast, comprised the majority of instances (70.7%), indicating that individuals with stable or permanent employment status were the most prevalent. This

data offers significant insights into the distribution of job types within the broader framework of virtual collaborative training and professional learning communities.

Table 4.7

Status of universities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		7	8.5	8.5	8.5
	Public	75	91.5	91.5	100.0
	Total	82	100.0	100.0	

The examination of employment types in this dataset consisting of 82 instances focuses on the classification labeled as "Public." All of the seventy-five occurrences, which accounts for 91.5% of the total, belong to the "Public" category, making it the sole category in the dataset. This data offers significant insights into the distribution of different types of work, emphasizing the dominance of public employment in the study's setting.

Have you ever attended any virtual collaborative training?

In analyzing the responses to the question regarding attendance at virtual collaborative training, frequencies and percentage frequencies were examined across various dimensions. Firstly, in terms of the total number of trainings attended, 42.3% of respondents reported not attending any, while 15.4% attended one training. Notably, 23.1% participated in faculty development programs, contributing significantly to the cumulative percentage at 44.9%. The distribution across different numbers of trainings demonstrated a varied engagement, with 10.3% attending three sessions and 3.8% attending six, marking the highest cumulative percentage at 100%. Further insights into the types of training attended reveal a diverse range of topics. Noteworthy categories include "Faculty

Development Program" (23.1%), "How to Code in Qualitative Research" (17.9%), and "Microteaching" (16.7%), collectively accounting for 62.8% of the responses. The breakdown by year indicates that the majority of trainings occurred in 2022 (42.3%), followed by 2023 (23.1%), contributing to a cumulative percentage of 100%. Examining the organizing entities, the distribution was varied. The highest frequency was associated with the National University of Modern Languages (NUML) at 23.1%, followed by the University of Athabasca as an organizer of training at 16.7%. The International category dominated, with 53.8% of responses, while National and National/International responses collectively made up 38.5%, contributing to a cumulative percentage of 100%. Overall, the results highlight a diverse and extensive participation in virtual collaborative training across various dimensions.

Table 4.8

Total No of trainings

Total num of trainings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	0	33	42.3	42.3	46.2
	1	12	15.4	15.4	61.5
	10	7	9.0	9.0	70.5
	10+	4	5.1	5.1	75.6
	2	3	3.8	3.8	79.5

	3	8	10.3	10.3	89.7
	5	5	6.4	6.4	96.2
	6	3	3.8	3.8	100.0
	Total	78	100.0	100.0	

The table presented is a frequency distribution of the number of trainings undertaken by individuals in a dataset. It shows that the category '0 trainings' is the most common, with 33 occurrences, accounting for 42.3% of the data. Interestingly, this indicates that nearly half of the people in the dataset have not undergone any training. Following this, 12 individuals (15.4%) have had 1 training, and 7 (9%) have had exactly 10 trainings. Notably, 4 individuals (5.1%) have participated in more than 10 trainings, suggesting a smaller group with extensive training experience. The categories for 2, 3 (listed twice, which might be an error), 5, and 6 trainings show fewer occurrences, each ranging from 3 to 8 times and contributing between 3.8% to 10.3% individually. The cumulative percentage column helps in understanding the distribution more clearly, showing a progressive accumulation of percentages across the categories. In total, there are 78 data points in this dataset.

Table 4.9

Title

Title				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	3.8	3.8	3.8

Title				
NRPU, Skill based education	3	3.8	3.8	7.7
Antibullying intervention	4	5.1	5.1	12.8
Bullying	3	3.8	3.8	16.7
Capacity building of college students of KPK	3	3.8	3.8	20.5
Community development	1	1.3	1.3	21.8
Faculty development program	18	23.1	23.1	44.9
How to code in qualitative research	14	17.9	17.9	62.8
LMS	4	5.1	5.1	67.9
Microteaching	13	16.7	16.7	84.6
Sohanjana antibullying intervention	4	5.1	5.1	89.7
summer school on peace education and cyber security	4	5.1	5.1	94.9
University partnership grant project	4	5.1	5.1	100.0

Title			
Total	78	100.0	100.0

The table is a summary of the frequency and distribution of various titles or programs, likely within an educational or training context. There are 78 entries in total, each categorized under different titles. The most frequent program is the "Faculty development program," which has 18 occurrences, making up 23.1% of the dataset. This is followed by "How to code in qualitative research" with 14 entries (17.9%) and "Microteaching" with 13 entries (16.7%). Other programs like "NRPU, Skill based education," "Bullying," "Capacity building of college students of KPK," each have 3 instances, constituting 3.8% individually. "Antibullying intervention," "LMS," "Sohanjana antibullying intervention," "summer school on peace education and cyber security," and "University partnership grant project" each occur 4 times, contributing 5.1% each to the dataset. "Community development" is the least frequent with only 1 occurrence (1.3%). The cumulative percent column shows the aggregate percentage of each title, cumulatively adding up to 100%. This distribution provides insights into the frequency and relative importance or focus given to each program or title within the dataset.

Table 4.10

Year

Year				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	3.8	3.8	3.8

2020-2021	4	5.1	5.1	9.0
2020-2023	4	5.1	5.1	14.1
2021	12	16.7	16.7	30.8
2021-2022	3	3.8	3.8	34.6
2022	32	42.3	42.3	76.9
2023	17	23.1	23.1	100.0
Total	75	100.0	100.0	

This table represents a frequency distribution of data across different years or time periods, with a total of 75 entries. The year 2022 stands out as the most represented, with 32 occurrences, making up 42.3% of the dataset. Following this, the year 2023 has 17 entries, accounting for 23.1%. The year 2021 also has a significant representation with 12 instances, constituting 16.7% of the data.

In addition to specific years, the table includes entries for broader time periods: 4 instances each for the periods 2020-2021 and 2020-2023 (each 5.1%), and 3 occurrences for 2021-2022 (3.8%). There is also an initial 'Valid' category with 3 entries, which might represent data that is not categorized under a specific year or range.

The cumulative percent column in the table shows the running total percentage for each category, cumulatively adding up to 100%. This distribution provides insight into the concentration of events or occurrences across different years, with a clear emphasis on the more recent years, particularly 2022 and 2023.

Table 4.11

Organizer

Organizer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	AIOU	1	1.3	1.3	5.1
	Berlin	3	3.8	3.8	9.0
	Elsvier	14	17.9	17.9	26.9
	IIUI	4	5.1	5.1	32.1
	NUML	18	23.1	23.1	55.1
	PERU, NAHE, HEC,	3	3.8	3.8	59.0
	QAU-USEFP	4	5.1	5.1	64.1
	UNDP, University of Jaume-I, UN Women, M/O HR	4	5.1	5.1	69.2
	UNESCO, HEC, ALIGHT	3	3.8	3.8	73.1
	University of Athabasca	12	16.7	16.7	89.7
	University of Berlin	7	10.3	10.3	100.0
	Total	75	100.0	100.0	

This table details the frequency distribution of various organizers, potentially of events, workshops, or programs, within a dataset of 78 entries. The most frequent organizer is "NUML" with 18 occurrences, accounting for 23.1% of the dataset. This is followed by "Elsvier" with 14 entries (17.9%) and "University of Athabasca" with 12 entries (16.7%).

"University of Berlin" also has a significant presence with 7 instances (10.3%). Organizers like "IIUI" and "QAU-USEFP" each have 4 occurrences, contributing 5.1% each to the dataset. Similarly, "UNDP, University of Jaume-I, UN Women, M/O HR" collectively account for 4 entries (5.1%).

Other organizers like "AIOU," "Berlin," "PERU, NAHE, HEC," and "UNESCO, HEC, ALIGHT" have fewer instances, ranging from 1 to 3, and each constituting between 1.3% to 3.8% of the data. The category 'Valid' starts the table with 3 entries (3.8%), which might represent a general category or uncategorized data.

The cumulative percent column shows the aggregate percentage of each organizer, cumulatively adding up to 100%, indicating the distribution of event organizers across the dataset. This data highlights the involvement and frequency of different organizations in hosting or organizing various activities or programs.

Table 4.12

In house/national/international

In house/national/international

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	Intl	42	53.8	53.8	57.7
	National	24	33.3	33.3	91.0
	National and international	3	3.8	3.8	94.9

national, international	4	5.1	5.1	100.0
Total	75	100.0	100.0	

The table categorizes events or programs based on their scope as either in-house, national, or international, within a dataset of 75 entries. The category 'Intl' (International) is the most represented with 42 occurrences, making up 53.8% of the dataset, indicating a strong emphasis on international events or programs. The 'National' category follows with 24 instances, accounting for 33.3% of the data, showcasing a significant national focus as well.

Additionally, there are entries that combine these scopes: 3 for 'National and international' and 4 for 'national, international', each contributing 3.8% and 5.1% respectively to the dataset. These categories suggest events or programs that have both national and international components or reach.

The category 'Valid' at the beginning of the table, with 3 entries (3.8%), might represent a general category or uncategorized data. The cumulative percent column shows the running total percentage for each category, cumulatively adding up to 100%. This distribution provides insight into the geographic scope and reach of the events or programs represented in the dataset, with a clear emphasis on international activities.

Objective 1: Investigate the level of virtual collaborative trainings

The investigation into the level of virtual collaborative trainings unveils diverse patterns in terms of the number of trainings attended, mode of participation, duration of training, level of attendance, and the number of connections. Concerning the number of trainings, respondents participated in various formats, with 33.3% engaging in Zoom sessions, 26.9% using Google Sheets, and 12.8% opting for 1-day training. Notably, 71.8% reported using

Zoom as their primary mode of virtual collaboration, followed by 17.9% utilizing Zoom, Google Meet, and other platforms. The cumulative percentage of responses reached 100%, showcasing the varied preferences in virtual training platforms and formats. Examining the mode of participation, 26.9% of respondents reported utilizing Google Sheets, 24.4% used PowerPoint presentations (PPTs), and 15.4% employed a combination of SPSS, PPTs, and Google Meet. The cumulative percentage indicated a diverse range of participation modes, with SPSS, PPTs, and Google Meet being a prominent combination. The duration of training also displayed diversity, with 51.3% of respondents engaging in 5-day sessions, followed by 14.1% participating in 2-day training. This distribution reflected a preference for more extended virtual collaborative sessions. In terms of the level of attendance, 48.7% reported attending more than 80% of the sessions, while 41.0% attended less than 80%. This indicates a generally high level of participation in the virtual collaborative trainings. Regarding the number of connections, the majority (35.9%) reported having one connection, while 32.1% had three connections. The cumulative percentage reached 100%, indicating a prevalence of a moderate number of connections among participants. In conclusion, the investigation highlights a varied landscape in virtual collaborative training, encompassing different platforms, modes of participation, durations, attendance levels, and connection numbers, reflecting the adaptability and diverse preferences of participants in this virtual learning environment.

Table 4.13

Number of trainings

Number of trainings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	online training	2	2.6	2.6	6.4
	online trainings 10	1	1.3	1.3	7.7
	Google Meet	5	6.4	6.4	14.1
	In house, online	1	1.3	1.3	15.4
	In house 01, online 04	1	1.3	1.3	16.7
	In house 02, online 03	1	1.3	1.3	17.9
	In house 03, online 04	2	2.6	2.6	20.5
	In house 05, online 10	2	2.6	2.6	23.1
	In house 06, online 06	2	2.6	2.6	25.6
	in-house training05, online 03	1	1.3	1.3	26.9
	inhouse/ online trainings	1	1.3	1.3	28.2
	NA	3	3.8	3.8	32.1
	online 01	4	5.1	5.1	37.2
	online 27	1	1.3	1.3	38.5
	Zoom	26	33.3	33.3	71.8
	Zoom, Google Meet, & others	14	17.9	17.9	89.7

	Zoom, Google Meet, LMS & others	8	10.3	10.3	100.0
	Total	75	100.0	100.0	

This table categorizes 75 entries based on the number and types of trainings, emphasizing the medium or platform used. The most frequent category is 'Zoom' with 26 occurrences, accounting for 33.3% of the dataset, indicating that Zoom is a popular platform for trainings. Following this, 'Zoom, Google Meet, & others' and 'Zoom, Google Meet, LMS & others' are significant categories with 14 (17.9%) and 8 (10.3%) entries respectively, suggesting a mix of platforms is commonly used.

The 'Google Meet' category alone accounts for 5 entries (6.4%). There are several categories combining in-house and online trainings, with varying frequencies: 'In house, online' (1 entry), 'In house 01, online 04' (1 entry), 'In house 02, online 03' (1 entry), 'In house 03, online 04' (2 entries), 'In house 05, online 10' (2 entries), 'In house 06, online 06' (2 entries), and 'in-house training05, online 03' (1 entry). These categories indicate a blend of in-house and online training formats.

'Online training' and 'online trainings 10' are mentioned separately, with 2 and 1 entries respectively. There's a specific mention of 'online 01' and 'online 27', with 4 and 1 entries respectively, possibly indicating the number of online sessions.

The category 'NA' (not applicable or not available) is listed 3 times (3.8%), which might represent unspecified training formats. The initial 'Valid' category with 3 entries (3.8%) could be a general or uncategorized grouping.

The cumulative percent column in the table adds up to 100%, showing the progression of the cumulative percentage across different training types and mediums. This data

highlights the varied use of platforms and formats for training purposes, with a notable emphasis on online tools like Zoom and Google Meet.

Table 4.14

Mode of your preparation

Mode of your participation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	Answering	1	1.3	1.3	5.1
	sharing experiences	9	11.5	11.5	16.7
	google sheet	21	26.9	26.9	43.6
	PPTs	19	24.4	24.4	67.9
	PPTs,	1	1.3	1.3	69.2
	Questioning	1	1.3	1.3	70.5
	Questioning & sharing experiences	2	2.6	2.6	73.1
	Questioning, Answering	1	1.3	1.3	74.4
	Questioning, Answering & sharing experiences	6	7.7	7.7	82.1
	sharing experience	2	2.6	2.6	84.6

	SPSS, PPTs, Google Meet	12	15.4	15.4	100.0
	Total	75	100.0	100.0	

This table classifies 75 entries based on the modes of participation in an event or program. The most prominent mode of participation is 'google sheet' with 21 instances, constituting 26.9% of the dataset. This is closely followed by 'PPTs' (PowerPoint presentations), which accounts for 19 entries or 24.4%. Another significant category is 'SPSS, PPTs, Google Meet' with 12 entries (15.4%), indicating a combination of statistical software, presentation tool, and online meeting platform for participation.

'Sharing experiences' is another notable mode with 9 occurrences (11.5%). This category appears again as 'sharing experience' with 2 entries (2.6%), and in combination with other modes such as 'Questioning & sharing experiences' (2 entries) and 'Questioning, Answering & sharing experiences' (6 entries), suggesting an emphasis on interactive and experiential participation.

Other modes like 'Answering' and 'Questioning' are mentioned, each with 1 entry (1.3%), along with a specific combination 'Questioning, Answering' (1 entry). 'PPTs,' appears as a separate category with 1 entry, which might be an error or a different mode than just 'PPTs'. The initial category 'Valid' includes 3 entries (3.8%), possibly representing general or uncategorized forms of participation. The cumulative percent column in the table adds up to 100%, indicating the progression of cumulative percentages across different participation modes. This distribution provides insights into how participants engage in these events or programs, highlighting the diverse methods of involvement ranging from technical tools to more interactive methods like questioning and sharing experiences.

Table 4.15

Duration of training

Duration of training					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	1 day	10	12.8	12.8	16.7
	1,2& 5 days	5	6.4	6.4	23.1
	1&3 days	1	1.3	1.3	24.4
	2 days	11	14.1	14.1	38.5
	3 days	8	10.3	10.3	48.7
	5 days	40	51.3	51.3	100.0
	Total	78	100.0	100.0	

The table provides a breakdown of the duration of trainings across 78 entries. The most common duration is '5 days', with 40 occurrences, making up a substantial 51.3% of the dataset. This indicates that a majority of the trainings are relatively extensive, spanning across five days.

