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ANALYZING THE IMPACT OF INQUIRY-BASED LEARNING ON STUDENT ENGAGEMENT: A PHENOMENOLOGICAL STUDY OF ELEMENTARY SCHOOLS IN UPPER SINDH, PAKISTAN

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ABSTRACT

Inquiry-Based Learning (IBL) has emerged as a student-centered pedagogical approach that encourages active learning, curiosity, and deeper cognitive engagement, particularly in educational contexts where traditional teacher-centered instruction and rote memorization are dominant. This study aimed to analyze the impact of Inquiry-Based Learning on student engagement in elementary schools in Upper Sindh, Pakistan. Adopting a qualitative phenomenological design, the study explored the lived experiences and perceptions of both students and teachers regarding the implementation of IBL in classroom settings. Data were collected through semi-structured interviews with seventh-grade students and teachers using purposive sampling until data saturation was achieved. The collected data were transcribed, translated where necessary, and analyzed using thematic analysis to identify recurring patterns and themes.

The findings reveal that Inquiry-Based Learning significantly enhances students' behavioral, emotional, and cognitive engagement. Students reported that inquiry-based activities such as questioning, experimentation, group discussion, and problem-solving made learning more meaningful, enjoyable, and relevant to real-life contexts. The approach encouraged curiosity, independent thinking, and active participation in the learning process. Teachers also observed noticeable improvements in students' motivation, confidence, collaboration, and problem-solving abilities when inquiry-oriented strategies were incorporated into classroom instruction. Furthermore, the findings indicate that IBL promotes interdisciplinary learning, strengthens conceptual understanding, and improves knowledge retention by engaging multiple senses and learning styles.

Another important theme emerging from the study is the role of collaboration in inquiry-based classrooms. Both students and teachers highlighted that group discussions, peer interaction, and cooperative problem-solving not only enhanced academic understanding but also fostered communication skills and a supportive learning environment. In addition, teachers emphasized that IBL provides opportunities for differentiated and inclusive learning by allowing flexibility in tasks, questioning strategies, and learning pathways suited to diverse student abilities.

Despite these benefits, the study also identified several challenges in implementing IBL effectively, including limited instructional time, rigid curriculum structures, and examination-oriented educational practices. These structural constraints often limit teachers' ability to integrate inquiry-

based strategies consistently across subjects.
Overall, the study concludes that Inquiry-Based Learning has strong potential to transform classroom practices by shifting students from passive recipients of knowledge to active participants in the learning process. With appropriate teacher training, institutional support, and curriculum flexibility, IBL can significantly enhance student engagement and improve the quality of education in elementary schools in Pakistan. The study contributes to the growing body of research advocating constructivist and student-centered pedagogies and highlights the importance of context-sensitive strategies for implementing inquiry-based learning in developing educational systems.
Keywords: *Inquiry-based learning, student involvement, critical thinking, constructivist pedagogy, active learning, motivation, teamwork, differentiated instruction.*

CHAPTER ONE

1.1 Introduction

Inquiry is defined as a learning process of formulating questions and hypotheses, developing procedures to answer questions, gathering data by doing experiments or making observations, reaching a conclusion and communicating this conclusion (NRC, 2011). The inquiry starts with the students formulating an authentic research problem to seek answers to interesting ideas (Ku et al., 2014). When students are looking for answers to their research problem, they review their previous knowledge, determine which materials they will need, and generate a strategy to use (Chan, 2011). The students collect data through doing experiments, measuring and observing to test their hypothesis (Pedaste et al., 2015). The students use reasoning in order to draw a conclusion from their evidence, and creates a justification for this conclusion or revises the created justification (Zhang et al., 2015). Finally, the students communicate their conclusions with their colleagues in spoken or in written way. It is thought that inquiry, rather than progressing linearly on a straight line beginning with expressing a problem that the student is curious about and ending with the reached conclusion, has a more spiral structure in which the student advances by controlling his learning. For example, after gathering data, students can both go back in order to change the research problem and go forward in order to develop a new experimental design (Wu & Hsieh, 2006). Therefore, we think that students who are engaged in the inquiry process can change learning speeds by themselves and determine ways of learning by themselves.

