Research

Exploring ESL teachers' experiences about ICT-based 4Cs skills: a phenomenological study

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Abstract

This study examines the experiences of university-level English as a Second Language (ESL) teachers in relation to the integration of Information and Communication Technology (ICT)-based 4Cs (communication, collaboration, critical thinking, and creativity) skills in English language teaching and learning. The research aims to explore the impact of 4Cs skills on the teaching and learning process, particularly in the context of ESL education. Through a phenomenological study approach, data have been collected through semi-structured interviews with the five ESL teachers of a public sector university's education department. The recorded semi-structured interviews were transcribed into verbatim form and analysed thematically to gain insights into the ESL teachers' experiences and perceptions regarding ICT-based 4Cs skills. The phenomenological approach offered a rich and nuanced understanding of the five ESL teachers' experiences by exploring the subjective meanings they attribute to their lived experiences. The findings provided valuable insights into the experiences of ESL teachers and emphasize the significance of ICT-based 4Cs skills in the twenty-first century. The results highlight the effectiveness of various teaching techniques in implementing these skills but also identify challenges faced by ESL teachers when teaching ESL learners. Overall, this research underscores the importance of integrating ICT-based 4Cs skills in ESL instruction and contributes to the understanding of their implementation in the field of education.

Keywords ESL teachers · Twenty-first century 4Cs skills · ICT · Phenomenology · Thematic analysis

1 Introduction

In recent years, the integration of Information and Communication Technology has transformed the landscape of education, opening up new avenues for teaching and learning [50]. This technological revolution has had a profound impact on English as Second Language (ESL) classrooms, where teachers are increasingly incorporating ICT tools to enhance language instruction [17]. Within this context, the development of twenty-first century skills has emerged as a crucial goal for ESL teachers, aiming to equip their students with the competencies needed to thrive in a digitally-driven world [6]. One set of skills that has gained prominence in educational discourse is the 4Cs: Critical Thinking, Communication, Collaboration, and Creativity [18]. These skills are being considered essential for preparing students to navigate complex challenges, think critically, communicate effectively, work collaboratively, and unleash their creative potential [24]. As ESL classrooms become more reliant on ICT-based tools and resources, understanding how ESL teachers perceive and experience the integration of the 4Cs within this digital environment has become a matter of significant importance [38]. This phenomenological study aims to delve into the lived experiences of ESL teachers who have embraced ICT

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tools to foster the development of the 4Cs skills in their language classrooms. Phenomenology, as a qualitative research approach, seeks to explore the subjective experiences and perceptions of individuals in a particular phenomenon [16]. By adopting this approach, this study intends to provide an in-depth understanding of how ESL teachers engage with ICT-based strategies and resources to cultivate the 4Cs skills among their students.

1.1 Problem statement

ICT-Based 4Cs skills are on the rise in academic settings to improve ESL learning and foster the development of twenty-first century skills. However, due to little investigation, including exploring the experiences of ESL teachers, things vary in the context of North Sindh. Similarly, limited research has been done at university level in North Sindh to explore the experiences of ESL teachers. Adding into it, there is a lack of recognition for ESL teachers' expertise while integrating ICT-based 4Cs competences into the classroom [39]. This phenomenological study therefore, aims to explore the experiences which ESL teachers are having while implementing ICT-Based 4Cs skills in the context of North Sindh, Pakistan, in addition to their awareness of and use of ICT resources to strengthen them. Although this exploration of the experiences of ESL teachers regarding integration of ICT-Based 4Cs skills is limited in context, yet it offers valuable insights for university level ESL teachers in broader context.
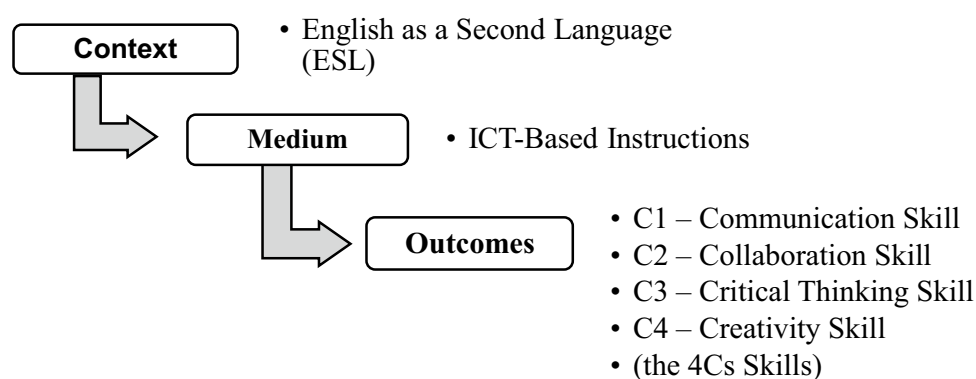
1.2 Objectives of the study

The research objectives for the study on "Exploring ESL Teachers' Experiences about ICT-Based 4Cs Skills: A Phenomenological Study" include:

1. To explore the experiences of ESL Teachers with regard to the use of ICT-based 4Cs skills during the process of teaching and learning ESL.
2. To explore the teaching strategies of ESL Teachers regarding the use of ICT-based 4Cs skills while teaching to ESL learners.
3. To identify ESL Teachers' challenges that they face while teaching ICT-Based 4Cs skills to ESL learners.
4. To explore some of the common practices that ESLTs apply to overcome certain challenges which they face while teaching ICT-Based 4Cs skills to ESL learners?

1.3 Conceptual framework

The purpose of this conceptual framework (see Fig. 1) is to provide a theoretical structure for understanding and investigating the experiences of English as a Second Language (ESL) teachers in relation to the integration of ICT for developing 4Cs skills in their classrooms. This phenomenological study aims to explore the context in which these teachers operate, the medium through which ICT is utilized, and the outcomes of this integration.

Fig. 1 Showing the conceptual framework of the study

- English as a Second Language (ESL)

Context

Medium
- ICT-Based Instructions

Outcomes
- C1 – Communication Skill
- C2 – Collaboration Skill
- C3 – Critical Thinking Skill
- C4 – Creativity Skill
- (the 4Cs Skills)

1.3.1 Context

The context refers to the setting and environment in which the ESL teachers operate, including the cultural, institutional, and educational factors that influence their experiences with ICT-based 4Cs skills.

1.3.2 Medium

The medium refers to the specific ICT instructions, tools, platforms, and resources used by ESL teachers to enhance the development of 4Cs skills among their students.

1.3.3 Outcomes

The outcomes represent the effects and impacts of integrating ICT-based 4Cs skills on ESL teachers, students, and the learning environment.

This conceptual framework provides a comprehensive structure for examining the experiences of ESL teachers regarding the integration of ICT-based 4Cs skills in their classrooms. By considering the context, medium, and outcomes, researchers can gain insights into the factors influencing this integration and its impact on teaching, learning, and the overall learning environment.