Other durations include '1 day' and '2 days', with 10 (12.8%) and 11 (14.1%) entries respectively, suggesting that shorter, more concentrated trainings are also fairly common. The category '3 days' appears 8 times (10.3%), representing a moderate duration for training.

The table also lists combined durations such as '1,2& 5 days' with 5 entries (6.4%) and '1&3 days' with 1 entry (1.3%), showing variability in training lengths. These categories imply that some trainings offer multiple options or sessions of different lengths.

The initial category 'Valid' includes 3 entries (3.8%), which might be a general classification for unspecified training durations. The cumulative percent column shows a running total percentage for each category, cumulatively reaching 100%. This distribution highlights the range of training durations available, from single-day workshops to week-long programs, reflecting the diverse needs and formats of training sessions.

Table 4.16

Level of attendance in all trainings approximately

Level of attendance in all trainings approximately

				Valid	
		Frequency	Percent	Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	<80%	32	41.0	41.0	44.9
	>50%	5	6.4	6.4	51.3
	>80%	38	48.7	48.7	100.0
	Total	75	100.0	100.0	

The table presents data on the level of attendance in various trainings, with a total of 75 entries. The category '>80%' represents the highest level of attendance, accounting for 38 instances or 48.7% of the dataset. This indicates that nearly half of the trainings had an attendance rate above 80%, showing high engagement or interest in these sessions.

The '<80%' category follows with 32 occurrences, making up 41.0% of the data. This suggests that a significant number of trainings had attendance rates below 80%, which might indicate moderate interest or possible barriers to higher attendance.

Additionally, the category '>50%' is mentioned with 5 entries (6.4%), representing trainings where attendance was more than 50% but not necessarily reaching as high as 80%. This might reflect trainings with moderate or varying levels of engagement.

The initial 'Valid' category, including 3 entries (3.8%), could be a general or unspecified classification for attendance levels. The cumulative percent column shows the running total of percentages for each attendance level, cumulatively adding up to 100%. The distribution of these categories provides insights into the overall engagement and attendance rates across different trainings, highlighting a range of participation levels from moderate to very high.

Table 4.17

Number of connections

Number of Connections

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	11	14.1	14.7	14.7
	1	28	35.9	37.3	52.0
	2	1	1.3	1.3	53.3
	3	25	32.1	33.3	86.7
	5	9	11.5	12.0	98.7

	6	1	1.3	1.3	100.0
	Total	75	96.2	100.0	
Missing	System	3	3.8		
Total		75	100.0		

This table provides a breakdown of the 'Number of Connections' in a given context, across a dataset of 75 entries. The table categorizes the data into different frequency groups based on the number of connections, and also accounts for missing data.

'Valid' Category: This category seems to represent valid data points where the number of connections is known. It begins with 0 connections (11 entries, 14.1% of the total, 14.7% of valid data), indicating a significant portion of the dataset has no connections. The most frequent category is 1 connection with 28 occurrences (35.9% of the total, 37.3% of valid data), suggesting that a single connection is quite common. The category for 3 connections also shows a high frequency with 25 entries (32.1% of the total, 33.3% of valid data). There are fewer entries for 2, 5, and 6 connections, with 1, 9, and 1 occurrence respectively.

There are 3 entries under 'Missing/System' (3.8% of the total dataset), indicating that data on connections is unavailable or not applicable for these instances. The 'Valid' categories add up to 75 entries, which account for 96.2% of the total dataset. The remaining 3.8% falls under the 'Missing' category, making up the full count of 78 entries.

The cumulative percent column provides insight into the distribution of connections throughout the dataset. Starting from 14.7% for no connections, it gradually increases, reaching 53.3% by 2 connections and eventually 100% by 6 connections. This indicates the progression of the cumulative percentage of connections, highlighting the prevalence

of lower connection numbers, with a substantial proportion of the dataset having one or three connections.

Overall, the table suggests that in this dataset, a single connection or a few connections (specifically three) are the most common scenarios, while instances of higher numbers of connections (like six) are relatively rare.

Objective 2: Assess the virtual practices of professional learning communities

Table 4.18

Mode used to attend online training

Mode used to attend online training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	Google Meet	13	16.7	16.7	20.5
	Others	1	1.3	1.3	21.8
	Zoom	3	3.8	3.8	25.6
	Zoom	20	25.6	25.6	51.3
	Zoom, Google Meet	7	9.0	9.0	60.3
	Zoom, Google Meet, & others	10	12.8	12.8	73.1
	Zoom, Google Meet, LMS & others	19	24.4	24.4	97.4
	zoom, LMS	1	1.3	1.3	98.7

	zoom, google, LMS	1	1.3	1.3	100.0
	Total	78	100.0	100.0	

The examination of the mode used to attend online training reveals a diverse range of preferences among participants. Zoom emerged as a dominant platform, with 25.6% using it exclusively and an additional 24.4% combining it with Google Meet, LMS, and other tools. Google Meet was utilized by 16.7% of respondents, while a variety of other platforms collectively constituted 12.8%. The cumulative percentage demonstrated a distribution reflecting the adaptability of participants to different virtual collaboration tools, with 97.4% using Zoom in some capacity.

Table 4.19

Software like

Software like

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	3.8	3.8	3.8
	google sheet	20	25.6	25.6	29.5
	PPTs	21	29.5	29.5	59.0
	PPTs, Google sheet	3	3.8	3.8	62.8
	PPTs,	10	12.8	12.8	75.6
	SPSS, PPTs, Google Meet	18	24.4	24.4	100.0
	Total	75	100.0	100.0	

Regarding the software employed during online training, PowerPoint presentations (PPTs) were widely utilized, with 29.5% using them exclusively and an additional 12.8% combining them with other tools. Google Sheets was also a popular choice, being used by 25.6% of respondents. The combination of SPSS, PPTs, and Google Meet was employed by 24.4% of participants, showcasing a preference for diverse software integration in virtual collaborative training. The cumulative percentage reached 100%, highlighting the versatility of software usage among the respondents.

Table 4.20

Preparing student Records

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	39	52.0	52.0	52.0
	Yes	36	48.0	48.0	100.0
	Total	75	100.0	100.0	

This table presents data on the preparation of student records. It shows that out of 75 respondents, 39 (representing 52%) indicated 'No', they have not prepared student records. On the other hand, 36 respondents (48%) answered 'Yes', indicating they have prepared student records. These percentages are based on the total number of respondents and are also the valid percentages, as there are no missing or invalid responses. The cumulative percentage, which adds up as we move down the categories, reaches 100% with the 'Yes' responses, indicating that all responses are accounted for in these two categories.

Table 4.21

Preparing Online tests/Quizes to asses or engage students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Preparing Online tests	23	30.7	30.7	30.7
	Quizes to asses	25	33.3	33.3	64.0
	engage students	27	36.0	36.0	100.0
	Total	75	100.0	100.0	

This table provides information on the use of online tests and quizzes for assessing or engaging students, based on responses from 75 participants. It is divided into three categories: 'Preparing Online tests', 'Quizzes to assess', and 'Engage students'. 23 participants (30.7%) reported that they are involved in preparing online tests. This figure is both the actual percentage and the valid percentage of the total responses. 25 respondents (33.3%) indicated that they use quizzes to assess students. This brings the cumulative percentage to 64.0% when combined with the previous category. The final category, 'Engage students', includes 27 respondents (36.0%). This category completes the responses, bringing the cumulative percentage to 100.0%. All responses are valid, as evidenced by the total cumulative percent reaching 100.0%, which indicates full representation of the participants' responses within these categories.

Table 4.22

Preparing tasks/Rubrics/presentation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Preparing tasks	24	32.0	32.0	32.0
	Rubrics	19	25.3	25.3	57.3
	presentation	32	42.7	42.7	100.0
	Total	75	100.0	100.0	

This table summarizes data on how participants prepare tasks, rubrics, and presentations, based on a survey of 75 respondents. 24 respondents, accounting for 32% of the total, indicated that they are involved in preparing tasks. This percentage is both the actual and the valid percentage for this category, and it makes up 32% of the cumulative total. In the category of preparing rubrics, there are 19 respondents, which represents 25.3% of the total. When added to the previous category, this brings the cumulative percentage to 57.3%. The largest group is those preparing presentations, with 32 respondents. This constitutes 42.7% of the total. With this category, the cumulative percentage reaches 100%, indicating that all participant responses are covered across these three categories. The total responses add up to 100%, with no missing or invalid responses, indicating that these three categories fully represent the participants' activities in preparing tasks, rubrics, and presentations.

Objective 3: Identify the role of Virtual Collaborative Trainings in Promoting Professional Learning Communities

Table 4.23

Shared and Supportive Leadership

Shared and Supportive Leadership						
S.No	**Statements**	**SDA**	**DA**	**N**	**A**	**SA**
1	Participants were engaged in discussion to make decisions about student issues.	0	0	99(12.0%)	38(50.7%)	28(37.7%)
2	Participants were motivated to initiate change.	8(10.7%)	4(5.3%)	25(33.3%)	13(17.3%)	25(33.3%)
3	Leadership skills were discussed in the trainings.	0	4(5.3%)	10(13.3%)	51(68.0%)	10(13.3%)
4	Participants learned how	11(14.7%)	3(4.0%)	14(18.7%)	41(54.7%)	6(8.0%)

	the decision making takes place through committees to tackle down the work place related issues.					
5	Participants were taught to use multiple sources of data to facilitate teaching - learning process.	7(9.3%)	0	22(29.3%)	34(45.3%)	12(16.0%)

The table presents the data on the role of Virtual Collaborative Trainings in promoting Shared and Supportive Leadership within Professional Learning Communities. The responses are categorized into five levels of agreement: Strongly Disagree (SDA), Disagree (DA), Neutral (N), Agree (A), and Strongly Agree (SA). The data reveals that a significant portion of participants (37.7%) strongly agree that they were engaged in discussions to make decisions about student issues, while 50.7% agree. Additionally, 33.3% strongly agree that they were motivated to initiate change, with 33.3% agreeing. Leadership skills were discussed in the trainings, as reported by 68.0% who agreed. Furthermore, 54.7%

agree that participants learned how decision-making takes place through committees to address workplace-related issues, and 45.3% agree that participants were taught to use multiple sources of data to facilitate the teaching-learning process. This suggests that Virtual Collaborative Trainings play a substantial role in fostering Shared and Supportive Leadership within Professional Learning Communities, as evidenced by the positive responses to these statements.

Table 4.24

Shared values and vision

	Shared Values and Vision					
S.No	**Statements**	**SDA**	**DA**	**N**	**A**	**SA**
1	Trainings attempt to develop collective process for promoting a shared sense of values among learning communities.	0	0	15(20.0%)	37(49.3%)	23(30.7%)

2	Values shared in trainings develops norms of behavior to enable partcipents to make decisions about teaching - learning.	0	12(16.0%)	0	48(64.0%)	15(20.0%)
3	Trainings taught that institutions vision and value guide the decision making.	0	0	25(33.3%)	27(36.0%)	23(30.7%)
4	Trainees believed that effective teaching-learning depends on shared vision.	0	0	13(17.3%)	43(57.3%)	19(25.3%)
5	Trainings emphasize to priorities your	0	0	12(16.0%)	52(69.3%)	11(14.7%)

actions based on the shared values and vision to make good decisions.	

The table examines the role of Virtual Collaborative Trainings in promoting Shared Values and Vision within Professional Learning Communities. Participants' responses are categorized into five levels of agreement: Strongly Disagree (SDA), Disagree (DA), Neutral (N), Agree (A), and Strongly Agree (SA). The data reveals that a substantial proportion of participants (49.3%) agree that trainings aim to develop a collective process for promoting a shared sense of values among learning communities, with 30.7% strongly agreeing. Similarly, 64.0% agree that values shared in trainings develop norms of behavior to enable participants to make decisions about teaching and learning, while 20.0% strongly agree. Additionally, 36.0% agree that trainings taught that institutional vision and values guide decision-making, and 30.7% strongly agree. This data indicates that Virtual Collaborative Trainings play a significant role in fostering Shared Values and Vision within Professional Learning Communities, as reflected in the positive responses to these statements.

Table 4.25

Collective creativity

Collective Creativity

S.No	Statements	SDA	DA	N	A	SA
1	Trainings emphasize on teamwork to exchange multiple dimensions of knowledge and skills.	0	6(8.0%)	10(13.3%)	34(45.3%)	25(33.3%)
2	Participants were motivated to work together to find multiple solutions to address student needs.	0	0	23(30.7%)	37(49.3%)	15(20.0%)
3	Trainings give variety of opportunity to learn through open dialogue.	0	17(22.7%)	4(5.3%)	30(40.0%)	24(32.0%)

4	Participants were engaged in dialogue that reflects a mutual respect for diverse opinions.	0	18(24.0%)	0	38(50.7%)	19(25.3%)
5	In trainings multiple sources of data were used ro ensure the effectiveness of instructional practices.	0	0	19(25.3%)	34(45.3%)	22(29.3%)

This table examines the role of Virtual Collaborative Trainings in promoting Collective Creativity within Professional Learning Communities. Participants' responses are categorized into five levels of agreement: Strongly Disagree (SDA), Disagree (DA), Neutral (N), Agree (A), and Strongly Agree (SA). The data reveals that a significant portion of participants (45.3%) agree that trainings emphasize teamwork to exchange multiple dimensions of knowledge and skills, with 33.3% strongly agreeing. Additionally, 49.3% agree that participants were motivated to work together to find multiple solutions to address student needs, with 20.0% strongly agreeing. Furthermore, 40.0% agree that trainings

provide a variety of opportunities to learn through open dialogue, and 32.0% strongly agree. This data suggests that Virtual Collaborative Trainings play a substantial role in promoting Collective Creativity within Professional Learning Communities, as indicated by the positive responses to these statements.

Table 4.26

Supportive conditions

	Supportive Conditions					
S.No	**Statements**	**SDA**	**DA**	**N**	**A**	**SA**
1	In trainings, it was shared that how to make caring relationships among trainees who built trust worthy environment.	0	8 (10.7%)	30 (40.0%)	37 (49.3%)	0
2	There was culture of respect in the trainings.	0	12 (16.0%)	9 (12.0%)	39 (52.0%)	15 (20.0%)

3	Instructional materials were provided in the trainings.	0	0	9 (12.0%)	46 (61.3%)	20 (26.7%)
4	Trainings were helpful to develop supportive environment for continuous learning.	0	0	25 (26.7%)	43 (57.3%)	12 (16.0%)
5	Communication strategies were discussed in the trainings to flow the information among the stake holders.	0	0	7(9.3%)	47 (62.7%)	21 (28.0%)

The table focuses on the role of Virtual Collaborative Trainings in creating Supportive Conditions within Professional Learning Communities. Participant responses are categorized into five levels of agreement: Strongly Disagree (SDA), Disagree (DA), Neutral (N), Agree (A), and Strongly Agree (SA). The data reveals that a substantial proportion of participants (49.3%) agree that trainings emphasized creating caring relationships among trainees to build a trustworthy environment. Furthermore, 52.0% agree that there was a culture of respect in the trainings, and 20.0% strongly agree. Additionally, 61.3% agree that instructional materials were provided in the trainings, and 57.3% agree that trainings were helpful in developing a supportive environment for continuous learning. It is also notable that 62.7% agree that communication strategies were discussed in the trainings to facilitate the flow of information among stakeholders. This data indicates that Virtual Collaborative Trainings play a significant role in fostering Supportive Conditions within Professional Learning Communities, as reflected in the positive responses to these statements.