Inquiry-Based Learning IBL is an educational approach that encourages students to explore, investigate, and solve problems through active learning and critical thinking (Banchi & Bell, 2008). This approach is grounded in the constructivist theory of learning, which posits that students construct knowledge through active engagement and social interaction (Vygotsky, 1978). Santrock (2001) defined IBL as a constructivist pedagogical instruction where students are provided with a chance to exercise control in their learning environment by exploring, discovering, constructing knowledge/understanding and reflecting/thinking critically. IBL has also been described as enhancing engagement, motivation, and school performance of students and cultivating critical thinking, problem and communication skills (Hmelo-Silver, 2004; Minner et al., 2010). Inquiry-Based Learning (IBL) refers to a teaching strategy that puts students firsthand in the process of exploration, investigation and learning, through hands-on experiences, critical and problem-solving (Bruner, 1966). This highlights the student-centered learning where learners are involved in developing knowledge and understanding of their own. IBL supports inquiries, curiosity, and creativity among the students and supports them to have better knowledge in the subject matter (Wiggins & McTighe, 2005). It is indicated that IBL can exert a positive effect on student learning outcomes, such as enhanced critical thinking skills, student willingness to learn and memory (Alfieri et al., 2011; Kuhn, 2007). It has been discovered that the variation in inquiry-based learning to the

conventional teaching pedagogy yielded, in association to attitude of the students towards science, much more positive gains (Aktamiş, Hinge, Ozden, 2016, p. 257). Students feel engaged and motivated and committed in their learning (Fredricks, Blumenfeld, & Paris, 2004). IBL engages students in the investigation of questioning, observing, hypothesizing and testing process so that they can form knowledge and their understanding based on their [firsthand] experience (Banchi & Bell, 2008; Hmelo-Silver, 2004). The IBL makes students explore an activity of asking questions, making observations, developing hypotheses, and testing (Banchi & Bell, 2008). IBL also promotes collaborative problem solving through exploration by the students (Minner et al., 2010). IBL encourages thinking, analysis and assessment of information (Hmelo-Silver, 2004). This is a more student-based method of learning, in which students play an active part of building their knowledge and insights by themselves. Although the literature has been accumulating around the Inquiry-Based Learning (IBL), there is still a gap in literature on how to implement the concept in Pakistani schools, and how effective the concept is in Pakistani schools. Nevertheless, there are works recommending that IBL can enhance student performance and critical thinking ability among Pakistani students (Khan, 2017; Shah, 2019). To fill this gap, the study will analyse the effects of IBL on student engagement and learning results in schools in Pakistan. This research paper is concerned with how Inquiry-Based Learning (IBL) is used in elementary schools in Sukkur, Pakistan. Particularly, the research will examine how IBL can influence the engagement and learning outcome of elementary school students in Sukkur.

1.2 Problem Statement

Inquiry based learning has great importance considering motivation of engagement by students and deep learning. Despite of the increasing awareness with regards to the relevance of student engagement in the learning process, a large number of students in the elementary schools of Pakistan still possess a low rate of engagement and motivation in the classroom. As one possible way of addressing this issue, proposing inquiry-based learning (IBL) as a way of encouraging student engagement, motivation, and deep learning is suggested due to its already recorded success in solving the problem when applied in other settings. With the help of research, it was revealed that inquiry-based learning (IBL) is able to foster student engagement and student motivation as well as deep learning of students (Hmelo-Silver, 2004; Krajcik & Blumenfeld, 2006). However, no studies have been conducted regarding the role of IBL in increasing student engagement in Pakistan in elementary schools. There are also studies that indicate the fact that IBL can enhance student outcomes and student learning and develop critical thinking skills among Pakistan students (Khan, 2017; Shah, 2019). Traditional instructional techniques adopted by most of the elementary schools in Pakistan are rote learning and teacher-centered learning, which may result in poor learning and student engagement and an inability to interpret the subject knowledge as deeply (Husain, 2018). This research paper gathers to solve this issue the effect of IBL on student engagement in elementary Schools.