2 Literature review

As we know that the twenty-first century's accelerated globalization and digitalization have been progressively altering the ways in which we live, interact, learn, and work. Therefore, if ESL learners want to be competitive and more efficient in the twenty-first century and as per global context, they need to be equipped with what are referred to as the 4Cs skills including proper utilization of various ICT tools. ESL classrooms should incorporate the 4Cs into the learning process in addition to focusing on students' language skills in order to meet the challenges [34]. In addition, in order to meet the needs of teaching and learning in the twenty-first century, teaching concepts, approaches, techniques, and methodologies have already undergone a significant transformation. In point of fact, the teaching and learning process is extending beyond the boundary walls of a classroom.

2.1 ICT-based 4Cs skills

ICT has revolutionized various aspects of our lives, including education and workforce development. In today's digital age, it is crucial for individuals to possess the necessary skills to thrive in a technology-driven society. The 4Cs skills framework, comprising Critical Thinking, Communication, Collaboration, and Creativity, has gained significant attention as essential competencies for success in the twenty-first century. This literature review explores the role of ICT in fostering and enhancing the development of 4Cs skills.

2.1.1 Communication

The use of ICT tools has transformed communication processes, enabling learners to engage in various forms of digital communication. Social media platforms, online discussion forums, and video conferencing applications facilitate effective communication and collaboration among learners. Research by Johnson [25] revealed that students who utilized ICT tools for collaborative writing projects exhibited enhanced written communication skills, such as clarity, coherence, and organization. Additionally, the study by Lin et al., [37] highlighted the positive impact of ICT-based communication tools on students' oral communication skills, such as articulation, fluency, and persuasion.

2.1.2 Collaboration

ICT-based platforms have reshaped the landscape of collaboration, allowing learners to engage in virtual teamwork and cooperative learning experiences. Virtual learning environments, online project management tools, and cloud-based platforms enable learners to collaborate regardless of their physical location. A study by Zheng et al. [54] demonstrated

Discover

that students who engaged in collaborative ICT-based activities exhibited improved teamwork skills, including effective communication, task distribution, and conflict resolution. Furthermore, research by Wang et al. [51] emphasized the positive impact of ICT-supported collaboration on students' ability to work collaboratively, fostering social skills and promoting a sense of community.

2.1.3 Critical thinking

ICT tools provide a multitude of opportunities to foster critical thinking skills. Virtual simulations, data analysis software, and online research platforms offer learners the ability to engage in complex problem-solving tasks. For instance, Li and Zhao [36] found that students who utilized ICT tools for inquiry-based learning demonstrated higher levels of critical thinking abilities compared to traditional instruction. Similarly, Lin et al. [37] reported that the integration of ICT in teaching and learning environments positively influenced students' critical thinking skills, as evidenced by improved analysis, evaluation, and inference abilities.

2.1.4 Creativity

ICT tools present a multitude of possibilities for nurturing and unleashing the creative potential of learners. Through software for crafting multimedia, platforms dedicated to digital storytelling, and design tools, students are empowered to creatively articulate their ideas and concepts. Chen & Chen [12], found that the integration of ICT tools in the curriculum positively influenced students' creative thinking abilities, as evidenced by their ability to generate unique ideas and produce original artefacts. Additionally, a study by Davis and Rodrignnez [14] revealed that students who engaged in ICT-supported creative activities demonstrated enhanced problem-solving skills, as they were encouraged to think divergently and find unconventional solutions. The literature reviewed demonstrates the significant role of ICT in fostering and enhancing the development of 4Cs skills. The integration of ICT tools in educational settings provides learners with opportunities to cultivate critical thinking, communication, collaboration, and creativity. Findings show that there are positive effects on students' competence and creativity. Significant enhancements have been noticed in different aspects of the 4Cs framework. As technology continues to evolve, it is imperative for educators and policymakers to leverage ICT effectively to cultivate these essential skills for the success of learners in the digital era.

2.2 ESL teachers' ICT-based instructional practices and challenges

English as a Second Language instruction has increasingly incorporated Information and Communication Technology tools to enhance teaching and learning experiences. This literature review aims to explore the current state of ESL teachers' ICT-based instructional practices, as well as the challenges they encounter in implementing technology in their classrooms. By examining recent research, this review provides insights into the benefits and obstacles associated with integrating ICT in ESL instruction.

2.2.1 ICT-based instructional practices

2.2.1.1 Integration of digital resources ESL teachers have embraced various digital resources to supplement traditional teaching methods. According to Bergmann and Schmidt [7], these resources include online language learning platforms, multimedia materials, and educational apps. The use of such resources promotes engagement, autonomy, and individualized learning among ESL learners [44].

2.2.1.2 Online collaboration and communication ICT tools have facilitated collaboration and communication among ESL students, enabling them to connect with peers and native English speakers worldwide. Research by Ali and Hashim [4], suggests that platforms such as video conferencing, discussion forums, and social media promote intercultural exchanges and foster language skills development.

2.2.1.3 Adaptive learning technologies Adaptive learning technologies, such as intelligent tutoring systems and personalized learning platforms, have gained prominence in ESL instruction. These tools offer tailored learning experiences, track individual progress, and provide immediate feedback to learners [22]. The integration of adaptive technologies has shown promise in enhancing ESL students' language proficiency and motivation.

2.2.2 Challenges faced by ESL teachers

2.2.2.1 Limited technological competence Some ESL teachers face challenges in adapting to new technologies due to limited technological competence. Research by Abdul-Wahab et al. [1] highlights the need for professional development programs to enhance teachers' digital literacy and pedagogical knowledge to effectively integrate ICT tools in their classrooms.

2.2.2.2 Insufficient infrastructure and resources In certain contexts, ESL teachers encounter challenges related to inadequate infrastructure and resources to support ICT-based instruction. Jones et al. [27] emphasize the importance of providing schools with sufficient equipment, reliable internet access, and relevant software to ensure the smooth implementation of technology in ESL classrooms.

2.2.2.3 Pedagogical shifts and resistance to change Integrating ICT in ESL instruction often requires teachers to undergo pedagogical shifts and adapt their teaching approaches. This can result in resistance to change among some educators, as highlighted by Park and Kim [40]. Supportive professional development programs and a positive organizational culture are crucial in fostering teachers' willingness to embrace ICT-based practices. ESL teachers' adoption of ICT-based instructional practices offers numerous benefits for language learning. The integration of digital resources, online collaboration tools, and adaptive learning technologies has the potential to enhance ESL students' engagement, autonomy, and language proficiency. However, challenges related to technological competence, infrastructure, and resistance to change must be addressed to maximize the effective implementation of ICT in ESL classrooms. Future research should focus on identifying strategies to overcome these challenges and provide comprehensive support for ESL teachers in their ICT integration efforts.

2.3 ESL teachers' role & significance in ICT-based curriculum development

In recent years, the integration of Information and Communication Technology (ICT) into education has gained significant attention due to its potential to enhance teaching and learning experiences. For ESL learners, ICT tools offer numerous opportunities to develop language skills and engage in interactive learning experiences. This section provides an overview of the importance of ICT-based curriculum development and highlights the role of ESL teachers in this process.