Table 4.27

Shared personal practice

Shared Personal Practice						
S.No	**Statements**	**SDA**	**DA**	**N**	**A**	**SA**
1	Trainings emphasized on providing feedback to	0	8(10.7%)	3(4.0%)	44(58.7%)	20(26.7%)

	peers about their instructional practices.					
2	Participants were motivated to share ideas and personal experiences to improve their teaching skills.	0	0	0	41(54.7%)	34(45.3%)
3	Participants were asked to review students' performance together to develop effective instructional practices.	0	3(4.0%)	6(8.0%)	39(52.0%)	27(36.0%)

4	Importance of coaching and mentoring were emphasized in the trainings.	0	0	21(28.0%)	42(56.0%)	12(16.0%)
5	Trainings focused on sharing the results of their practices with each other.	0	15(20.0%)	0	35(46.7%)	25(33.3%)

The table explores the role of Virtual Collaborative Trainings in promoting Shared Personal Practice within Professional Learning Communities. Participants' responses are categorized into five levels of agreement: Strongly Disagree (SDA), Disagree (DA), Neutral (N), Agree (A), and Strongly Agree (SA). The data reveals that a significant proportion of participants (58.7%) agree that trainings emphasized providing feedback to peers about their instructional practices, with 26.7% strongly agreeing. Additionally, 54.7% agree that participants were motivated to share ideas and personal experiences to improve their teaching skills, while 45.3% strongly agree. Furthermore, 52.0% agree that participants were asked to review students' performance together to develop effective instructional practices, and 36.0% strongly agree. This data suggests that Virtual Collaborative Trainings play a significant role in promoting Shared Personal Practice

within Professional Learning Communities, as indicated by the positive responses to these statements.

Correlation Analysis

The provided Correlation Analysis table shows the Pearson Correlation coefficients and their significance levels (two-tailed) between the variables Shared and Supportive Leadership, Shared Values and Vision, Supportive Conditions, Shared Personal Practice, and Collective Creativity within the context of Professional Learning Communities.

Table 4.28

Correlations

Correlations

		Shared and Supportive Leadership	Shared Values and Vision	Supportive Conditions	Shared Personal Practice	Collective Creativity
Shared and Supportive Leadership	Pearson Correlation	1	.410**	.224	.157	-.083
	Sig. (2-tailed)		.000	.054	.179	.481
	N	75	75	75	75	75
	Pearson Correlation	.410**	1	.332**	.428**	.451**

Shared Values and Vision	Sig. (2-tailed)	.000		.004	.000	.000
	N	75	75	75	75	75
Supportive Conditions	Pearson Correlation	.224	.332**	1	.310**	.426**
	Sig. (2-tailed)	.054	.004		.007	.000
	N	75	75	75	75	75
Shared Personal Practice	Pearson Correlation	.157	.428**	.310**	1	.631**
	Sig. (2-tailed)	.179	.000	.007		.000
	N	75	75	75	75	75
Collective Creativity	Pearson Correlation	-.083	.451**	.426**	.631**	1
	Sig. (2-tailed)	.481	.000	.000	.000	
	N	75	75	75	75	75

**. Correlation is significant at the 0.01 level (2-tailed).

Shared and Supportive Leadership: There is a positive and statistically significant correlation between Shared and Supportive Leadership and Shared Values and Vision ($r = 0.410$, $p < 0.01$). This indicates that as Shared and Supportive Leadership increases, so

does Shared Values and Vision. However, the correlation with Supportive Conditions, Shared Personal Practice, and Collective Creativity is not statistically significant.

Shared Values and Vision: Shared Values and Vision is positively and significantly correlated with Shared and Supportive Leadership ($r = 0.410$, $p < 0.01$), Supportive Conditions ($r = 0.332$, $p < 0.01$), Shared Personal Practice ($r = 0.428$, $p < 0.01$), and Collective Creativity ($r = 0.451$, $p < 0.01$). This suggests that as Shared Values and Vision increase, so do these other variables, indicating a strong positive relationship.

Supportive Conditions: Supportive Conditions show a positive and statistically significant correlation with Shared Values and Vision ($r = 0.332$, $p < 0.01$), Shared Personal Practice ($r = 0.310$, $p < 0.01$), and Collective Creativity ($r = 0.426$, $p < 0.01$). However, the correlation with Shared and Supportive Leadership is not statistically significant.

Shared Personal Practice: Shared Personal Practice has a positive and statistically significant correlation with Shared Values and Vision ($r = 0.428$, $p < 0.01$), Supportive Conditions ($r = 0.310$, $p < 0.01$), and Collective Creativity ($r = 0.631$, $p < 0.01$). The correlation with Shared and Supportive Leadership is not statistically significant.

Collective Creativity: Collective Creativity is positively and significantly correlated with Shared Values and Vision ($r = 0.451$, $p < 0.01$), Supportive Conditions ($r = 0.426$, $p < 0.01$), and Shared Personal Practice ($r = 0.631$, $p < 0.01$). The correlation with Shared and Supportive Leadership is not statistically significant.

Overall, these correlation results provide valuable insights into the interrelationships between these variables in the context of Professional Learning Communities. The statistically significant positive correlations indicate that as certain variables increase,

others tend to increase as well, suggesting a strong connection among these dimensions within the learning community.

Multiple Linear Regression model

The Multiple Linear Regression Model Summary provides valuable insights into the relationship between the dependent variable, "Collective Creativity," and the independent variables or predictors, including "Shared Personal Practice," "Shared and Supportive Leadership," "Supportive Conditions," and "Shared Values and Vision."

Table 4.29

Model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.756[a]	.572	.548	.41561

a. Predictors: (Constant), Shared Personal Practice, Shared and Supportive Leadership, Supportive Conditions, Shared Values and Vision

The R-squared value of approximately 0.572 indicates that the combination of these predictors explains roughly 57.2% of the variance in "Collective Creativity." This suggests a moderately strong relationship between the predictors and "Collective Creativity." The adjusted R-squared, which accounts for the model's complexity and sample size, is approximately 0.548, providing a more conservative estimate of the variance explained. The standard error of the estimate (approximately 0.41561) represents the average error between the predicted values from the model and the actual values of "Collective

Creativity." A lower standard error indicates a better fit of the model to the data. In practical terms, these results imply that "Shared Personal Practice," "Shared and Supportive Leadership," "Supportive Conditions," and "Shared Values and Vision" have a collective influence on fostering "Collective Creativity" within the context of Professional Learning Communities. However, it's important to note that there is some unexplained variance, and further analysis of the coefficients for each predictor is required to better understand the specific nature and strength of their relationships with "Collective Creativity."

Table 4.30

ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.168	4	4.042	23.401	.000[b]
	Residual	12.091	70	.173		
	Total	28.259	74			

a. Dependent Variable: Collective Creativity

b. Predictors: (Constant), Shared Personal Practice, Shared and Supportive Leadership, Supportive Conditions, Shared Values and Vision

The ANOVA results provide valuable information about the significance of the Multiple Linear Regression model in explaining the variance in the dependent variable, "Collective Creativity." The model's regression component, which includes predictors such as "Shared Personal Practice," "Shared and Supportive Leadership," "Supportive Conditions," and "Shared Values and Vision," demonstrates a significant F-statistic of 23.401 ($p < 0.001$). This suggests that the combination of these predictors significantly contributes to explaining the variance in "Collective Creativity." In contrast, the residual component represents the unexplained variance. Overall, the ANOVA results confirm the model's overall significance in predicting "Collective Creativity."

Table 4.31

Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.523	.669		.782	.007
	Shared and Supportive Leadership	-.422	.108	-.337	-3.911	.000
	Shared Values and Vision	.597	.189	.301	3.165	.002

Supportive Conditions	.331	.111	.253	2.976	.004
Shared Personal Practice	.573	.106	.476	5.392	.000

a. Dependent Variable: Collective Creativity

The Coefficients table provides insights into the relationships between the dependent variable, "Collective Creativity," and the independent variables or predictors, including "Shared Personal Practice," "Shared and Supportive Leadership," "Supportive Conditions," and "Shared Values and Vision."

Constant: The constant term represents the y-intercept of the regression equation. In this case, it has a coefficient (B) of 0.523, indicating the expected value of "Collective Creativity" when all predictor variables are set to zero.

Shared and Supportive Leadership: This predictor has a negative coefficient of -0.422, indicating that a one-unit increase in "Shared and Supportive Leadership" results in a 0.422 unit decrease in "Collective Creativity." The standardized coefficient (Beta) of -0.337 suggests that "Shared and Supportive Leadership" has a moderate negative impact on "Collective Creativity."

Shared Values and Vision: This predictor has a positive coefficient of 0.597, suggesting that a one-unit increase in "Shared Values and Vision" leads to a 0.597 unit increase in "Collective Creativity." The standardized coefficient (Beta) of 0.301 indicates a moderate positive impact of "Shared Values and Vision" on "Collective Creativity."

Supportive Conditions: The coefficient for "Supportive Conditions" is 0.331, implying that a one-unit increase in this predictor results in a 0.331 unit increase in "Collective

Creativity." The standardized coefficient (Beta) of 0.253 indicates a moderate positive influence of "Supportive Conditions" on "Collective Creativity."

Shared Personal Practice: This predictor has the largest coefficient of 0.573, suggesting that a one-unit increase in "Shared Personal Practice" corresponds to a substantial 0.573 unit increase in "Collective Creativity." The standardized coefficient (Beta) of 0.476 indicates a strong positive impact of "Shared Personal Practice" on "Collective Creativity."

In summary, the coefficients provide a quantitative understanding of how each predictor contributes to "Collective Creativity." "Shared Personal Practice" appears to have the most significant positive impact, while "Shared and Supportive Leadership" has a negative influence. These coefficients aid in interpreting the practical implications of the model and understanding which predictors are most influential in fostering "Collective Creativity."

4.1.1 Qualitative Analysis

In this part of the analysis researcher explored thematic analysis to the qualitative data gleaned from the respondents' open-ended questionnaire responses. The purpose of this research is to better understand the complex interplay between effect of virtual collaborative trainings and promoting professional learning communities at university level. This section uses a thorough thematic analysis technique to glean recurrent patterns, central ideas, and developing themes from the comments of the participants. The analysis meets the standards set forth by Nowell et al. (2017), guaranteeing its validity and dependability.

4.1.2 Thematic Analysis Process

Step-by-step instructions for doing a thematic analysis, showing how the topics were discovered in the data (figure 5), are provided below.

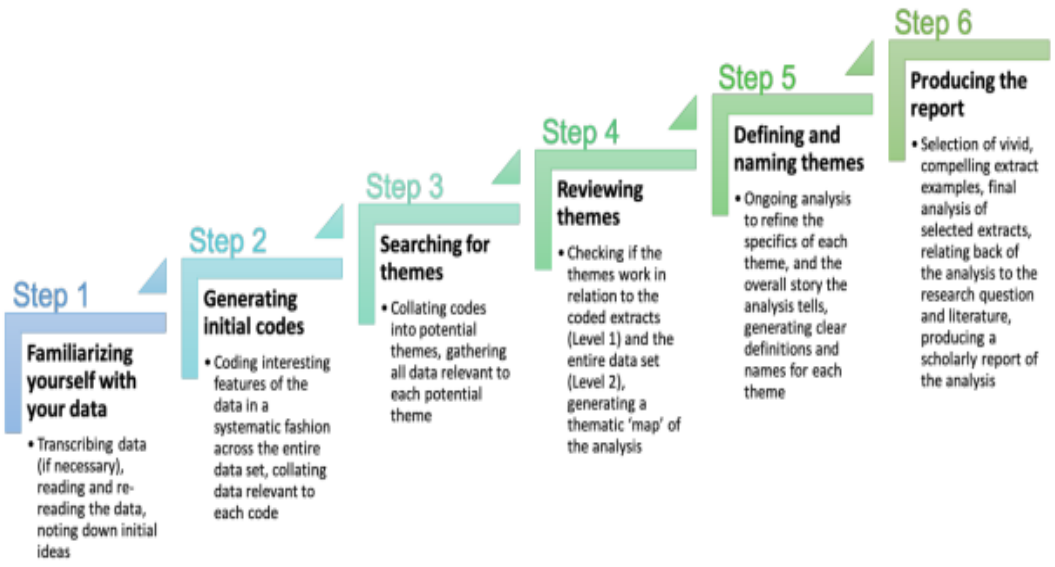


Figure 4.1 Phases of Thematic Analysis (Source: Braun & Clarke, 2006)

4.1.2.1 Transcribing Data of Respondents

Transcription is an essential component in our research as it facilitates the linkage between raw data and in-depth analysis. Our study consisted of a sample size of one hundred participants who provided their perspectives through a combination of written and oral forms of communication. The process of transcribing their comments was initiated in order to extract, organize, and categorize their ideas, facilitating a comprehensive analysis of the qualitative data.

4.1.2.2 Calculation of Mean and Percentage for each Response to the Qualitative Question:

How do Virtual Collaborative Trainings are contributing in promoting professional learning communities at university level?

Table 4.32

Shared and Supportive Leadership

Response Category	Mean	Percentage %
Positive Responses	10.83	22%
Mixed Responses	6.00	23%
Negative Responses	19.00	12%
Neutral Responses	11.63	18%
No Response	-	25%

Table 4.33

Shared Values and Vision - Odd Number Distribution

Response Category	Mean	Percentage %
Positive Responses	10.93	42%
Mixed Responses	19.00	17%
Negative Responses	10.78	9%
Neutral Responses	11.55	33%
No Response	-	25%

Table 4.34

Collective Creativity

Response Category	Mean	Percentage %
Positive Responses	10.93	42%
Mixed Responses	10.93	17%
Negative Responses	19.00	9%
Neutral Responses	11.55	33%
No Response	-	25%

Table 4.35

Supportive Condition

Response Category	Mean	Percentage %
Positive Responses	10.78	23%
Mixed Responses	10.94	18%
Negative Responses	6.21	14%
Neutral Responses	18	18%
No Response	-	25%

Table 4.36

Shared Personal Practice

Response Category	Mean	Percentage %
Positive Responses	10.78	24%
Mixed Responses	10.96	23%

Negative Responses	10.96	23%
Neutral Responses	10.96	23%
No Response	-	25%

4.1.2 Data Coding:

Transcripts are divided into cohesive segments, and codes are allocated to collect pertinent data. Codes serve as representations of essential concepts, so facilitating the organization and comprehension of data. This stage facilitates the process of recognizing and categorizing repeating concepts and motifs.

Multiple iterations of coding were performed on different regions of the data. Throughout the duration of my inquiry, a plethora of codes surfaced, each signifying a unique aspect of the narratives put out by the participants. The preliminary stage of coding served the purpose of not only organizing the data but also aiding in the identification of themes by emphasizing the repeated occurrence of thoughts and sensations.

Table 4.37

Data Coding

Concepts	**Questions**	**Codes**
Shared and Supportive Leadership.	What do you think about Virtual Collaborative Trainings you received? Do these trainings make the participants as part of the institutions' training	"Positive Impact on Leadership" "Improvement in Learning Techniques" "Mixed Opinions and Concerns"

	management on a larger scale?	"Sense of belonging" "Negative Sentiments and Doubts"
Shared Values and Vision	What is your opinion about Virtual Collaborative Trainings convince the leadership to share the rules, regulations and vision of the university or department with the teachers?	"Positive Impact on Vision" "Personal Growth" "Negative Sentiments and Doubts"
Collective Creativity	What is your feedback about the Virtual Collaborative Trainings you received. Did these trainings encourage the attendees to use their cognitive skills and how?	"Positive Impact on Cognitive Skills and Creativity" "Mixed Impact on Cognitive Skills"
Supportive Conditions	Did you learn from the Virtual Collaborative Trainings to support providing friendly and conducive for the collogues	"Positive Impact on Supportive Conditions" "Positive Impact on Learning Environment" "Positive Impact on Tech-Based Training"

	to work and experience freely?	"Positive Impact on Collaborative Learning" "Positive Impact on Professional Learning Communities"
Shared Personal Practice	How these Virtual Collaborative Trainings inculcate the habit of exchange of knowledge and experience among the fellows and across the professional learning communities?	"Positive Impact on Personal Practices" "Positive Impact on Knowledge Sharing" "Positive Impact on Idea Exchange" "Positive Impact on Professional Skills" "Positive Impact on Intellectual Idea Exchange" "Positive Impact on Idea Sharing and Mentoring" "Positive Impact on Experience and Habit Sharing" "Positive Impact on Previous Experience"

4.1.3 Themes Identification

The objective of the theme identification phase in qualitative data analysis is to extract pertinent patterns and concepts from a collection of responses or textual data. The utilization of themes in qualitative analysis is essential as they provide as a structured framework for interpreting the inherent content and emotions inside a dataset in a methodical manner (Mishra & Dey, 2022). The capacity to identify recurring patterns and extract valuable insights is crucial within the context of virtual collaborative training, wherein participants contribute their experiences, thoughts, and perspectives (Lowe et al., 2018). Researchers have the ability to direct their inquiry into common viewpoints and recurring patterns by doing a thorough analysis of the coded data obtained from each question (Vaismoradi et al., 2013). Consequently, scholars are more proficient in deriving conclusions and formulating suggestions by using the extensive content of the qualitative data (Green et al., 2007). In the subsequent section, an examination was being conducted on the process of identifying themes for each of the five concepts related to the Virtual learning community and an analysis would be provided on the implications of these themes in relation to the most significant areas of concern.