2.3.1 ESL teachers' role in ICT integration

2.3.1.1 Curriculum design and adaptation ESL teachers play a vital role in designing and adapting curriculum materials to incorporate ICT resources. They consider learners' needs, language proficiency levels, and pedagogical goals when selecting appropriate digital tools and platforms [3]. By integrating ICT into curriculum design, teachers can create engaging and interactive learning experiences that cater to diverse learners' needs [12].

2.3.1.2 Instructional facilitation ESL teachers serve as facilitators of ICT-based instruction, guiding students to effectively use digital tools to improve language skills. They provide necessary guidance and support to ensure learners develop the necessary digital literacy skills required for the successful utilization of ICT resources [33]. Teachers encourage active participation, monitor progress, and provide timely feedback to promote effective language learning through ICT [8].

2.3.2 Significance of ESL teachers in ICT-based curriculum development

2.3.2.1 Individualized instruction ESL teachers are instrumental in the individualization of instruction through ICT-based curricula. They can tailor learning experiences to meet the specific needs of each learner, providing differentiated tasks and personalized feedback [51]. Through ICT tools, teachers can cater to diverse learning styles and abilities, promoting inclusive language learning environments [32].

2.3.2.2 Enhancing language proficiency According to Brown [10], ICT-based curricula allow ESL teachers to create authentic language learning experiences by incorporating real-world multimedia resources. Learners engage in

activities such as online discussions, virtual simulations, and multimedia projects that enhance language proficiency and promote cultural understanding [54]. ESL teachers facilitate language practice in meaningful contexts, which can lead to improved language acquisition outcomes [43].

2.3.3 Challenges and considerations

2.3.3.1 Teacher training and professional development To effectively integrate ICT into ESL curricula, teachers require adequate training and professional development opportunities. Educational institutions should provide on-going support and resources to equip ESL teachers with the necessary knowledge and skills for ICT integration [5]. In their study on the impact of professional development on teachers' ICT integration practices, Aydin and Gülseçen [5] (p. 52), found that "teachers who participated in regular professional development programs reported increased confidence in using ICT tools and greater integration of technology into their ESL instruction". Warschauer [52] highlights the importance of teacher training and support for successful ICT integration in ESL curricula. Several CALL-related journals emphasize the need for continuous professional development in this area. For instance, Language Learning and Technology suggests that "effective integration of ICT in language teaching requires on-going training and support for teachers" [42], (p. 67). Brown [10] also emphasizes the significance of teacher training, stating that "teachers' professional development is crucial for the successful integration of ICT in language education" [9], (p. 89). Desai [15] emphasizes the role of professional development in equipping teachers with the necessary skills for ICT integration [34]. Similarly, System highlights the importance of on-going support and resources for teachers to effectively integrate ICT into their language classrooms, Garcia and Tanaka [19] (p. 112), argue that "continuous professional developments programs are essential for ESL teachers to keep up with the ever-changing landscape of educational technology and effectively integrate ICT in their instruction". Jones et al. [27] stress the need for continuous learning and support, stating that "teachers must continuously update their skills and knowledge through professional development opportunities to effectively incorporate ICT in ESL curricula". Thompson [47], Review emphasizes the role of in process training in equipping teachers with the necessary knowledge and skills for ICT integration in language teaching [7]. Similarly, Huang & Chen [21], highlight the importance of professional development for ESL teachers to enhance their digital competence and effectively integrate ICT in their teaching.

2.3.3.2 Access and equity The accessibility and availability of ICT tools and resources can pose challenges in some educational contexts. ESL teachers need to consider the digital divide and ensure equitable access to ICT resources for all learners [31]. Inclusive strategies should be implemented to support learners with limited technological access or proficiency, ensuring they are not left behind in the digital learning landscape [50]. This literature review highlights the pivotal role of ESL teachers in ICT-based curriculum development. By actively engaging in curriculum design, implementing effective ICT integration strategies, and fostering digital literacy, ESL teachers enhance language proficiency and promote interactive learning experiences for ESL learners [23]. However, challenges related to teacher training and equitable access to ICT tools should be addressed to fully harness the potential of ICT-based curricula in ESL education [53].

3 Methodology

In order to review the existing knowledge available regarding ESL teachers' experiences while integrating ICT-Based 4Cs skills, conceptual literature review approach was adopted. Conceptual review of the available literature approach provided a method for exploring the contextual knowledge of a phenomenon including shared meaning and understanding of the words used within the context of research. Utilising on the qualitative phenomenological approach, purposive sampling was used in the study to ensure that only 5 male in-service teachers who integrate ICT-based 4Cs skills in varying settings and proficiency levels were included. Semi-structured face-to-face interviews were carried out to enable the participants to fully describe their experiences. Transcripted audio recorded results were shared with the research participants to ensure accuracy. They were given the opportunity to provide additional input or consent to include any further comments. Additionally, thematic analysis was used to identify themes and patterns in the interview transcripts. This involved organizing and reviewing the data carefully. Researchers made sure to follow ethical standards, respecting

the participants' consent and privacy throughout the process. The findings were compared with recent research, and recommendations for best practices were made regarding the use of ICT-Based 4Cs skills in ESL teaching.

3.1 Philosophical stance (ontological & epistemological stance)

The purpose of this research is to identify ESL teachers' practice and concerns in the context of a public university and also analyse their teaching methods for ICT integrated 4Cs skills. These experiences and techniques are well expounded by constructivism and interpretivism paradigms in the research. For this particular study, constructivism highlights searching for practices in teaching (ontological perspective), whereas interpretivism shed a light on teachers' practice and difficulties (epistemological perspective).

3.2 Research approach

A specific strategy for data collection, analysis, and interpretation is known as a research approach. In contrast, the research approach is basically the way a problem is looked at, including finding a viable solution to the problem. Similarly, for this particular qualitative research study, the phenomenological research approach has been selected (observe Fig. 2). In addition, a phenomenological (or qualitative) study is one that aids in the investigation of a phenomenon within a specific context by utilizing a variety of data sources and may employ a variety of lenses to disclose multiple aspects of the phenomenon.

3.3 Research design

This study aims to explore the experiences and challenges ESL teachers encounter when teaching ICT-based 4Cs skills. It involves collecting qualitative data through semi-structured interviews to address the research questions based on ESL teachers' experiences (see Fig. 3). The exploratory research design supports achieving the research objectives and answering the research questions in detail. Semi-structured interview process offered flexibility to research participants to answer in detail. Open ended questions help researchers in gathering comprehensive data that is essential to address research questions properly [16].

3.4 Research participants for this study

5 ESL teachers who are enrolled in one of the North Sindh's public universities selected to approach. Purposefully selected 5 ESL teachers have been teaching English at the graduation and master's degree levels for the past three years. They hold M. Phil and PhD degrees in English language and education. Additionally, notes were taken during the semi-structured interviews, including the recording of the interviews after seeking permission. The minimum required participant count for a phenomenological exploration is 3 to 20 [16]. However, due to data saturation, this study relied on just 5 research participants.
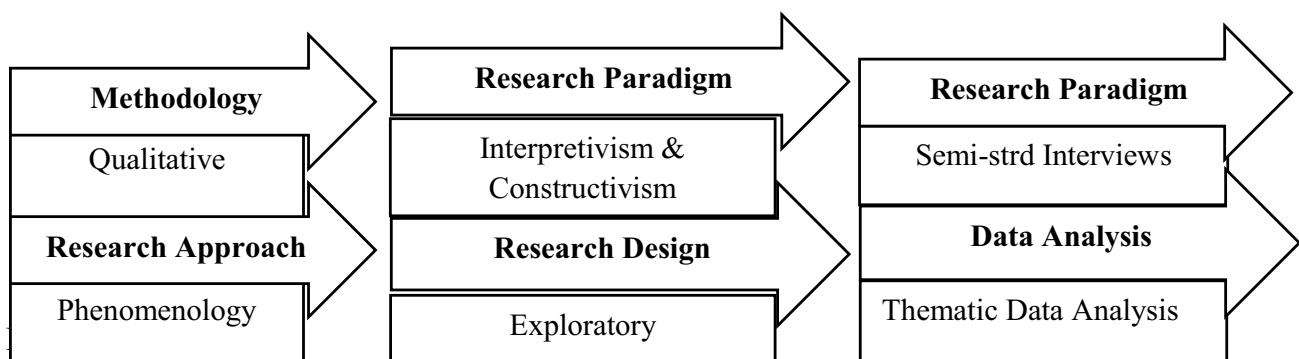

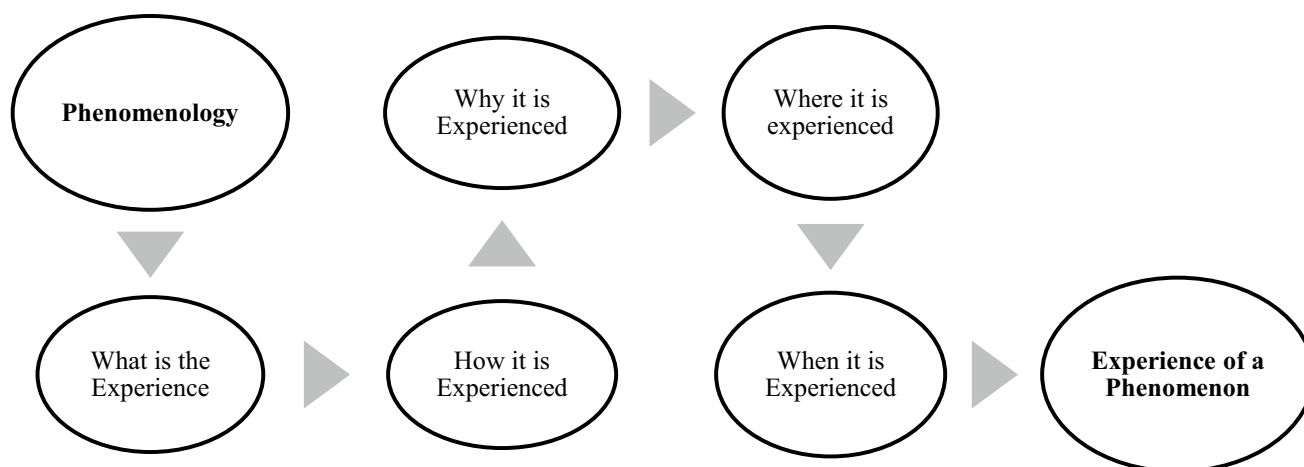**Fig. 2** Reflecting methodological framework approach

Fig. 3 Showing Phenomenological Research Design

3.5 Data collection procedure

Researchers ensured through pilot study that each participant had a clear understanding of the topic and was able to schedule a convenient time for their interview. All the Research participants were informed that they could end the interview at any time if they felt uncomfortable. Participants were assured that their information would remain anonymous and confidential, both personally and professionally. 5 one-on-one interviews took place on different days, with each participant assigned a unique code (ESLT-1 to ESLT-5) to explore the beliefs, behaviours, experiences, and phenomena of the ESL teachers. A phenomenological approach was used to describe their viewpoints. Data was gathered through semi-structured interviews, which were transcribed, analysed, and organized into themes separately by the researchers. The findings were then individually shared by researchers including developing themes and sub-themes.

3.6 Data analysis process

The data analysis was carried out in accordance with the proper procedure. Before beginning a full-scale research study, a pilot study was conducted following the creation of a semi-structured interview guide to evaluate the feasibility, dependability, reliability, and time duration. Purposively, as mentioned earlier a specific group of the 5 ESL teachers from the Department of Education of a public sector university were approached to collect data. At the subsequent stage, participants were asked to share any particular experience or a phenomenon that they feel important to share with the researcher. After successfully completing the process of data collection, the available data were transcribed and coded in order to generate major themes and subthemes for the thematic analysis of the data. To understand it further, the data collection and analysis procedure is highlighted in the following Fig. 4.

3.7 Trustworthiness & credibility

A pilot study was conducted before the full-scale research to ensure trustworthiness and credibility. Throughout the semi-structured interviewing process, including coding, transcription, data analysis, and interpretation of results, conformability, dependability, credibility, and transferability were given priority. Alam [2] emphasizes the importance of all four components of trustworthiness in qualitative research. Li and Ran [35] suggest that ensuring trustworthiness and credibility in qualitative research help maintain neutrality and minimizes bias for the researchers. To ensure the credibility, consistency, and accuracy of the data, language and content experts were consulted during the development of the semi-structured interview protocol.

3.8 Limitations & delimitations of the study

I. Limitations: Phenomenological studies are qualitative research methods that aim to explore and describe how people experience and understand a particular phenomenon. While phenomenological studies can provide rich and in-depth insights into people's experiences, there are also some limitations to this approach, including:
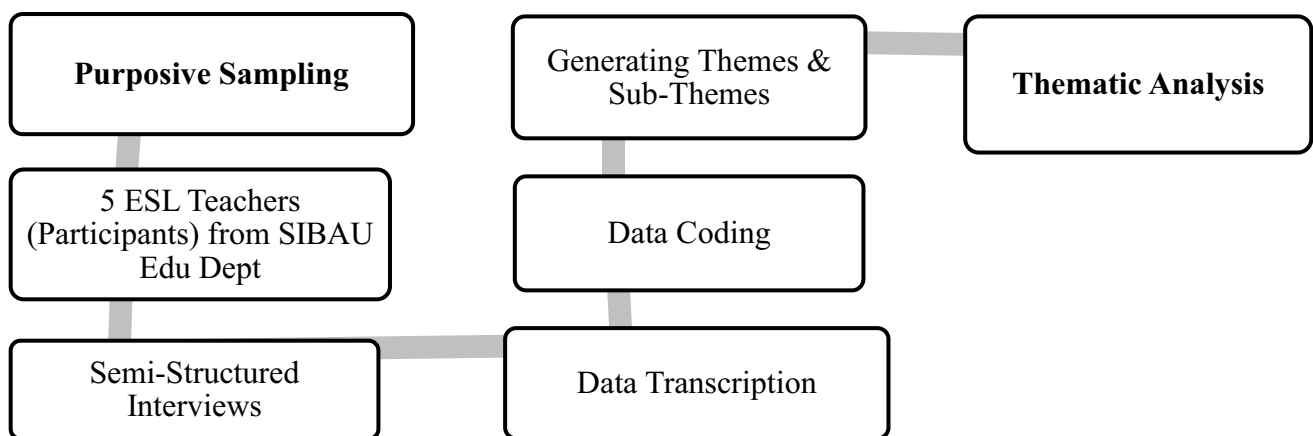
Fig. 4 Showing data analysis procedure