4.1.3.1 Identified Themes for Shared and Supportive Leadership

Positive Impact on Leadership:

Observations highlight the positive impact of e-collaborative training on participants' leadership abilities, community belonging, and contribution to training management. Participants report enhanced leadership skills and increased commitment to their organizations.

Mixed Opinions and Concerns:

Virtual training elicits diverse responses, encompassing varied attitudes. While some experience advantages, others express concerns about challenges in establishing social connections and complete integration within the institution.

Improvement in Learning Techniques:

Participants emphasize virtual collaborative training's role in enhancing learning methodologies and engaging with administrative functions more impact fully, perceiving it as beneficial for skill enhancement.

Sense of Belonging:

Remarks align with the theme, emphasizing virtual training's efficacy in fostering a sense of connection with the organization. Participants experience stronger interpersonal connections and a heightened sense of achievement.

Negative Sentiments and Doubts:

Responses in this thematic framework express predominantly unfavorable sentiments, with participants expressing skepticism about virtual collaborative training's efficacy in enhancing leadership or management skills.

Within the realm of virtual collaborative training, these themes encapsulate the diverse range of perspectives and encounters participants have in relation to shared and supportive leadership.

4.2.3.2 Identified Themes for Shared Values and Vision

Positive Impact on Shared Values and Vision:

Teachers emphasize virtual collaborative training's efficient exchange of rules, regulations, and departmental vision, contributing to a shared set of values and goals within the institution.

Mixed Opinions and Concerns:

Responses reflect divided viewpoints on the effectiveness of virtual training in conveying shared values. Some acknowledge utility, while others express concerns about execution.

Neutral Responses:

Participants in this theme show objectivity, lacking expressive contentment or concern, though responses may lack depth and subjective viewpoints.

These themes capture diverse participant perspectives on shared values and vision in virtual collaborative training.

4.2.3.3 Identified Themes for Collective Creativity

Positive Impact on Collective Creativity:

Responses unanimously agree that virtual collaborative training stimulates cognitive engagement and fosters creativity within the professional setting. Participants appreciate the program's focus on cognitive and critical thinking skills, promoting idea exchange and collaborative efforts.

Mixed Opinions and Concerns:

This theme elicits concerns and trust regarding virtual training's effectiveness in promoting group creativity. While some harbor reservations, others hold a favorable perception of the training program.

Neutral Responses:

Participants in this theme exhibit predominantly apathetic stances, with only a small number emphasizing positive or negative aspects. Responses may lack specificity and contextual information.

Enhancing Cognitive Skills and Critical Thinking:

This theme aims to improve participants' cognitive abilities and critical thinking skills through virtual collaborative training. Responses highlight diverse techniques and activities employed to enhance memory, attention, and analytical thinking. These diverse perspectives underscore the promotion of collective creativity in virtual collaborative training.

4.2.3.4. Identified Themes for Supportive Conditions

Positive Impact on Supportive Conditions:

Responses unanimously agree that virtual collaborative training positively influences the training environment. Participants highly value the collaborative aspect for facilitating unrestricted activity and providing a supportive atmosphere.

Mixed Responses and Challenges:

Participants' perspectives on this matter are polarized, with challenges highlighted in establishing a supportive atmosphere. While many acknowledge the benefits, some emphasize challenges and limitations in collaborative endeavors.

Neutral Responses:

This theme includes responses with a neutral stance, lacking explicit evidence of positive or negative influence. Responses may tend towards generality, lacking a personal perspective.

Promotion of Professional Learning Communities:

Remarks underscore the significance of online collaborative learning in cultivating communities of activity. Participants find value in the training for enhancing teamwork through knowledge and skill exchange.

These recurring themes reflect diverse experiences and perspectives on the impact of virtual collaborative training in fostering supportive contexts.

4.2.3.5 Identified Themes for Shared Personal Practice

Promotion of Knowledge and Experience Sharing:

Replies indicate virtual collaborative training's crucial role in fostering information and experience exchange, creating a climate where participants are open to new information and collaborative problem-solving.

Encouragement of Collaborative Learning:

Students highlight the benefits of virtual collaborative training, emphasizing its role as a forum for diverse backgrounds to meet, learn, and collaborate.

Neutral Responses:

Comments in this theme are neutral, lacking discernible positive or negative sentiments. Responses may lack depth or perspective.

Impact on Professional Learning Communities:

This section emphasizes the impact of online group education on academic institutions, recognizing the program's significance in promoting collaboration and the sharing of research outcomes.

These key themes illuminate distinct aspects of the impact of online group teaching on knowledge transmission and the development of communities of practice.

4.3 Integration of Quantitative and Qualitative Findings:

Combining quantitative and qualitative information is an essential part of our research. We hope to present a complete picture of the research issue by integrating the qualitative analysis's subjective narratives with the quantitative analysis's statistical facts. Through this synthesis, we are better able to verify results, establish causality, and comprehend the interconnected components of our research problems.

4.3.1 Alignment of Themes with Research Objectives and Question:

Research Objectives and Aligned Themes:

Objective 1: Investigate the level of virtual collaborative trainings at the university level.

- *Themes: Positive Impact on Leadership, Improvement in Learning Techniques, Mixed Opinions and Concerns, Sense of Belonging.*
- The aforementioned themes provide insight into the extensive scope, profound impact, and effectiveness of virtual collaborative training in relation to its influence on leadership, facilitation of learning, and engagement.

Objective 2: Assess the virtual practices of professional learning communities at the university level.

- *Themes: Positive Impact on Leadership, Mixed Opinions and Concerns, Improvement in Learning Techniques, Sense of Belonging.*
- These themes serve to highlight the impacts of virtual collaborative training on leadership, the challenges faced, the improved learning outcomes, and the development of a sense of community among participants.

Objective 3: Identify the role of virtual collaborative trainings in promoting professional learning communities at the university level.

- *Themes: Collective Creativity, Supportive Conditions, Shared Personal Practices, Positive Impact on Leadership.*
- The subsequent themes exemplify the ways in which online collaboration can facilitate the growth of professional learning communities through the promotion of teamwork, mutual respect, and creativity.

4.3.2 Research Question and Aligned Themes:

Research Question: How Virtual Collaborative Trainings are contributing in integrating the participants into institutional training management on a wider scale by fostering the distribution of rules, and vision, even by promoting cognitive skills development, creating

a supportive work environment, and facilitating knowledge exchange and also experience within and across professional learning communities?

On the basis of above-mention research question, following themes were revealed:

Theme 1: Positive Impact on Leadership, Improvement in Learning Techniques, Mixed Opinions and Concerns, Sense of Belonging.

- These themes encompass the various aspects of virtual collaborative education within the context of higher education.

Theme 2: Positive Impact on Leadership, Mixed Opinions and Concerns, Improvement in Learning Techniques, Sense of Belonging.

- These topics examine the leadership's influence, difficulties, and online classroom culture within virtual professional learning communities.

Theme 3: Collective Creativity, Supportive Conditions, Shared Personal Practices, Positive Impact on Leadership.

- These themes underscore the significance of virtual collaborative training in fostering collective creativity, facilitating supportive environments, and promoting common practices within professional learning groups.

This alignment provides a cohesive representation of how the chosen themes intersect with the research aims and questions, resulting in a methodical and all-encompassing perspective of the qualitative study.

4.4 Thematic Analysis: Synthesis of Findings:

4.4.1 Shared and Supportive Leadership

A dominant theme surfaced from an examination of participant feedback in the study on Shared and Supportive Leadership. Participants' inclination to effect positive changes in professional roles through virtual collaborative training. This suggests a perception of authority and motivation for change, positioning online training as a catalyst for innovative leadership. Participants reported enhanced decision-making, communication, and strategic thinking, aligning with virtual collaborative training principles. The training fosters a sense of community, emphasizing belonging and affiliation, contributing to a constructive work environment. Despite positive responses, some expressed isolation challenges in online classes, highlighting the intricate dynamics of virtual collaborative training and its diverse impacts on leadership.

4.4.2 Shared Values and Vision

The analysis of responses to Question 2 unveils diverse perspectives on virtual collaborative training in sharing organizational rules and vision. Participants appreciate the convenience of online training in disseminating knowledge, recognizing it as an effective means to communicate institutional ideals. The focus on teamwork is deemed crucial, facilitating participants' understanding of company principles. However, varied responses indicate divergent perspectives on the efficacy of virtual platforms in sharing values, with some expressing neither agreement nor disagreement. This dual nature of virtual collaborative training is crucial for enterprises aiming to align their workforce with organizational principles, acknowledging both positive impacts and nuanced viewpoints.

4.4.3 Collective Creativity

Responses to Question 3 unveil diverse perspectives on the potential of virtual collaborative training in enhancing cognitive capacities and fostering inclusive discourse. Participants express a generally positive perception, identifying dynamic and interactive virtual sessions as crucial for developing higher-order cognitive abilities. Recognition of virtual training's capacity for intellectual stimulation and skill enhancement is widespread. Additionally, the program is noted for fostering a congenial environment that encourages open communication and knowledge exchange. This aligns with the interactive nature of education, emphasizing collaboration and collective assistance. Overall, the findings highlight the dual outcomes of virtual collaborative training: cognitive enhancement and the creation of an inclusive space for open communication and knowledge exchange, providing valuable insights for optimizing learning outcomes.

4.4.4 Supportive Conditions

The analysis of responses to Question 4 unveils a pattern emphasizing the importance participants attribute to activities within virtual collaborative training for cultivating an encouraging atmosphere. The thematic focus prioritizes collaborative actions, highlighting the positive effects of engaging in conversations and group projects, fostering mutual support and camaraderie. Virtual training is deemed efficacious in building a supportive community through its collaborative nature. Participants stress the role of conversations, including question and answer sessions and role-playing, in creating a conducive learning environment. Mutual assistance is recognized as a crucial element, encompassing the sharing of personal experiences and guidance, fostering both educational enrichment and the development of a cohesive community. This thematic understanding provides crucial

insights into participants' perspectives on how collaborative activities contribute to establishing a congenial and supportive virtual learning atmosphere.

4.4.5 Shared Personal Practice

Responses to Question 5 reveal a consistent theme emphasizing the role of virtual collaborative training in facilitating the exchange of information and expertise. Acknowledging its efficacy in participant engagement, the training is recognized for nurturing the sharing of effective strategies. The participatory nature of virtual sessions underscores collaboration, contributing to a shared pool of knowledge. The raining fosters an environment conducive to open discourse on professional challenges, emphasizing mutual assistance and collaboration. Participants note a lasting influence on their professional activities, extending beyond virtual meetings to include ongoing knowledge exchange through digital platforms. This theme underscores the transformative impact of virtual collaborative training, fostering a collective and inventive community of specialists, surpassing traditional education.

4.4.1 Notable Insights:

Technology as a Facilitator

The role of virtual platforms in online debates is pivotal, facilitating instantaneous communication and information sharing. Enhanced by technologically driven role-playing activities, the training program allows active application of concepts through virtual simulations, promoting a deeper understanding. Presentations within the virtual setting provide a platform for showcasing expertise, fostering a participatory educational

atmosphere and increased engagement. The integration of various technological tools contributes to a holistic and engaging educational experience, highlighting the efficacy of technology in fostering effective learning.

Professional Development

Virtual training significantly influences leadership capabilities, as observed in the enhancement of participants' leadership abilities. The transformative impact of online education is evident in fostering behavioral modification, cultivating capable and compassionate leaders across organizational hierarchies.

Virtual training proves instrumental in augmenting cognitive capabilities, focusing on cognitive self-esteem, analysis, synthesis, and practical application of knowledge. Activities promoting teamwork, discussion, and mutual support establish an inclusive environment conducive to lifelong learning and personal advancement.

Professional development through online education is likened to a grand journey. It extends beyond knowledge transmission, cultivating future leaders, enhancing analytical aptitudes, and fostering a vibrant professional community. This comprehensive pathway towards improvement holds strategic significance in shaping leaders and fostering a corporate culture prioritizing continuous learning.

Conclusion

Qualitative investigation highlights virtual collaborative training's transformative capabilities, emphasizing its impact on leadership development, individual cognitive agency, and fostering a positive classroom climate.

The positive influence on leadership qualities, promotion of cognitive abilities, and creation of an inclusive learning environment collectively illustrate virtual training as a versatile catalyst for professional progression.

The findings underscore virtual training's potential to shape future leaders and enhance organizational effectiveness, serving as an efficacious and versatile instrument in the evolving dynamics of professional education. In essence, virtual collaborative training emerges as a stimulating catalyst, showcasing its transformative capacity in shaping the future workforce and fostering continuous learning in organizations.

4.6 Implications

Professional Development:

The compelling portrayal of the impact of virtual training on professional development is evident through the convergence of quantitative and qualitative research findings. The findings from the qualitative analysis indicated that the utilization of online training resulted in enhancements to the participants' leadership skills and cognitive sharpness, manifesting through a range of nuanced effects. The qualitative richness of the data is supported by the quantitative findings, namely in the examination of participant demographics. It is noteworthy that a significant proportion of respondents (64%) hold a Ph.D., indicating the high level of intellectual and professional expertise among the participants.

The qualitative findings contribute to a more comprehensive understanding by highlighting the transformative aspect of acquiring new skills or talents. There is a growing trend among professionals to utilize online education as a versatile medium for acquiring new

knowledge and enhancing their cognitive abilities and leadership qualities. The narrative is enhanced by the inclusion of quantitative data, which offers a numerical perspective on the individuals' median educational attainment.

Supportive Learning Environment:

Extensive research conducted on online education and training has consistently demonstrated the significant value of supportive learning environments, as evidenced by both quantitative and qualitative studies. When participants were requested to offer qualitative comments, they consistently commended virtual collaborative training for its ability to cultivate an atmosphere that promotes open and honest discussions, mutual regard, and productive sharing of knowledge. The qualitative focus is supported by the demographic analysis, which reveals that almost half of the respondents (49.3%) hold the belief that virtual training prioritizes the cultivation of caring connections among learners as a means to develop an environment that is reliable and dependable.

The concurrence of these findings implies that the advantages of online instruction extend beyond the mere transmission of information. Establishing an atmosphere conducive to open expression and constructive critique is of paramount importance. The numerical data serves as a fundamental basis, providing an indication of the extent to which this sentiment is prevalent within the sample population.

Leadership Development:

The alignment between the quantitative results and qualitative themes on the impact of online training on leadership skills is characterized as a state of ideal concordance. The narratives shared by participants offer a comprehensive and detailed understanding of the diverse ways in which e-learning contributes to the development of leadership skills. The

statistical significance of the positive correlation observed between Shared and Supportive Leadership and other dimensions, namely Shared Values and Vision, Supportive Conditions, Shared Personal Practice, and Collective Creativity, offers quantitative validation of the qualitative depth inherent in these associations.