1. Sample size: The study may have a limited number of participants, which could limit the generalizability of the findings to a larger population of ESL teachers.
2. Geographic scope: The study may focus on a specific region or country, which may restrict the transferability of the results to other contexts or cultural settings.
3. Time constraints: The research may be limited by the available time frame, which might restrict the depth of data collection and analysis.
4. Participant bias: The participants in the study may have their own biases or preconceived notions about ICT-based 4Cs skills, which could influence their responses and potentially affect the validity of the findings.
5. Subjectivity of phenomenological research: Phenomenological studies rely on individual experiences and interpretations, which may introduce subjective bias into the analysis and interpretation of the data.

II. Delimitations: Because the primary objective of this phenomenological study is to investigate the difficulties and experiences of English as a Second Language Teachers (ESLTs) in terms of improving the quality of English language instruction through the use of ICT-based 4Cs skills, As a result, it was more feasible to prefer the qualitative method over the quantitative method so that respondents could respond more freely and in open manner through open-ended questions. Similarly, it was not possible to use the Likert scale and collect data from a large population due to the limitations of the sample size and the selection of a specific group of professionals (5 ESL teachers only).

1. Focus on ESL teachers: The study specifically targets ESL (English as a Second Language) teachers, which allows for a more focused investigation into their experiences with ICT-based 4Cs skills in the context of language education.
2. Phenomenological approach: The research is delimited to a phenomenological study design, which enables an in-depth exploration of the lived experiences and perspectives of ESL teachers regarding the integration of ICT-based 4Cs skills.
3. Emphasis on ICT-based 4Cs skills: The study concentrates on the integration of ICT (Information and Communication Technology) tools and the development of 4Cs skills (Critical Thinking, Communication, Collaboration, and Creativity) within ESL teaching, providing a clear framework for investigation.
4. Qualitative data collection: The research employs qualitative methods, such as interviews or focus groups, to gather rich and nuanced data that can provide a deeper understanding of the participants' experiences.
5. Research context: The study may specify the educational settings or institutions where the participants teach, establishing a clear context for examining the integration of ICT-based 4Cs skills in ESL education.

4 Results & analysis

After transcription and coding process, available results have been thematically. All the important themes and subthemes that emerged from the results are theme-wise analysed as under.

4.1 ESL teachers' perceptions about ICT-based 4Cs skills

For this phenomenological study, theoretical framework review method has been adapted to elucidate phenomena, create visual representations, and formulate predictions. In line with this, a semi-structured interview protocol was devised, focusing on ICT-Based 4Cs skills encompassing communication, collaboration, critical thinking, and creativity. This protocol aimed to understand how ESL teachers perceive these skills. The main theme and its sub-themes are detailed in Table 1.

4.1.1 Perceptions of ESL teachers regarding ICT-based 4Cs skills

In the realm of education, the integration of Information and Communication Technology (ICT) has catalysed a transformation in teaching and learning methodologies. One noteworthy aspect of this transformation is the emphasis on the development of the ICT-Based 4Cs skills—Communication, Collaboration, Critical Thinking, and Creativity. These skills are seen by ESL (English as a Second Language) teachers as pivotal tools for nurturing English language proficiency among their students in both general and academic contexts. Through the perspectives of five ESL teachers who participated in this research, the manifold advantages and interrelated nature of these skills in preparing students for the twenty-first century have come to light.

According to the insights provided by the ESL teachers, the foundation of the twenty-first century education landscape hinges upon the cultivation of ICT-Based 4Cs skills. ESLT-1 articulated this as, "*ICT-Based 4Cs skills are the building blocks of twenty-first century teaching and learning English as a Second Language.*" Such skills are deemed invaluable by the ESL instructors, who view them as instrumental tools that can heighten the language proficiency of their students. This sentiment is further underscored by ESLT-5, telling that; "*ICT-Based 4Cs skills are mainly developed for digital learning in the twenty-first century. Teaching English as a foreign language heavily relies on these ICT-Based 4Cs skills. These ICT-Based 4Cs skills are a demand of the market in today's global village world*". A recurrent theme across the perspectives of the ESL teachers is the interconnectedness and interdependence of the ICT-Based 4Cs skills. These skills are viewed as a collective force, with each facet relying on the others to create a comprehensive skill set. This interconnectedness is considered pivotal for ESL learners, as it equips them to navigate the challenges of the modern world. However, the ESL teachers emphasize the need for a purpose-driven approach to teaching these skills. ESLT-2 expressed that; "*being purposeful in their pedagogical strategies is essential, as it ensures the effective transmission of these skills and the achievement of desired objectives*".

4.1.2 ICT-based communication skills

ICT-Based communication skills entail the use of digital platforms for exchanging ideas, information, and knowledge through verbal and non-verbal means. ESLT-4 stated that "*I use videos, Audios, You Tube and TED talks to teach communication skills. I also use digital library, WhatsApp and Facebook facility to communicate with my students*". ESL teachers are united in their adoption of various ICT tools to enhance communication skills among their students. These tools range from IELTS and TOEFL models to digital libraries. Notably, social media and multimedia resources like videos, audios, YouTube, and TED talks are harnessed to foster effective communication.

	S. No	Main theme	Sub-themes
Table 1 Showing main & sub-themes about ESL teachers' perceptions	1	ESL teachers' perception about ICT-based 4Cs skills	ICT-based communication skills ICT-based collaboration skills ICT-based critical thinking skills d. ICT-based creativity skills

Table 2 Showing main theme & sub-themes about ESL teachers' practices

| 1 | ESL teachers' teaching experiences for ICT-based 4Cs skills | • ICT-based cooperative teaching and learning approach for ICT-based 4Cs skills in ESL teaching
• ICT-based students-centred teaching and learning approach for ICT-based 4Cs skills in ESL teaching
• ICT-based flipped classroom teaching and learning approach for ICT-based 4Cs skills in ESL teaching
• ICT-based inductive & deductive teaching and learning approach for ICT-based 4Cs skills in ESL teaching
• ICT-based inquiry-based teaching and learning approach for ICT-based 4Cs skills in ESL teaching
• ICT-based demonstrative teaching and learning approach for ICT-based 4Cs skills in ESL teaching |

4.1.3 ICT-based collaboration skills

ICT-Based collaboration refers to digitally working together towards a common goal while acknowledging individual contributions. This collaborative approach is supported by interactive digital means. ESLT-2 shared his experiences stating that "*I collaborate with my students through active pedagogy and practical approaches inside classroom*". Strategies such as group division, active pedagogy, and psychological approaches are employed to encourage interaction and cooperation. ESLT-3 shared his experiences that "*I use testifying and psychological approaches in order to improve ICT-Based collaborative skills of my students*".

4.1.4 ICT-based critical thinking skills

ICT-Based critical thinking skills play a crucial role in today's information-rich digital environment. These skills enable students to discern high-quality sources of information, solve problems, make informed decisions, and conduct digital research. ESLT-1 shared his experiences that "*I Pose prior knowledge and thought provoking questions on LMS software including using inductive & deductive teaching approaches inside my class*".

ESLT-2 described that "*I show them different video clips that are available on YouTube and create a situation for my students to think critically and share their critical views*". By stimulating critical thinking through analytical readings, inspirational videos, and interactive tasks, the ESL instructors empower students to think critically and contribute meaningfully to discussions.

4.1.5 ICT-based creativity skills

ICT-Based creativity skills go hand in hand with critical thinking skills, fostering novel ideas and innovative solutions. ESLT-4 told about his practices that "*I often assign different writing project works to my students. I also encourage creative work of my students and ask them to write anything that comes into their minds after showing them thought provoking pictures and silent videos*". These skills empower students to share, discuss, and express unique perspectives digitally.

ESLT-5 stated that "*I pose some projects on LMS and ask my students to work on them and solve them in their own way. I never restrict my students while working on those projects and give them freedom to work freely as per their own ideas*". By encouraging individuality and granting freedom, ESL teachers nurture a generation of learners capable of original and impactful contributions.

4.2 ESL teachers' teaching experiences with ICT-based 4Cs skills

Keeping in view the rapid and overnight changes of the twenty-first century teaching and learning approaches, we can't fix and limitise the process of teaching and learning to certain pedagogical methodologies only. The main theme and generated sub-themes are mentioned in the following Table 2.

4.2.1 ESL teachers' teaching experiences for ICT-based 4Cs skills

In the realm of ESL education, the integration of ICT-based approaches has transformed pedagogical practices. Instructors have ventured beyond conventional methods, experimenting with innovative strategies to foster the development of vital twenty-first century skills collectively known as the 4Cs: communication, collaboration, critical thinking, and creativity. In this regard, one of the research participants (ESLT-2) shared his experiences by telling that "*I mostly engage my students through active participation and reading strategies. I do pose prior knowledge questions and use inductive & deductive teaching and learning approaches. I practice all these four skills using a theme-based tasks strategy*".

4.2.2 Cooperative teaching and learning approach: fostering collaboration and communication

ESL educators have embraced the cooperative teaching and learning approach to nurture collaboration and diminish barriers among students. By forming small groups with varying levels of proficiency, instructors leverage diverse perspectives and learning dynamics. ESLT-1 shared his experiences that "*I make pairs among slow learner and shy students with intelligent students. This technique helps me to break the inertia and provide opportunity to shy and slow learner students*". ESLT-4 shared his approach that "*I mostly stress my students to use polite and formal language. I often tell them that slang and informal language is very common on different social media platforms. Therefore, it is important for them to differentiate between formal and informal language.*"

4.2.3 Student-centered teaching and learning approach: empowering active participation

Student-centred pedagogy has emerged as a cornerstone of modern ESL education. In stark contrast to teacher-centred practices, this approach shifts instructors from lecturers to facilitators, allowing students to actively engage and contribute. The emphasis on debates, group discussions, project work, essay competitions, and role plays cultivates a vibrant learning environment. ESL teachers leverage this strategy to empower students to express their opinions, fostering critical thinking and creativity. ESLT-4 shared his teaching strategies by telling that "*I use different teaching methods including discussion method, cooperative and student centred approaches while teaching ICT-Based 4Cs skills. When I offer students different opportunities they not only show their keen interest but also enthusiastically take part in different activities.*"

4.2.4 Flipped classroom approach: reimagining learning dynamics

The flipped classroom approach, bolstered by Learning Management Systems (LMS), has gained prominence in universities and ESL settings alike. Through this strategy, teachers provide instructional content online, allowing students to engage with it at their convenience. ESL teachers leverage this method to assign tasks, share readings, and deliver lectures through digital platforms. Notably, the COVID-19 pandemic expedited the adoption of this approach, enabling educators to seamlessly transition to virtual teaching. ESLT-1 told that "*I use theme based tasks strategy on LMS software and put certain questions that require critical thinking approach to solve them. Similarly, I often ask my students to submit different assignments through LMS software. It is user friendly and systematic software where I can easily put documents, PDF files, audios and videos.*"

4.2.5 Inductive and deductive teaching and learning approach: unveiling language patterns

Inductive and deductive teaching approaches constitute fundamental pillars in ESL instruction. These methods involve presenting general language rules and applying them to specific language scenarios, honing students' language proficiency through practice. ESLT-4 shared his practices by saying that "*I use inductive and deductive teaching approaches in order to improve critical thinking and creativity skills. What I do is that I define my topic, pose some questions and then ask my students to think critically and response logically. I also give them time and allow them to use ICT tools to find proper and accurate answers*".

4.2.6 Inquiry-based teaching and learning approach: fostering curiosity and exploration

Inquiry-based teaching transcends traditional didactic methods, encouraging students to explore topics through self-directed inquiry. By prompting students with thought-provoking questions, educators kindle curiosity and drive engagement. ESLT-2 shared his experiences that "*I always pose prior questions before starting my teaching. I enquire different thinks related to my topic just to engage my students and make them curious about the topic*". The integration of ICT tools supplements inquiry-based teaching, offering students avenues for data collection, note-taking, multimedia creation, and collaboration. The synergy between inquiry-based pedagogy and ICT magnifies learning opportunities and equips students with essential skills for the modern age.

4.2.7 Demonstrative teaching and learning approach: visualizing learning pathways

Demonstrative teaching harnesses visuals, such as videos, images, and narratives, to illustrate concepts, impart knowledge, and evoke motivation. This method employs multimedia platforms like YouTube and TED Talks to immerse students in compelling narratives and real-life anecdotes. ESLT-2 shared his practices that "*I often use demonstrative and inquiry based teaching methodology. I sometimes also use inquiry based teaching approach. I show them certain pictures and silent video clips that create a situation and then ask my students to define the message given through the picture or a video clip*". By integrating ICT-based visuals, educators invigorate their teaching, enhance comprehension, and ignite students' innate creativity.