The integration of qualitative and quantitative studies provides a comprehensive understanding of the role of virtual training in fostering leadership development. This study extends beyond theoretical concepts by presenting actual evidence that establishes connections between self-reported enhancements in leadership skills and other key characteristics that are essential for achieving success in one's profession. This congruence provides support for the notion that e-learning has the potential to serve as a catalyst for the enhancement of several dimensions of a leader's character within a conducive environment for learning and personal development.

Chapter 5:

SUMMARY, FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The main objective of this comprehensive study was to analyze the complex interplay of factors associated with online collaborative training, with a specific focus on the organizational framework of Professional Learning Communities (PLCs). The study sought to offer a comprehensive understanding of the phenomenon by integrating qualitative depth with quantitative rigor.

Analytical Quantitative Study: The researcher's objective was adopting a quantitative approach, focusing on identifying demographic patterns and uncovering statistical correlations among significant variables. The demographic analysis provided a partial view of the landscape, offering insights into the educational backgrounds of the respondents and their affiliations with different institutions. Correlation research aimed to quantitatively assess the relationships between several elements of Professional Learning Communities (PLCs), such as collaborative and empathic leadership, shared values and vision, conducive surroundings, personal and professional development, and inventive problem solving.

The study centered on a qualitative investigation, aiming to comprehend the diverse experiences and perspectives of individuals involved in virtual collaborative training. The primary objective of this research was to examine the impact of virtual training on several dimensions of professional development. This investigation employed qualitative

methodologies, namely theme analysis, to analyze the data. The study aimed to investigate the perspectives of participants about leadership, intelligence, and the establishment of virtual training environments that promote learning.

The objective of the study was to develop a comprehensive and intricate understanding of venture capital training through the utilization of a dual-focused methodology. The objective of the qualitative component was to present a narrative that transcended numerical data, aiming to capture the fundamental nature of the participants' lived experiences. In contrast to the qualitative findings, the inclusion of a quantitative component in the study introduced objectivity through the process of measuring links and patterns.

The process of methodological integration involves the incorporation and synthesis of many research methods to enhance the comprehensiveness and rigor of a study.

The purpose of this methodological integration is to establish a comprehensive understanding of the intricate effects of virtual collaborative training inside professional learning communities (PLCs).

The research methodology employed in this study was positioned within the framework of professional learning communities (PLCs), which place a strong focus on teamwork and lifelong education. Through the use of this framework, we conducted an examination of the various aspects of online education, specifically focusing on leadership, knowledge acquisition, and the quality of life within professional communities.

The research findings hold significant importance for both educators and policymakers, as they can get valuable insights and benefits from them.

This study represents a rigorous and comprehensive investigation aimed at untangling the complexities of online collaboration within the dynamic landscape of professional learning communities (PLCs).

5.2 Findings

This chapter delves into the critical findings of the research, aligning them with the study's objectives. The investigation centered on the efficacy of virtual collaborative training at university levels, focusing on various key aspects: cognitive abilities, the fostering of professional learning communities, the enhancement of leadership skills, and the overarching theme of professional development.

Enhancement of Cognitive Abilities and Critical Thinking

A significant revelation of the study is the impact of virtual collaborative training on cognitive abilities and critical thinking. The training programs, characterized by their diverse methodologies and interactive nature, have been instrumental in enhancing memory, attention, and analytical thinking among participants.

Diverse Techniques and Activities: The variety of techniques employed in virtual training sessions has been shown to promote collective creativity. Participants reported a noticeable improvement in their cognitive capabilities, attributed to the dynamic nature of the training.

Interactive Sessions: The interactive sessions were crucial in developing higher-order cognitive abilities. This aspect of the training not only augmented intellectual capacities but also created an inclusive space for open communication and knowledge exchange.

Impact on Professional Learning Communities

The research has highlighted the positive influence of virtual collaborative training on professional learning communities.

Supportive Training Environment: Participants expressed a unanimous agreement on the positive impact of the training environment. The collaborative aspect of the training was particularly valued for its role in facilitating a supportive and unrestricted atmosphere.

Challenges and Limitations: Despite the benefits, some participants also pointed out challenges in establishing a fully supportive atmosphere, indicating a need for a balanced perspective on the efficacy of these programs.

Enhancements in Leadership Skills and Professional Development

One of the most striking findings is the improvement in leadership skills and overall professional development as a result of virtual training.

Leadership Skills and Cognitive Sharpness: The qualitative analysis indicated significant enhancements in participants' leadership skills and cognitive sharpness, with a range of nuanced effects. This is particularly significant given the high level of intellectual and professional expertise among the participants, as indicated by the high proportion of respondents with advanced degrees.

Professional Development: The findings underscore virtual training's potential in shaping future leaders and enhancing organizational effectiveness, serving as an efficacious instrument in the evolving dynamics of professional education.

Alignment with Existing Literature

The findings of this study are in congruence with existing scholarly literature, especially concerning the adaptability of virtual platforms in fostering leadership development and innovation.

Leadership Development: The study corroborates previous research emphasizing the dynamic nature of leadership development, particularly in virtual environments. The adaptability and accessibility of these platforms make them ideal for individuals from diverse backgrounds to enhance their leadership capabilities.

Shared Personal Practice and Collective Creativity: Our findings also resonate with the literature highlighting the importance of shared experiences in innovation. The concept of shared personal practice in virtual training as a platform for knowledge exchange aligns with the notion of collective intelligence and communal knowledge construction.

Comprehensive Implications

The implications of these findings are far-reaching and multifaceted, extending beyond the confines of the academic setting into the broader realms of professional development and organizational learning.

For Educational Institutions: The insights from this study are particularly relevant for universities and educational institutions, emphasizing the need to integrate virtual collaborative methods into their training and development programs. This approach can

significantly enhance the cognitive and leadership skills of students and staff, preparing them for the challenges of the modern professional landscape.

For Professional Organizations: Organizations can leverage these insights to develop training programs that foster leadership and collaborative skills, which are crucial in today's rapidly evolving workplace. The emphasis on collective creativity and shared learning experiences can lead to more innovative and adaptive organizational cultures.

Policy Implications: At a policy level, the findings can inform the development of educational and professional training standards and guidelines, emphasizing the importance of virtual collaborative platforms in continuous learning and professional growth.

This study provides compelling evidence of the effectiveness of virtual collaborative training in enhancing cognitive abilities, fostering professional learning communities, improving leadership skills, and promoting professional development. The integration of quantitative and qualitative research findings offers a holistic view, echoing the dynamic and transformative potential of virtual training in contemporary educational and professional settings. The alignment of these findings with existing literature further validates the study's contribution to the field, offering valuable insights and directions for future research and practice.

5.3 Discussion

The inclusion of a discussion section in this study serves as a crucial bridge connecting the research's findings with their broader implications. The process involves doing a

comprehensive examination of the research results comparing them with previous studies and generating valuable perspectives that contribute to the scholarly discourse on professional online PLC training. The study's robustness and significance within the academic community are underscored by the alignment of our findings with the prevailing body of literature.

Initially, it exerts a "beneficial influence" on an individual's aptitude for leadership. The discovery that virtual collaborative training can yield favorable outcomes for the enhancement of leadership skills aligns with prior research underscoring the adaptability of virtual platforms in fostering leadership development. The acknowledgement of the dynamic nature of leadership development has been well-documented in the literature since it recognizes the limitations of traditional approaches in a rapidly evolving professional landscape (Huang et al., 2022). Virtual environments are widely recognized as an advantageous platform for the cultivation of leadership skills due to their inherent adaptability and accessibility. This makes them an ideal setting for individuals from diverse backgrounds to enhance their leadership capabilities.

Previous scholarly literature highlights the significance of shared experiences in fostering innovation, and our research findings demonstrate a positive correlation between Shared Personal Practice and Collective Creativity, providing further evidence in support of this notion (Kim & Zimmerman, 2023). The existing body of research pertaining to the stimulating impacts of knowledge sharing within group settings is highly persuasive. The concept of Shared Personal Practice within the realm of virtual training serves as a platform for the dissemination and interchange of diverse perspectives and methodologies.

Our study not only validates previously acknowledged observations but also contributes to the existing body of information regarding the efficacy of virtual collaborative training in the domains of leadership development and creative problem-solving by establishing connections with relevant literature. The combination of our qualitative and quantitative results highlights the significant impact that virtual training may have on professional development, emphasizing its potential for transformation.

The significance of virtual training in the development of leadership abilities is evident in both the quantitative analyses and qualitative themes since there is a persistent emphasis on this aspect. In light of the evolving landscape of educational practices, the integration of technology has become essential for educators to remain current and responsive to the shifting demands (Liu & Jia, 2010).

The acknowledgement of the improvement in cognitive abilities in both datasets further emphasizes the influence of virtual training on the intellectual capabilities of educators (Khanal, & Kahol, 2011). The virtual environment enables the exchange of knowledge through a range of activities including online chats, role-playing, and presentations.

In addition to personal growth, the results of this study have significant significance for educational establishments. They accomplish this by offering essential resources, mentorship opportunities, and platforms that effectively allow collaborative learning. The provision of institutional support plays a crucial role in ensuring that the advantages of virtual training have a broader influence on teaching communities rather than solely benefiting individual educators (Kodama et al., 2023).

In conclusion, the significance placed on fostering a supportive learning environment inside virtual spaces highlights the adaptability of online platforms in addressing the social

and emotional aspects of education. In order to fully actualize the potential of virtual spaces for effective professional development, it is imperative that educators and educational institutions strategically design virtual training experiences that prioritize the cultivation of community, provision of support, and fostering of emotional engagement.

5.4 Conclusion

The combination of quantitative assessments and qualitative insights in the realm of virtual collaborative training inside Professional Learning Communities (PLCs) unveils a captivating tale of transformation and progress. Throughout this discourse, we shall engage in an exploration of professional development, the establishment of an inclusive learning environment, and the intricacies surrounding the progression of leadership abilities.

The basic premise of the study posits that online collaborative learning plays a significant role in the transformative character of employment. The phenomenon has transcended traditional methods of knowledge dissemination and has become a valuable instrument for substantial professional advancement.

The examination of virtual training reveals a prominent underlying concept of integrating a supportive learning environment into its structure, which is crucial for fostering sustainable ecosystems. The qualitative remarks provided by participants underscore the significance of trust, open communication, and shared learning. This aligns with the statistical observation that a considerable proportion of individuals possess an understanding of the need of nurturing affectionate connections. Hence, virtual training not only functions as a vehicle for information dissemination, but also plays a pivotal role in fostering an inclusive atmosphere that values individuals from all backgrounds and varied experiences.

Examining the development of leaders in their respective jobs can be likened to the experience of listening to a symphony, where a harmonious blend of qualitative and quantitative elements can be observed. Correlational data offers quantitative evidence supporting the validity of virtual training as a conducive setting for the development of leaders. The concept of sharing and providing help. The development of leadership is not solely a theoretical concept, but rather a tangible force that is closely intertwined with shared ideals, conducive circumstances, individual behaviors, and collaborative innovation. This narrative explores the concept of leadership that surpasses traditional hierarchical structures and becomes an integral part of collective professional growth.

The findings demonstrate a harmonious integration of qualitative and quantitative components, resulting in a cohesive melody that effectively encapsulates the essence of collaborative online learning in the field of education. This melodic composition traverses the corridors of leadership development programs, resonating across the communities that cultivate personal and professional advancement among their constituents. Hence, the research goes beyond mere analysis and serves as evidence of the transformative capabilities of virtual collaborative training, specifically in terms of the digital elements and interactions inside professional learning communities (PLCs).

The document's discussion part centers on the ramifications of the research findings within the framework of professional online PLC training. The text highlights the significance of virtual collaborative training in improving leadership abilities, acknowledging the flexibility and convenience of virtual platforms as advantageous for leadership growth. The study emphasizes the significance of shared experiences in promoting creativity, illustrating a direct relationship between Shared Personal Practice and Collective

Creativity. This is consistent with the current body of research on the influence of knowledge sharing in group environments. The research enhances our comprehension of the effectiveness of virtual collaborative training in fostering leadership development and promoting innovative problem-solving. It emphasizes the importance of virtual training in the advancement of professional skills, especially in the education sector. The study recommends the use of carefully planned virtual training experiences that prioritize community building, support, and emotional engagement in order to fully harness the potential of virtual environments for effective professional growth. Moreover, it confronts conventional perspectives on online education, emphasizing the capacity of digital platforms to promote cohesion, cooperation, and interpersonal relationships.

The study highlights the importance of virtual collaborative training in improving leadership skills and promoting innovation by facilitating shared experiences. This study is consistent with previous research on the flexibility of virtual platforms for leadership training and emphasizes the strong relationship between Shared Personal Practice and Collective Creativity. This study enhances our comprehension of the effectiveness of virtual training in fostering professional growth, specifically within the realm of education. The statement promotes the use of carefully crafted digital settings that prioritize community, assistance, and emotional involvement. It challenges conventional perspectives on online education and emphasizes its capacity to cultivate harmony and human relationships.

5.5 Recommendations

Based on the findings and limitations of the study, several recommendations emerge for educators, institutions, and policymakers:

Recommendations Based on the Findings of Quantitative Data

Objective 1: Investigate the level of virtual collaborative trainings at university level.

1. **Expansion of Virtual Training Programs:** Universities should expand their virtual collaborative training programs, focusing on enhancing cognitive abilities, leadership skills, and group cohesion among students and staff.
2. **Customized Training Content:** Develop training content that specifically targets the improvement of critical thinking and analytical skills, as identified as key outcomes in the study.
3. **Integration of Diverse Learning Techniques:** Incorporate a variety of interactive and innovative teaching methods to cater to different learning styles, enhancing the effectiveness of virtual collaborative training.

Objective 2: Assess the practices of professional learning communities at university level.

1. **Professional Development Curricula:** Integrate virtual collaborative training into the broader professional development curricula. Focus on modules that enhance leadership capabilities and professional growth, as these were identified as significant outcomes.
2. **Cultural Sensitivity in Training:** Given the impact of cultural dynamics on learning effectiveness, tailor training programs to be culturally responsive, ensuring relevance and accessibility to a diverse educator population.

3. **Long-Term Impact Studies:** Conduct longitudinal studies to assess the long-term impact of virtual collaborative training on professional development, particularly in leadership and innovation.

Recommendations Based on the Findings of Qualitative Data

Objective 3: Identify the role of virtual collaborative trainings in promoting professional learning communities at university level.

1. **Enhanced Technology Accessibility:** Address the variability in access to and proficiency with technology among educators. This involves providing necessary training and resources to ensure equitable participation in virtual training programs.
2. **Feedback-Driven Improvement:** Establish mechanisms for continuous feedback and improvement of virtual training programs. Regularly update the content and delivery methods based on participant feedback and emerging educational trends.
3. **Policy Framework Development**: Develop and implement policies that support the adoption and integration of virtual collaborative training methods in university settings. This includes providing necessary resources and infrastructural support.
4. **Fostering Collaborative Learning Environments:** Encourage the creation of professional learning communities where educators can share experiences and best practices, thereby enriching the overall learning experience.
5. **Promotion of Shared Personal Practice:** Emphasize the importance of shared personal experiences in virtual training programs. Encourage educators to integrate their own experiences into the curriculum, fostering a richer and more relatable learning environment.

These recommendations are crafted to directly address the findings of the study and its stated objectives, aiming to enhance the efficacy and impact of virtual collaborative training in university and professional development settings.

Table 5.1

Objectives Align with Findings and Their Recommendations

Objectives	Findings	Recommendations
1. Investigate the level of virtual collaborative trainings at university level.	1.The majority of participants acknowledged the existence of virtual collaborative training programs at the university level. 2. - Participants expressed a need for more specialized virtual training modules.	1. Strengthen existing virtual collaborative training programs by incorporating advanced technologies and interactive methodologies. 2. Conduct a needs assessment to identify specific areas of interest and design targeted virtual training sessions.
2. Assess the practices of professional learning communities at university level.	1.Professional Learning Communities (PLCs) are prevalent at the university level, fostering collaboration among educators.	1.Promote and support the formation of PLCs, emphasizing their role in continuous professional development.

	2.Effective PLCs incorporate regular meetings, collaborative projects, and knowledge-sharing platforms	2.Encourage universities to establish structured PLC frameworks with defined meeting schedules and digital platforms for information exchange.
3. Identify the role of virtual collaborative trainings in promoting professional learning communities at university level.	1.Virtual collaborative trainings significantly contribute to the formation and sustenance of PLCs. 2.Shared Personal Practice emerged as a key factor in strengthening Collective Creativity within PLCs.	1.integrate virtual collaborative training as a core component of PLC initiatives, emphasizing its role in enhancing collaborative skills. 2.Develop strategies to encourage individuals to share their experiences and practices within virtual training settings, fostering a culture of knowledge exchange.

Limitations

There are some important considerations that must be acknowledged regarding the study.

1. **Sample Homogeneity:** The majority of the sample consists of individuals who possess a Ph.D. degree from private institutions. Due to this underlying resemblance, it is important to acknowledge that the findings of this study may not possess generalizability to a wider population of educators, particularly those operating at varying educational tiers or within the public domain.
2. **Potential Self-Selection Bias:** The presence of self-selection bias may be attributed to individuals' voluntary participation in virtual collaborative training. The generalizability of the findings to teachers with lower levels of enthusiasm for e-learning may be limited due to the potential self-selection bias, as the participants in the study might have possessed a preexisting interest or motivation in the subject matter.
3. **Short-Term Focus:** This research mostly centers on the initial responses to and firsthand encounters with virtual training. The emphasis placed on immediate outcomes hinders our ability to gain a deeper understanding of the enduring effects and lasting advancements in leadership, intellect, and community development.
4. **Quantitative Measures:** The research mostly relies on data that is self-reported by participants, while the quantitative analyses do offer valuable numerical insights. Participants have the potential to provide responses that they see as favorable or socially desirable, so introducing the potential for response bias.
5. **Cultural Context:** The study provides only a limited discussion on the influence of cultural factors on the efficacy of virtual collaborative training. Further

investigation is warranted in order to ascertain the degree to which cultural factors impacted the outcomes of this study, as cultural disparities can exert a significant impact on educational interventions.

6. **Technology Access and Comfort:** The study presupposes a specific degree of technological proficiency and access among participants, considering the virtual nature of the training. This could potentially result in the exclusion of educators who have less technological resources or possess less familiarity with virtual platforms.
7. **External Factors:** Insufficient consideration is given in the research to extraneous variables that possess the potential to influence the outcomes, such concurrent professional development initiatives, shifts in institutional policies, or broader societal occurrences.
8. **Qualitative Data Interpretation:** Despite our efforts to maintain objectivity in our qualitative research, the findings remain susceptible to varying interpretations. Diverse interpretations can be attributed to same evidence by various scholars.
9. **Limited Intervention Variation:** The primary focus of this study is to examine the impact of virtual collaborative training as a broad concept. The utilization of several virtual training interventions, each with distinct designs and implementation strategies, can provide valuable insights into the key determinants that contribute significantly to the attainment of desired outcomes.

It is crucial to acknowledge these limitations in order to accurately assess the results of the study and provide guidance for future research in this field.

References

Alebaikan, R. (2016). Online and face-to-face guest lectures: graduate students' perceptions. *Learning and Teaching in Higher Education: Gulf Perspectives*, *13*(2). https://doi.org/10.18538/lthe.v13.n2.229

Anthony, J. (2020, March 18). *Importance of Learning Experience and How It Impacts Learner Engagement*. Financesonline.com. https://financesonline.com/importance-of-learning-experience/

Arbaugh, J. B. (2000). Virtual Classroom Characteristics and Student Satisfaction with Internet-Based MBA Courses. *Journal of Management Education*, *24*(1), 32–54. https://doi.org/10.1177/105256290002400104

Arbaugh, J. B. (2002). Managing the on-line classroom: A study of technological and behavioral characteristics of web-based MBA courses. *The Journal of High Technology Management Research*, *13*(2), 203–223. https://doi.org/10.1016/S1047-8310(02)00049-4

Aronson, B., & Laughter, J. (2016). The Theory and Practice of Culturally Relevant Education. *Review of Educational Research*, *86*(1), 163–206. https://doi.org/10.3102/0034654315582066

Billups, F. D., & Borstel, S. L. (2018a). Advancing A Community of Practice: Reflections from the Field One Year Later. *Impacting Education: Journal on Transforming Professional Practice*, *3*(1). https://doi.org/10.5195/ie.2018.56

Billups, F. D., & Borstel, S. L. (2018b). Advancing A Community of Practice: Reflections from the Field One Year Later. *Impacting Education: Journal on Transforming Professional Practice*, *3*(1). https://doi.org/10.5195/ie.2018.56

Bloch, M., Lave, J., & Wenger, E. (1991). Situated Learning: Legitimate Peripheral Participation. *Man*, *29*(2), 487. https://doi.org/10.2307/2804509

Bridging the Gap: The Digital Divide in Times of COVID-19. (n.d.). UNICEF Global Development Commons. https://gdc.unicef.org/resource/bridging-gap-digital-divide-times-covid-19

Brown, C., Correll, P., & Stormer, K. J. (2021). The "new" normal: Re-imagining professional development amidst the COVID-19 pandemic. *Middle School Journal*, *52*(5), 5–13. https://doi.org/10.1080/00940771.2021.1978787

Carpenter, J., Carpenter, J. P., & Krutka, D. G. (2014). How and Why Educators Use Twitter: A Survey of the Field. *Journal of Research on Technology in Education*, *46(4)*. https://doi.org/10.1080/15391523.2014.925701

Collaboration technology: what software to use to improve team collaboration. (2021, October 21). Knowledge Library. https://pumble.com/learn/collaboration/collaboration-technology/

Collaborative Learning. (n.d.). Training Industry. Retrieved January 1, 2023, from https://trainingindustry.com/wiki/content-development/collaborative-learning/

Crowther, F. (2011). From School Improvement to Sustained Capacity: The Parallel Leadership Pathway. In *SAGE Knowledge* (2nd ed.). https://sk.sagepub.com/books/from-school-improvement-to-sustained-capacity

Daniel, B., Schwier, R. A., & McCalla, G. (2003). Social Capital in Virtual Learning Communities and Distributed Communities of Practice. *Canadian Journal of Learning and Technology / La Revue Canadienne de l'Apprentissage et de La Technologie*, *29*(3). https://doi.org/10.21432/t21s4r

Delpit, L. D., & Ladson-Billings, G. (1996). The Dreamkeepers: Successful Teachers of African American Children. *Contemporary Sociology*, *25*(2), 240. https://doi.org/10.2307/2077209

Domingo-Segovia, J., Bolívar-Ruano, R., Rodríguez-Fernández, S., & Bolívar, A. (2020). Professional Learning Community Assessment-Revised (PLCA-R) questionnaire: translation and validation in Spanish context. *Learning Environments Research*, 23, 347-367.

Dorner, H., & Kumar, S. (2016). Online Collaborative Mentoring for Technology Integration in Pre-Service Teacher Education. *TechTrends*, *60*(1), 48–55. https://doi.org/10.1007/s11528-015-0016-1

Evans, J. (n.d.). *Digital Learning during the Pandemic: Emerging Evidence of an Education Transformation*.https://tomorrow.org/speakup/pdfs/2020%20Speak %20 Up%20National%20Report.pdf

Falloon, G. (2011). Making the Connection. *Journal of Research on Technology in Education*, *43*(3), 187–209. https://doi.org/10.1080/15391523.2011.10782569

Fox, A. R. C., & Wilson, E. G. (2015). Networking and the development of professionals: Beginning teachers building social capital. *Teaching and Teacher Education*, *47*, 93–107. https://doi.org/10.1016/j.tate.2014.12.004

Fullan, M. (2006). The future of educational change: system thinkers in action. *Journal of Educational Change*, *7*(3), 113–122. https://doi.org/10.1007/s10833-006-9003-9

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What Makes Professional Development Effective? Results From a National Sample of

Teachers. *American Educational Research Journal*, *38*(4), 915–945. https://doi.org/10.3102/00028312038004915

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, *15*(1), 7–23. https://doi.org/10.1080/08923640109527071

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough. *American Journal of Distance Education*, *19*(3), 133–148. https://doi.org/10.1207/s15389286ajde1903_2

Garrison, D. Randy., Anderson, T., & Archer, W. (1999). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, *2*(2-3), 87–105. https://auspace.athabascau.ca/bitstream/handle/2149/739/?sequence=1

Gay, G. (2002). Preparing for Culturally Responsive Teaching. *Journal of Teacher Education*, *53*(2), 106–116. https://doi.org/10.1177/0022487102053002003

Gay, G. (2013). Teaching To and Through Cultural Diversity. *Curriculum Inquiry*, *43*(1), 48–70. https://doi.org/10.1111/curi.12002

Green, J., Willis, K., Hughes, E., Small, R., Welch, N., Gibbs, L., & Daly, J. (2007). Generating best evidence from qualitative research: the role of data analysis. *Australian and New Zealand Journal of Public Health*, *31*(6), 545–550. https://doi.org/10.1111/j.1753-6405.2007.00141.x

Greenhalgh, S. P., & Koehler, M. J. (2016). 28 Days Later: Twitter Hashtags as “Just in Time” Teacher Professional Development. *TechTrends*, *61*(3), 273–281. https://doi.org/10.1007/s11528-016-0142-4

Hall, V., & Southworth, G. (1997). Headship. *School Leadership & Management*, *17*(2), 151–170. https://doi.org/10.1080/13632439770005

Hargreaves, A., & Goodson, I. (2003). Educational Change Over Time? The Sustainability and Nonsustainability of Three Decades of Secondary School Change and Continuity. *Educational Administration Quarterly*, *42*(1), 3–41. https://doi.org/10.1177/0013161x05277975

Harrison, L., & Bishop, P. (2021). The Evolving Middle School Concept: This We (Still) Believe. *Current Issues in Middle Level Education*, *25*(2). https://doi.org/10.20429/cimle.2021.250202

Hay, A., Hodgkinson, M., Peltier, J. W., & Drago, W. A. (2004). Interaction and virtual learning. *Strategic Change*, *13*(4), 193–204. https://doi.org/10.1002/jsc.679

Heirdsfield, A., Walker, S., Tambyah, M., & Beutel, D. (2011). Blackboard As An Online Learning Environment: What Do Teacher Education Students And Staff Think? *Australian Journal of Teacher Education*, *36*(7). https://doi.org/10.14221/ajte.2011v36n7.4

Hemphill, L. S., & Hemphill, H. H. (2007). Evaluating the impact of guest speaker postings in online discussions. *British Journal of Educational Technology*, *38*(2), 287–293. https://doi.org/10.1111/j.1467-8535.2006.00622.x

Holmes, K., & Prieto - Rodriguez, E. (2018). Student and Staff Perceptions of a Learning Management System for Blended Learning in Teacher Education. *Australian Journal of Teacher Education*, *43*(3), 21–34. https://doi.org/10.14221/ajte.2018v43n3.2

Hord, S. M. (1997). *Professional Learning Communities: Communities of Continuous Inquiry and Improvement.*

Horn, I. S., & Little, J. W. (2010). Attending to Problems of Practice: Routines and Resources for Professional Learning in Teachers' Workplace Interactions. *American Educational Research Journal*, *47*(1), 181–217. https://doi.org/10.3102/0002831209345158

Huffman, J. B., Hipp, K. A., Pankake, A. M., & Moller, G. (2003). Professional Learning Communities: Leadership, Purposeful Decision Making, and Job-Embedded Staff Development. *Journal of School Leadership*, *11*(5), 448–463. https://doi.org/10.1177/105268460101100504

Jadallah, Y., Raghad Shaher Alsarayreh, Al, A., Haitham Mustafa Eyadat, Mohammad Nayef Ayasrah, & Saleem, A. (2023). An examination of teacher collaboration in professional learning communities and collaborative teaching practices. *Journal of Education and E-Learning Research*, *10*(3), 446–452. https://doi.org/10.20448/jeelr.v10i3.4841

Jane Bumpers Huffman, Kristine Kiefer Hipp, & Al, E. (2003). *Reculturing schools as professional learning communities*. Scarecroweducation.

Jones, S., & McCann, J. (2005). Virtual learning environments for time-stressed and peripatetic managers. *Journal of Workplace Learning*, *17*(5/6), 359–369. https://doi.org/10.1108/13665620510606779

Joyce, B., & Fullan, M. (2001). The Meaning of Educational Change. *Curriculum Inquiry*, *14*(3), 357. https://doi.org/10.2307/3202223

Keengwe, J., & Kang, J.-J. (2012). A review of empirical research on blended learning in teacher education programs. *Education and Information Technologies*, *18*(3), 479–493. https://doi.org/10.1007/s10639-011-9182-8

Kim, Y. S., & Kim, H. M. (2013). Design of a new virtual interaction-based PLC training using virtual sensors and actuators: system and its application. *International Journal of Distributed Sensor Networks*, 9(7), 505920.

King, M. B., & Newmann, F. M. (2001). Building school capacity through professional development: conceptual and empirical considerations. *International Journal of Educational Management*, *15*(2), 86–94. https://doi.org/10.1108/09513540110383818

Kinjerski, V., & Skrypnek, B. J. (2006). Creating organizational conditions that foster employee spirit at work. *Leadership & Organization Development Journal*, *27*(4), 280–295. https://doi.org/10.1108/01437730610666037

Kodama, D., Takato Mizuho, Hatada, Y., Takuji Narumi, & Hirose, M. (2023). Effects of Collaborative Training Using Virtual Co-embodiment on Motor Skill Learning. *IEEE Transactions on Visualization and Computer Graphics*, *29*(5), 2304–2314. https://doi.org/10.1109/tvcg.2023.3247112

Ladson-Billings, G. (1995). Toward a Theory of Culturally Relevant Pedagogy. *American Educational Research Journal*, *32*(3), 465–491. https://doi.org/10.3102/00028312032003465

Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, *34*(3), 159–165.