4.3 Challenges that ESL teachers face when teaching ICT-based 4Cs skills

ESL teachers encounter several obstacles and challenges in their teaching, including limited resources and a lack of ICT-based teaching tools. One major difficulty they face is effectively instructing ESL students. ESLT-1 highlighted the communication gap between him and his students, where the "*students sometimes struggle to comprehend the intended message*". Moreover, there is a "*lack of cooperation not only among the students but also between the teacher and the students*". Additionally, "*monolingualism poses a significant challenge*". To overcome these challenges, ESLT-1 conducts research and seeks viable solutions.

ESLT-2 expressed his struggle with using ICT tools and software to teach the 4Cs skills. He faces numerous obstacles in this regard. ESLT-2 stated that "*when it comes to teaching ICT-Based 4cs skills, one thing is abundantly clear to me that I'm not good at using ICT tools and software. In this regard, I face numerous obstacles and challenges*". Regarding the instruction of ICT-based 4Cs skills, ESLT-3 emphasized that students' tendency to become distracted is a primary hurdle and challenge. He finds it "*challenging when students engage in conversations instead of paying attention during screen presentations*". ESLT-3 proposed the need for "*technical support and assistance to enable better focus on ESL students*". ESLT-4 frequently encounters challenges related to classical vocabulary and terminology. He addresses this issue by translating difficult words and providing explanations in local languages for better student understanding. ESLT-4 stated that "*as far as challenges that I face are concerned, sometimes students are unable to understand certain terms and classical words so I translate those terms into local languages for my students*". ESLT-5 finds the variations between American and British English, particularly different spellings, to be challenging. Confusion among students regarding these language differences poses a difficulty for him. ESLT-5 stated that "*I feel it is challenging for me when students get confused between American and British English and certain different spellings especially*".

4.4 ICT-related training sessions/work shops for ESL teachers

The results explore different views of all the participants (5 ESLTs). In this regard, According to ESLT-1, ESLT-3, and ESLT-4, ESL teachers should take advantage of various virtual and in-person training sessions to improve their ICT skills. ESLT-1 responded that "*I think that ESL Teachers must attend different ICT related trainings virtually and physically to improve their ICT skills*". In response to the same question, ESLT-3 replied that "*My views are positive that ESL teachers need to attend virtual seminars, training sessions and workshops in order to improve their ICT skills*". Similarly, ESLT-4 shared his views that "*I would suggest that ESL teachers must be given equal opportunities to improve their ICT-Based teaching skills by providing them different training opportunities*". They believe that every training session and workshop offers something new, including how to use the resources that are available. In a similar vein, they suggested that management organize a variety of ICT-based training sessions and workshops after consulting with ICT experts and coordinating their efforts. However, rather than relying on organizational support, ESLT-2 and ESLT-5 were of the opinion that teachers should be self-reliant and self-dependent. They also talked about their own personal experiences, saying that they not only get creative ideas for teaching English as a second language through some research on YouTube and Google Scholar, but they also take advantage of various opportunities by attending various online sessions through Facebook and TED Talks. ESLT-2 expressed his opinion and told that "*I would say that ESL teachers should be self-dependent and self-reliable instead of just waiting for various training session and workshops*". Adding into it, ESLT-5 expressed his views that "*ESL teachers should be self-dependent and self-reliant and keep searching different things that are coming every day. Today Google provides answer and solution to every sort of questions*".

5 Discussion

In today's digital age, technology has become an integral part of education. ESL teachers have started using ICT to enhance language learning and teaching. This integration of technology has led to the development of twenty-first century skills such as communication, collaboration, critical thinking, and creativity [41]. This discussion will explore ESL teachers' experiences with ICT-based 4Cs skills. ICT has enabled ESL teachers to enhance communication skills among students. Teachers use various digital tools such as video conferencing, email, and instant messaging to interact with students [45]. According to Koris [32], ESL teachers reported that video conferencing tools such as Skype and Zoom enabled them to have face-to-face interactions with students who were not physically present in the classroom. This interaction helped students improve their communication skills, as they had the opportunity to practice speaking and listening in English with native speakers. The integration of ICT in the classroom has become increasingly important in recent years, especially for the development of the 4Cs skills: communication, collaboration, critical thinking, and creativity. This is particularly true for ESL teachers, who face the challenge of not only teaching language skills but also preparing their students for the demands of the twenty-first century workforce [42]. In this discussion, we will explore the practices of ESL teachers in integrating ICT-based 4Cs skills in their classrooms.

However, there are some other useful teaching approaches as well that they should also consider. Additionally, the results and findings of a research study suggest that ESL teachers of a public sector university in North Sindh use eight different teaching technologies and methodologies, including cooperative teaching and learning approach, student-centred teaching and learning approach, project-based teaching and learning approach, flipped classroom teaching and learning approach, discussion method, inductive and deductive teaching and learning approach, inquiry-based teaching and learning approach, as well as demonstrative teaching and learning approach, to teach ICT-Based 4Cs skills to ESL learners [3]. As technology continues to advance, the use of ICT has become increasingly prevalent in classrooms. ESL teachers, in particular, are faced with the challenge of incorporating ICT-based 4Cs skills into their teaching practice. This integration can present a range of challenges for ESL teachers, including a lack of technological expertise, insufficient resources, and language barriers. One of the primary challenges that ESLTs face when integrating ICT-based 4Cs skills into their teaching is a lack of technological expertise. Many teachers may not have the necessary training or experience to effectively use technology in their classrooms. This can result in a steep learning curve as they attempt to navigate new software and hardware applications [24]. As a result, they may feel overwhelmed and unable to effectively integrate technology into their lesson plans.

Another challenge for ESL teachers is the lack of resources available to them. Many schools and educational institutions may not have the budget or infrastructure to support the use of ICT in classrooms. This can result in teachers having limited access to technology, making it difficult to incorporate ICT-based 4Cs skills into their teaching. Additionally, teachers may struggle to find appropriate resources and materials that align with their students' language proficiency levels [20]. The integration of ICT into language teaching has become an essential aspect of language education in the twenty-first century. ICT can facilitate the development of the four Cs skills, namely critical thinking, communication, collaboration, and creativity, in ESL learners [11]. However, ESL teachers must possess the necessary skills to integrate ICT into their teaching practices effectively. One way to enhance the ICT-based 4Cs skills of ESL teachers is through training seminars. These seminars can provide teachers with the opportunity to learn new teaching strategies and methods, as well as the necessary skills and knowledge to integrate ICT into their lessons [46]. Attending ICT training workshops has been found to have a positive impact on ESL teachers' ICT skills and their integration into teaching practices [49].