Liou, Y.-H., & Daly, A. J. (2018). Broken bridges: a social network perspective on urban high school leadership. *Journal of Educational Administration*, *56*(5), 562–584. https://doi.org/10.1108/jea-01-2018-0010

Liu, L., & Jia, Q. (2010). Research on Education and Training Oriented Virtual Collaborative Training Environment. *2010 Second International Conference on Computer Modeling and Simulation*. https://doi.org/10.1109/iccms.2010.32

Lomos, C., Hofman, R. H., & Bosker, R. J. (2011). Professional communities and student achievement – a meta-analysis. *School Effectiveness and School Improvement*, *22*(2), 121–148. https://doi.org/10.1080/09243453.2010.550467

Louis, K. S. (1994). Beyond "Managed Change": Rethinking How Schools Improve1. *School Effectiveness and School Improvement*, *5*(1), 2–24. https://doi.org/10.1080/0924345940050102

Louis, K. S., Kruise, S. D., & Associates. (1995). Professionalism and Community: Perspectives on Reforming Urban Schools, Karen Seashore Louis and Sharon D. Druse. 1995. Corwin Press, Inc., Thousand Oaks, CA. 272 pages. ISBN: 0-8039-6252-5 (hc); 0-8039-6253-3 (pb). $49.95 (hc); $24.95(pb. *Bulletin of Science, Technology & Society*, *15*(4), 192–192. https://doi.org/10.1177/027046769501500415

Lounsbury, J. H. (2010). This We Believe: Keys to Educating Young Adolescents. *Middle School Journal*, *41*(3), 52–53. https://doi.org/10.1080/00940771.2010.11461722

Lowe, A., Norris, A. C., Farris, A. J., & Babbage, D. R. (2018). Quantifying Thematic Saturation in Qualitative Data Analysis. *Field Methods*, *30*(3), 191–207. https://doi.org/10.1177/1525822x17749386

Macià, M., & García, I. (2017). Properties of Teacher Networks in Twitter: Are They Related to Community-Based Peer Production? *The International Review of Research in Open and Distributed Learning*, *18*(1). https://doi.org/10.19173/irrodl.v18i1.2644

McKoy, C. L., MacLeod, R. B., Walter, J. S., & Nolker, D. B. (2016). The Impact of an In-Service Workshop on Cooperating Teachers' Perceptions of Culturally Responsive Teaching. *Journal of Music Teacher Education*, *26*(2), 50–63. https://doi.org/10.1177/1057083716629392

McLaughlin, M. W., & Talbert, J. E. (2001). Professional communities and the work of high school teaching. *Choice Reviews Online*, *40*(01), 40-044240-0442. https://doi.org/10.5860/choice.40-0442

Meirinhos, M., & Osório, A. (2017). Criação de comunidades virtuais de aprendizagem colaborativa para a formação contínua de professores / Building virtual collaborative learning communities for teacher professional development. *Revista Internacional de Tecnologías En La Educación*, *4*(1). https://doi.org/10.37467/gka-revedutech.v4.1390

Mercer, N. (2008). Talk and the Development of Reasoning and Understanding. *Human Development*, *51*(1), 90–100. https://doi.org/10.1159/000113158

Michie, J., & Burt, R. S. (1992). Structural Holes: The Social Structure of Competition. *The Economic Journal*, *104*(424), 685. https://doi.org/10.2307/2234645

Mishra, S., & Dey, A. K. (2022). Understanding and Identifying "Themes" in Qualitative Case Study Research. *South Asian Journal of Business and Management Cases*, *11*(3), 187–192. https://doi.org/10.1177/22779779221134659

Moolenaar, N. M. (2012). A Social Network Perspective on Teacher Collaboration in Schools: Theory, Methodology, and Applications. *American Journal of Education, 119*(1), 7–39. https://doi.org/10.1086/667715

Moolenaar, N. M., & Daly, A. J. (2015). Social Networks in Education: Exploring the Social Side of the Reform Equation. *American Journal of Education, 119*(1), 1–6. https://doi.org/10.1086/667762

Moon, J., Passmore, C., Reiser, B. J., & Michaels, S. (2013). Beyond Comparisons of Online Versus Face-to-Face PD. *Journal of Teacher Education, 65*(2), 172–176. https://doi.org/10.1177/0022487113511497

Morong, G., & DesBiens, D. (2016). Culturally responsive online design: learning at intercultural intersections. *Intercultural Education, 27*(5), 474–492. https://doi.org/10.1080/14675986.2016.1240901

Newmann, F. M., Wehlage, G., & Wisconsin Center for Education Research. (1995). Successful school restructuring: a report to the public and educators by the Center on Organization and Restructuring of Schools. In *Library Catalog (Blacklight)*. The Center ; American Federation of Teachers [distributor] ; Association for Supervision and Curriculum Development [distributor] : National Association of Elementary School Principals [distributor] ; National Association of Secondary School Principals [distributor]. https://searchworks.stanford.edu/view/5499030

Norton, P., & Hathaway, D. (2008). Exploring Two Teacher Education Online Learning Designs. *Journal of Research on Technology in Education, 40*(4), 475–495. https://doi.org/10.1080/15391523.2008.10782517

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, *16*(1), 1–13. SagePub. https://doi.org/10.1177/1609406917733847

Olivier, D. F., Hipp, K. K., & Huffman, J. B. (2010). Assessing and analyzing schools as professional learning communities. *Demystifying professional learning communities: School leadership at its best,* 29-41.

Prabal Khanal, & Kanav Kahol. (2011). Interactive Haptic Virtual Collaborative Training Simulator to Retain CPR Skills. *Springer EBooks*, 70–77. https://doi.org/10.1007/978-3-642-23902-1_10

Quinn, D. M., & Kim, J. S. (2017). Experimental Effects of Program Management Approach on Teachers' Professional Ties and Social Capital. *Educational Evaluation and Policy Analysis*, *40*(2), 196–218. https://doi.org/10.3102/0162373717742198

Qutab, S., Shafi-Ullah, F., Safdar, M., & Khan, A. (2016). *Sustainable LIS Pedagogical Skills with Virtual Learning Environment (VLE): Collaborative Career Development Platforms, Communities and Practices*.

Redmond, P. (2006). Discipline specific online mentoring for secondary pre-service teachers. *Computers & Education*, *90*, 95–104. https://doi.org/10.1016/j.compedu.2015.08.018

Rienties, B., & Kinchin, I. (2014). Understanding (in)formal learning in an academic development programme: A social network perspective. *Teaching and Teacher Education*, *39*, 123–135. https://doi.org/10.1016/j.tate.2014.01.004

Robertson, J., Leithwood, K., & Louis, K. S. (1998). Organizational Learning in Schools. *Canadian Journal of Education / Revue Canadienne de L'éducation*, *24*(4), 465. https://doi.org/10.2307/1585900

Rodesiler, L. (2015). The Nature of Selected English Teachers' Online Participation. *Journal of Adolescent & Adult Literacy*, *59*(1), 31–40. https://doi.org/10.1002/jaal.427

Rosenholtz, S. J., & Simpson, C. (1989). Workplace Conditions and the Rise and Fall of Teachers' Commitment. *Sociology of Education*, *63*(4), 241. https://doi.org/10.2307/2112873

Schaap, H., & de Bruijn, E. (2017). Elements affecting the development of professional learning communities in schools. *Learning Environments Research*, *21*(1), 109–134. https://doi.org/10.1007/s10984-017-9244-y

Schweizer, H. (2004). E-Learning in Business. *Journal of Management Education*, *28*(6), 674–692. https://doi.org/10.1177/1052562903252658

Scott, K. A., Sheridan, K. M., & Clark, K. (2014). Culturally responsive computing: a theory revisited. *Learning, Media and Technology*, *40*(4), 412–436. https://doi.org/10.1080/17439884.2014.924966

Siwatu, K. O. (2007). Preservice teachers' culturally responsive teaching self-efficacy and outcome expectancy beliefs. *Teaching and Teacher Education*, *23*(7), 1086–1101. https://doi.org/10.1016/j.tate.2006.07.011

Steve, G. (2005, April 1). *Learning Communities And Educational Technology: Part I*. TechLearningMagazine. https://www.techlearning.com/news/learning-communities-and-educational-technology-part-i

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional Learning Communities: A Review of the Literature. *Journal of Educational Change, 7*(4), 221–258. https://doi.org/10.1007/s10833-006-0001-8

Taylor, W. (2000). Educational Leadership and Learning: Practice, Policy and Research20001Sue Law and Derek Glover. Educational Leadership and Learning: Practice, Policy and Research. Buckingham: Open University Press 2000. 320pp., ISBN: 0 335 19752 3 £16.99. *International Journal of Educational Management*, *14*(4), 192–192. https://doi.org/10.1108/ijem.2000.14.4.192.1

The NCES Fast Facts Tool provides quick answers to many education questions (National Center for Education Statistics). (n.d.). Nces.ed.gov. Retrieved May 29, 2020, from https://nces.ed.gov/fastfacts/display.asp?id=79

Tynjälä, P., & Häkkinen, P. (2005). E-learning at work: theoretical underpinnings and pedagogical challenges. *Journal of Workplace Learning*, *17*(5/6), 318–336. https://doi.org/10.1108/13665620510606742

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences, 15*(3), 398–405.

Van Waes, S., De Maeyer, S., Moolenaar, N. M., Van Petegem, P., & Van den Bossche, P. (2018). Strengthening networks: A social network intervention among higher education teachers. *Learning and Instruction*, *53*, 34–49. https://doi.org/10.1016/j.learninstruc.2017.07.005

Van Waes, S., Van den Bossche, P., Moolenaar, N. M., De Maeyer, S., & Van Petegem, P. (2015). Know-who? Linking faculty's networks to stages of instructional

development. *Higher Education*, *70*(5), 807–826. https://doi.org/10.1007/s10734-015-9868-8

Varghese, D., Hafeni Mthoko, Watterson, J., Kulkarni, P., Richardson, D., Shaimaa Lazem, & Olivier, P. (2023). Shadow Program Committee: Designing for Diversity and Equity within Academic Communities. *ACM Journal on Computing and Sustainable Societies*. https://doi.org/10.1145/3630743

Veletsianos, G. (2016). Three Cases of Hashtags Used as Learning and Professional Development Environments. *TechTrends*, *61*(3), 284–292. https://doi.org/10.1007/s11528-016-0143-3

Warren Little, J. (2002). Locating learning in teachers' communities of practice: opening up problems of analysis in records of everyday work. *Teaching and Teacher Education*, *18*(8), 917–946. https://doi.org/10.1016/s0742-051x(02)00052-5

Wearmouth, J., Smith, A. P., & Soler, J. (2004). Computer conferencing with access to a "guest expert" in the professional development of special educational needs coordinators. *British Journal of Educational Technology*, *35*(1), 81–93. https://doi.org/10.1111/j.1467-8535.2004.00370.x

Wesely, P. M. (2013). Investigating the Community of Practice of World Language Educators on Twitter. *Journal of Teacher Education*, *64*(4), 305–318. https://doi.org/10.1177/0022487113489032

Westheimer, J. (1999). Communities and Consequences: An Inquiry into Ideology and Practice in Teachers' Professional Work. *Educational Administration Quarterly*, *35*(1), 71–105. https://doi.org/10.1177/00131619921968473

Williams, R., Brien, E., Sprague, E., & Sullivan, M. (2008). Professional Learning Communities: Developing a School-Level Readiness Instrument. *Canadian Journal of Educational Administration and Policy*, *74*. https://files.eric.ed.gov/fulltext/EJ807003.pdf

Woolcock, M. (2004). Social Capital: A Theory of Social Structure and Action. By Nan Lin. Cambridge University Press, 2001. 278 pp. *Social Forces*, *82*(3), 1209–1211. https://doi.org/10.1353/sof.2004.0061

Xing, W., & Gao, F. (2018). Exploring the relationship between online discourse and commitment in Twitter professional learning communities. *Computers & Education*, *126*, 388–398. https://doi.org/10.1016/j.compedu.2018.08.010

Zhang, S., Liu, Q., Chen, W., Wang, Q., & Huang, Z. (2017). Interactive networks and social knowledge construction behavioral patterns in primary school teachers' online collaborative learning activities. *Computers & Education*, *104*, 1–17. https://doi.org/10.1016/j.compedu.2016.10.011

APPENDIX A

Virtual Collaborative Trainings

Respected Sir/Madam,

I am Umair Arshad MPhil Education Scholar from National University of Modern Languages, Islamabad.

I have started working on my thesis under the supervision of **Dr. Wajeeha Aurangzeb** Department of Educational Sciences, NUML, Islamabad. Your experience and opinions are truly important and will help in fulfilling my research objectives.

I request you to fill the attached survey form and questionnaire. I assure you that the information collected shall be kept confidential and shall only be used for research purpose. Your cooperation in this regard shall enable the researcher to complete this study well in time.

Thank you in advance for your cooperation.

Operational Definition

Virtual Collaborative Training:

Virtual Collaborative Training is a method of online sharing of knowledge, skills and experiences through technological means even if the individuals are present at different geographical locations also. This is where they learn from one another at the same time. This allows the trainees to gain better expertise and understanding of the specific view point.

Yours Truly,
Umair Arshad (MPhil Scholar)
Department of Educational Sciences
National University of Modern Languages, Islamabad

APPENDIX B

Survey Form

Virtual Collaborative Trainings

Personal Particulars

Qualification:	**Designation:**	**Experience:**
-MPhil ☐	-Lecturer ☐	1-3 years ☐
-MS ☐	-Assistant Professor ☐	4-6 years ☐
-PhD ☐	-Associate Professor ☐	7-10 years ☐
-Post Doc ☐	-Professor ☐	10 + years ☐
- Any Other ☐		
Regular ☐	Faculty:	Department:
Contract ☐ Visiting ☐		
Public University ☐ Private University ☐		

Q. Have you ever attended any virtual collaborative training?

Yes ☐ No ☐

- **If <u>YES</u> please fill up the following details and attached questionnaire however, if <u>NO</u> then just tick the box and do not proceed further.**
- Only mention the trainings attended during last three years from (2021 - 2023).

Total number of trainings: _____

1. Title: _____

Year: _____

Organizer: _____

Level: In-house Training ☐ National ☐ International ☐

2. Title: _____

Year: _____

Organizer: _____

Level: In-house Training ☐ National ☐ International ☐

3. Title: _____

Year: _____

Organizer: _____

Level: In-house Training ☐ National ☐ International ☐

Thank you for taking time out of your busy schedule to answer this survey form.

APPENDIX C

QUESTIONNAIRE ON VIRTUAL COLLABORATIVE TRAININGS

(QVCT)

Questionnaire for Teachers

- Please recall the latest Virtual Collaborative Trainings attended in the last 03 years from (2021 - 2023) and share the best answer option.

Investigate the Level of Virtual Collaborative Trainings	
1	Number of trainings In-house trainings _____ Online trainings _____
2	Mode of your participation. Questioning ☐ Answering ☐ Sharing Experience ☐
3	Duration of Training 1 day ☐ 2 days ☐ 3 days ☐ 4 days ☐ 5 days ☐
4	Level of Attendance in all trainings approximately <50% ☐

	<80% ☐ >80% ☐
5	Number of connections you built with any professional learning community Number of Connections (if any) _____
Assess the Virtual Practices of Professional Learning Communities	
1	Which mode was used to attend online trainings Zoom ☐ Google Meet ☐ LMS ☐ Others. ☐
2	What practices were learned through virtual collaborative trainings: Preparing lesson ☐ Delivering lesson ☐ Use of technology to assign task ☐ Google classroom ☐ Internet Surfing ☐ Free resources for articles ☐ **Software like:** SPSS ☐ PPTs ☐ Google sheet ☐
3	Preparing students record ☐
4	Preparing online tests ☐

	Quizzes to assess or engage students	☐
5	Preparing task	☐
	Rubrics	☐
	Presentations	☐

Note: Please choose the degree to which you agree with the following statements.

Strongly Agree **(SA)**	Agree **(A)**	Uncertain **(U)**	Disagree **(DA)**	Strongly Disagree **(SDA)**
5	**4**	**3**	**2**	**1**

S.No	**Statements**	**SA**	**A**	**N**	**DA**	**SDA**
Identify the role of Virtual Collaborative Trainings in Promoting Professional Learning Communities						
	Shared and Supportive Leadership					
1	Participants were engaged in discussion to make decisions about student issues.	5	4	3	2	1
2	Participants were motivated to initiate change.	5	4	3	2	1
3	Leadership skills were discussed in the trainings.	5	4	3	2	1
4	Participants learned how the decision making takes place through committees to tackle down the work place related issues.	5	4	3	2	1
5	Participants were taught to use multiple sources of data to facilitate teaching - learning process.	5	4	3	2	1
	Shared Values and Vision					

1	Trainings attempt to develop collective process for promoting a shared sense of values among learning communities.	5	4	3	2	1
2	Values shared in trainings develops norms of behavior to enable participants to make decisions about teaching - learning.	5	4	3	2	1
3	Trainings taught that institutions vision and value guide the decision making.	5	4	3	2	1
4	Trainees believed that effective teaching-learning depends on shared vision.	5	4	3	2	1
5	Trainings emphasize to priorities your actions based on the shared values and vision to make good decisions.	5	4	3	2	1
	Collective Creativity					
1	Trainings emphasize on teamwork to exchange multiple dimensions of knowledge and skills.	5	4	3	2	1
2	Participants were motivated to work together to find multiple solutions to address student needs.	5	4	3	2	1
3	Trainings give variety of opportunity to learn through open dialogue.	5	4	3	2	1
4	Participants were engaged in dialogue that reflects a mutual respect for diverse opinions.	5	4	3	2	1

5	In trainings multiple sources of data were used to ensure the effectiveness of instructional practices.	5	4	3	2	1
	Supportive Conditions					
1	In trainings, it was shared that how to make caring relationships among trainees who built trust worthy environment.	5	4	3	2	1
2	There was culture of respect in the trainings.	5	4	3	2	1
3	Instructional materials were provided in the trainings.	5	4	3	2	1
4	Trainings were helpful to develop supportive environment for continuous learning.	5	4	3	2	1
5	Communication strategies were discussed in the trainings to flow the information among the stake holders.	5	4	3	2	1
	Shared Personal Practice					
1	Trainings emphasized on providing feedback to peers about their instructional practices.	5	4	3	2	1
2	Participants were motivated to share ideas and personal experiences to improve their teaching skills.	5	4	3	2	1
3	Participants were asked to review students' performance together to develop effective instructional practices.	5	4	3	2	1

4	Importance of coaching and mentoring were emphasized in the trainings.	5	4	3	2	1
5	Trainings focused on sharing the results of their practices with each other.	5	4	3	2	1

APPENDIX D

Structured Interview Protocol

Role of Virtual Collaborative Trainings in Promoting Professional Learning Communities

1. **Shared and Supportive Leadership**

What do you think about Virtual Collaborative Trainings you received? Do these trainings make the participants as part of the institutions' training management on a larger scale?