6 Conclusion

This phenomenological qualitative research study's primary objective was to investigate the perceptions, strategies, and challenges of a public sector University's ESL teachers regarding the teaching of ICT-Based 4Cs skills to ESL students. According to a study by Tondeur et al., [48], integrating ICT-based 4Cs skills in ESL instruction can foster creativity, critical thinking, collaboration, and communication among students. Similarly, Ali and Hashim [4] found that ICT-based 4Cs skills can help ESL teachers to create a more interactive and engaging learning environment for their students [13]. However, as noted by Abdel-[30], there are challenges associated with integrating ICT-based 4Cs skills in ESL instruction, such as inadequate technological resources and insufficient training opportunities [29]. To address these challenges, it is recommended that ESL teachers be provided with adequate technological resources and training opportunities. Additionally,

policy-makers and educational institutions should also prioritize the provision of necessary resources and support to ESL teachers to ensure the effective implementation of ICT-based 4Cs skills in ESL classrooms [28].

In conclusion, the experiences of ESL teachers regarding ICT-based 4Cs skills are crucial in enhancing the teaching and learning process. The findings of this study reveal that the integration of ICT-based 4Cs skills in ESL instruction can foster creativity, critical thinking, collaboration, and communication among students [23]. Moreover, the study also highlights the challenges faced by ESL teachers in integrating ICT-based 4Cs skills into their teaching practices, such as inadequate technological resources and insufficient training opportunities [26]. Despite these challenges, the benefits of integrating ICT-based 4Cs skills are significant and can improve student outcomes in ESL classrooms.

Declarations

Appendix

Consent Form for Participation in Research Study

Title of the Study: Exploring ESL Teachers' Experiences about ICT-BASED 4Cs Skills: A Phenomenological Study.
Researchers: Raja Bahar Khan Soomro, Dr. Rifat Abbas Khan, & Dr. Irfan Ahmed Rind.
Introduction:
You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being conducted and what your participation will involve. Please read the following information carefully and feel free to ask any questions you may have before deciding whether to participate.
Purpose of the Study:
The purpose of this study is to explore the experiences of ESL (English as a Second Language) teachers regarding the integration of Information and Communication Technology (ICT) in teaching the 4Cs skills (Communication, Collaboration, Critical Thinking, and Creativity) within the ESL classroom context.
Procedures:
If you agree to participate in this study, you will be asked to:
Participate in a one-on-one interview session.
Share your experiences, perspectives, and challenges related to integrating ICT tools to develop 4Cs skills in ESL teaching.
The interview will be audio-recorded for accuracy in data collection.
Risks and Benefits:
Participation in this study involves minimal risks. You may experience discomfort or inconvenience discussing your experiences. However, efforts will be made to ensure confidentiality and anonymity. There are no direct benefits to you

for participating in this study, but your contribution will help advance understanding in the field of ESL teaching and technology integration.

Confidentiality:

Your identity will be kept confidential throughout the study. All data collected will be stored securely and will only be accessible to the researcher. Any identifying information will be removed from transcripts, and pseudonyms will be used to refer to participants in any reports or publications resulting from the study.

Voluntary Participation:

Participation in this study is entirely voluntary. You have the right to refuse to participate or withdraw from the study at any time without penalty. Your decision whether or not to participate will not affect your current or future relationship with the researcher or any affiliated institutions.

Contact Information:

If you have any questions about the study or your participation, please feel free to contact the researcher, Raja Bahar Khan Soomro, at 03003731773 or Email: @baharkhan.mphils20@iba-suk.edu.pk.

Consent:

By agreeing to participate in this study, you acknowledge that you have read and understood the information provided in this consent form. You consent to participate voluntarily and understand that you may withdraw at any time without consequence. You also consent to the audio recording of the interview for the purpose of data collection.

Please indicate your consent by signing and dating below:

Participant's Name: _____.

Participant's Signature: _____.

Date: _____/_____/_____.

Semi-Structured Interview Protocol

Interview Date: _____ Interview Time: _____ Interview Place: _____

Topic:

ESL Teachers' Perceptions & Practices of ICT-Based 4Cs Skills; a Case Study of the Sukkur IBA University.

Study Objectives:

The main objectives of this study include:

1. To find out the perceptions of ESL teachers with regard to the use of ICT-based 4Cs skills in their teaching.
2. To explore the teaching practices of ESL teachers regarding the use of ICT-based 4Cs skills in their teaching.
3. To identify teachers' challenges they face while teaching ICT-based 4Cs skills.

Research Questions

The research questions of this study include:

I. How do ESL teachers perceive the ICT-based 4Cs skills and what are their understandings about it?
II. Which practices do ESL teachers bring into action with regard to ICT-based 4Cs skills inside classroom teaching practices?
III. What are some of the common challenges that ESL teachers are facing while teaching ICT-based 4Cs skills?

Declaration

The purpose of this semi-structured interview is strictly academic only. Similarly, this semi-structured interview aims to learn about ESL teachers' perceptions and practices about ICT-based 4Cs skills at Sukkur IBA University;s Department of Education. The interviewee's information will only be used for research purposes, and it will not be used in any other way. Participants won't be hurt in any way. Participants may withdraw from the study at any time during the data collection process. Participation in the study is voluntary. There are no any incentives for participants in this study.

I hereby declare that I have read and comprehended the purpose of this study and consent to the participation of volunteers. I hereby also let the researcher (interviewer) allow taking my interview and recording my voice (if required) for his research purpose only. I have given permission to the interviewer to conduct this interview on my wish and will.

Name & Signature: _____

Research Topic: ESL Teachers' Perceptions & Practices of ICT-Based 4Cs Skills; a Case Study of the Sukkur IBA University.

Q1: Would you like to introduce yourself in detail, including your qualifications please?

Q2: How long you have been teaching at SIBAU? Also do respond that to which levels/classes you have been teaching at SIBAU?

Q3: Now, let me begin by asking you that what do you perceive from the term ICT-Based 4Cs (Communication, Collaboration, Critical Thinking, & Creativity) skills?

Q4: How often do you practice ICT-Based 4Cs skills in your teaching techniques and methodologies?

PQ4.1: Can you explain that how do you integrate ICT-Based Communication Skills in your classroom?

PQ4.2: Kindly elaborate that how do you integrate ICT-Based Collaborative Skills in your classroom?

PQ4.3: Do explain to me that how do you integrate ICT-Based Critical Thinking Skills in your classroom?

PQ4.4: Let me know that how do you integrate ICT-Based Creativity Skills in your classroom?

PQ4.5: Which of these ICT-Based 4Cs skills do you teach quite convincingly & why?

Q5: What are your views about seminars/workshops/training sessions for ESL Teachers to improve their ICT-based 4Cs teaching skills?

PQ5.1: How often do you attend seminars/workshops/training sessions for ESL Teachers to improve their ICT-based 4Cs teaching skills?

PQ5.2: Do you think that seminars/workshops/training session for ESL Teachers to improve their ICT-based 4Cs teaching skills should be held regularly?

Q6: Would you like to elaborate that while teaching ICT-based 4Cs skills, what challenges do you face and how do you overcome them?

PQ6.1: Do you do some research to cope up the challenges that you do face while teaching ICT-based 4Cs skills?

Thank you very much for your time. I am done with my interview. Now, if you still have to say anything additional, you are welcome to share it with me.

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