_____

_____

_____

2. **Shared Values and Vision**

What is your opinion about Virtual Collaborative Trainings convince the leadership to share the rules, regulations and vision of the university or department with the teachers?

_____

_____

_____

3. **Collective Creativity**

What is your feedback about the Virtual Collaborative Trainings you received. Did these trainings encourage the attendees to use their cognitive skills and how?

_____

_____

_____

4. Supportive Conditions

Did you learn from the Virtual Collaborative Trainings to support providing friendly and conducive environment for the colleagues to work and experience freely. If yes, how?

_____

_____

_____

5. Shared Personal Practice

How these Virtual Collaborative Trainings inculcate the habit of exchange of knowledge and experience among the fellows and across the professional learning communities?

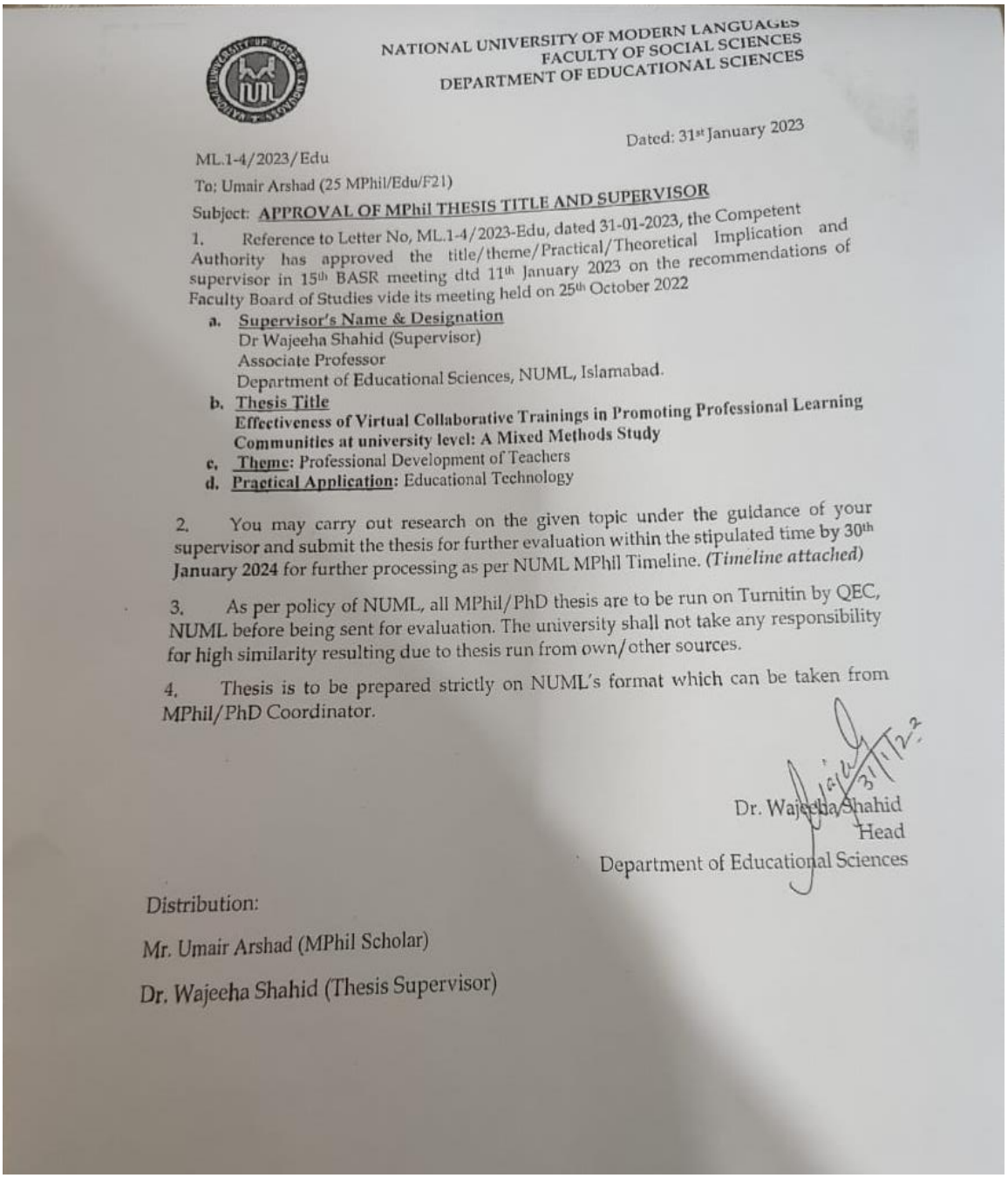
_____

_____

_____

APPENDIX E

TOPIC APPROVAL LETTER



NATIONAL UNIVERSITY OF MODERN LANGUAGES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF EDUCATIONAL SCIENCES

Dated: 31st January 2023

ML.1-4/2023/Edu

To: Umair Arshad (25 MPhil/Edu/F21)

Subject: **APPROVAL OF MPhil THESIS TITLE AND SUPERVISOR**

1. Reference to Letter No, ML.1-4/2023-Edu, dated 31-01-2023, the Competent Authority has approved the title/theme/Practical/Theoretical Implication and supervisor in 15th BASR meeting dtd 11th January 2023 on the recommendations of Faculty Board of Studies vide its meeting held on 25th October 2022

a. **Supervisor's Name & Designation**
   Dr Wajeeha Shahid (Supervisor)
   Associate Professor
   Department of Educational Sciences, NUML, Islamabad.
b. **Thesis Title**
   Effectiveness of Virtual Collaborative Trainings in Promoting Professional Learning Communities at university level: A Mixed Methods Study
c. **Theme:** Professional Development of Teachers
d. **Practical Application:** Educational Technology

2. You may carry out research on the given topic under the guidance of your supervisor and submit the thesis for further evaluation within the stipulated time by 30th **January 2024** for further processing as per NUML MPhil Timeline. ***(Timeline attached)***

3. As per policy of NUML, all MPhil/PhD thesis are to be run on Turnitin by QEC, NUML before being sent for evaluation. The university shall not take any responsibility for high similarity resulting due to thesis run from own/other sources.

4. Thesis is to be prepared strictly on NUML's format which can be taken from MPhil/PhD Coordinator.

31/1/23

Dr. Wajeeha Shahid
Head
Department of Educational Sciences

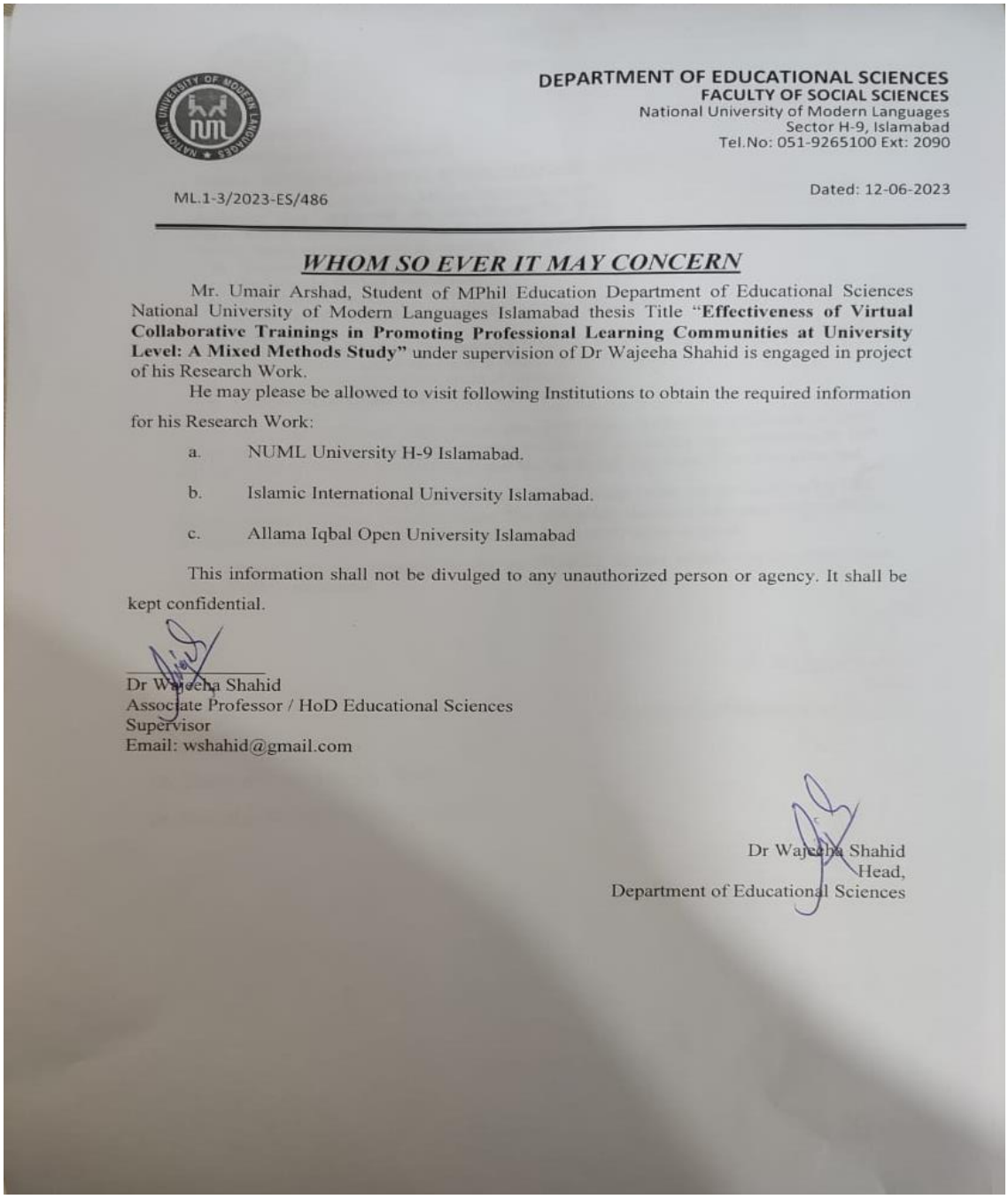
Distribution:

Mr. Umair Arshad (MPhil Scholar)

Dr. Wajeeha Shahid (Thesis Supervisor)

APPENDIX F

CONSENT LETTER FOR DATA COLLECTION



DEPARTMENT OF EDUCATIONAL SCIENCES
FACULTY OF SOCIAL SCIENCES
National University of Modern Languages
Sector H-9, Islamabad
Tel.No: 051-9265100 Ext: 2090

ML.1-3/2023-ES/486

Dated: 12-06-2023

WHOM SO EVER IT MAY CONCERN

Mr. Umair Arshad, Student of MPhil Education Department of Educational Sciences National University of Modern Languages Islamabad thesis Title "**Effectiveness of Virtual Collaborative Trainings in Promoting Professional Learning Communities at University Level: A Mixed Methods Study"** under supervision of Dr Wajeeha Shahid is engaged in project of his Research Work.

He may please be allowed to visit following Institutions to obtain the required information for his Research Work:

a. NUML University H-9 Islamabad.

b. Islamic International University Islamabad.

c. Allama Iqbal Open University Islamabad

This information shall not be divulged to any unauthorized person or agency. It shall be kept confidential.

Dr Wajeeha Shahid
Associate Professor / HoD Educational Sciences
Supervisor
Email: wshahid@gmail.com

Dr Wajeeha Shahid
Head,
Department of Educational Sciences

APPENDIX G

QEC TURNITIN REPORT

National University of Modern Languages
Quality Enhancement Cell
Sector H-9, P.O. Shaigan, Islamabad, Pakistan
Tel: +92-51-9265100 Ext 2246/2247
Web: www.numl.edu.pk

Dated: Nov 20, 2023

Faculty of Social Sciences

Subject: Turnitin-Similarity Test Report of MPhil Thesis of Mr Umair Arshad

Educational Sciences (1st- Attempt)

This is to state that **MPhil** thesis of **Mr Umair Arshad** has been run through **Turnitin Software on November 20, 2023**. Paper ID is 2234033444 and similarity index is **03%**. This is within the limit prescribed by the Higher Education Commission.

The subject similarity test report is attached for further processing, please.

(Dr. Khushbakht Hina)
Director
Quality Enhancement Cell

National University of Modern Languages
Quality Enhancement Cell

Dean/FSS

22/11/2023

HOD Educational Sciences:

APPENDIX H

CERTIFICATE OF VALIDITY 01

Certificate of Validity – 01

EFFECTIVENESS OF VIRTUAL COLLABORATIVE TRAININGS IN PROMOTING PROFESSIONAL LEARNING COMMUNITIES AT UNIVERSITY LEVEL: A MIXED METHODS STUDY

By: Mr. Umair Arshad

M.Phil. Scholar, Department of Educational Sciences, Faculty of Social Sciences
National University of Modern Languages, H-9, Islamabad, Pakistan.

It is certified that the research instruments developed by the aforementioned M.Phil. Scholar for his thesis has been assessed by me and I find it to have been designed adequately to check the effectiveness of virtual collaborative trainings in promoting professional learning communities.

The Scholar has developed survey form, checklist, 5-point Likert scale to collect data related to this study. A structured interview has also been developed for the members of professional learning communities to identify the role of virtual collaborative trainings in promoting professional learning communities at university level.

It is considered that the research instruments developed for the aforementioned of M.Phil. thesis title are according to the objectives and hypotheses of the research. It assures adequate construct and content validity according to the purpose of the research and can be used for data collection by the researcher with a fair amount of confidence.

Name: Dr. Muhammad Shoaib Malik

Designation: Associate Professor

Institute: NUML, H-9, Islamabad

Signature: 

Date: 15-02-23

APPENDIX I

CERTIFICATE OF VALIDITY 02

Certificate of Validity – 02

EFFECTIVENESS OF VIRTUAL COLLABORATIVE TRAININGS IN PROMOTING PROFESSIONAL LEARNING COMMUNITIES AT UNIVERSITY LEVEL: A MIXED METHODS STUDY

By: Mr. Umair Arshad

M.Phil. Scholar, Department of Educational Sciences, Faculty of Social Sciences
National University of Modern Languages, H-9, Islamabad, Pakistan.

It is certified that the research instruments developed by the aforementioned M.Phil. Scholar for his thesis has been assessed by me and I find it to have been designed adequately to check the effectiveness of virtual collaborative trainings in promoting professional learning communities.

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It is considered that the research instruments developed for the aforementioned of M.Phil. thesis title are according to the objectives and hypotheses of the research. It assures adequate construct and content validity according to the purpose of the research and can be used for data collection by the researcher with a fair amount of confidence.

Name: Dr. Fazal Rabbi

Designation: Associate Professor

Institute: NUML, H-9, Islamabad

Signature: 

Date: 15-02-23