1.3 Research Objectives and Questions

Research objectives	Research questions
To explore the perception of inquiry-based learning on student engagement in elementary school.	How does IBL influence student engagement in elementary schools in Sukkur, Sindh, Pakistan?
To investigate the perceptions of teachers regarding the effectiveness of inquiry-based learning in promoting student engagement.	How do teachers perceive the effectiveness of inquiry-based learning in promoting student engagement in elementary schools?
To examine the challenges of IBL in elementary schools in Sukkur, Sindh, Pakistan?	What are the lived experiences of students and teachers regarding inquiry-based Learning in elementary school?

CHAPTER TWO
Literature review

2.1 Understanding Inquiry-Based Learning (IBL)

A powerful pedagogical approach based on focusing on students, the inquiry-based learning (IBL) is increasingly gain popularity. Students actively do that by creating knowledge through asking questions, finding answers, and critical thinking. The recent study suggests that IBL is turning the routine rote learning into active interactive participation and deeper understanding (Pedaste et al., 2020). The problem is that students in IBL environments are encouraged to ask questions, investigate issues, and develop solutions, which transform them into an active knowledge co-creator as opposed to being people who simply consumed knowledge. The theoretical foundations of IBL are constructivist and social constructivist theories of learning, which rely on viewing learning as the active, contextualised process of meaning-making (Minner, Levy, & Century, 2020). As the contemporary readings emphasizing the importance of real-life situations to the cognitive and emotional activity of students become more prominent, the experiential learning ideas of Dewey remain extremely critical (Duran & Dokme, 2021). Tasdemir and Demirbag (2020) explain that modern inquiry models, including the 5E teaching model (Engage, Explore, Explain, Elaborate, and Evaluate) still offer a fixable framework that is implemented over a diverse range of students. A variety of student autonomy differentiates IBL. According to Uluyol and Şahin (2021), the transition between structured and open inquiry positively affects both motivation and self-efficacy in students as the former become more involved in the learning process.Effective facilitation is still essential, though; educators must provide scaffolds that progressively transfer responsibility to students in order to achieve a balance between guidance and autonomy (Emin & Yilmaz, 2023). Emerging research indicates that IBL significantly boosts 21st-century skills like digital literacy, collaboration, and critical thinking in addition to academic accomplishment (Yilmaz & Gül, 2022). Inquiry-based learning has become more dynamic and engaging thanks to the use of digital tools including virtual labs, online simulations, and collaborative platforms. IBL students use guided or autonomous inquiry to investigate real-world issues, create questions, and look for answers rather than merely passively absorbing information (Pedaste et al., 2019). IBL highlights that learning is most meaningful when students construct knowledge through social interactions and personal experiences, building on constructivist theories (Kim, Tan, & Talaue, 2020).

2.2 Teacher Perceptions and Roles in Inquiry-Based Classrooms

The way that teachers view IBL has a big impact on whether or not they want to use it in the classroom. Increased implementation fidelity is correlated with favourable impressions, such as considering IBL as a way to improve student motivation, engagement, and conceptual understanding (Levy et al., 2013). However, other educators remain cautious about its usefulness, particularly in environments with tight curricula, big class sizes, and high-stakes testing. According to Kang, Bryan, and Park (2008), these educators frequently view IBL as time-consuming, hard, and challenging to evaluate. The teacher's responsibilities in an IBL setting go beyond simply imparting knowledge. By asking thought-provoking questions, supporting student-led inquiry, offering scaffolded support, and promoting peer cooperation, teachers are supposed to foster an environment that is open and inquiry-rich (Hmelo-Silver, Duncan, & Chinn, 2007).

This calls for pedagogical adaptability, a thorough comprehension of the subject matter, and the ability to manage a variety of learning pathways. In order to keep inquiry focused and allow for student agency, teachers must find a balance between providing structure and granting autonomy. Notwithstanding the advantages, research points to a number of obstacles that prevent educators from embracing IBL to its fullest. According to Zion, Michalsky, and Mevarech (2005), a large number of teachers are untrained in inquiry-based pedagogy, which compromises their self-assurance and capacity to lead intricate, student-driven learning activities. Time constraints, the unavailability of institutional support, and poor access to instructional materials, complicate the successful implementation. To get out of these challenges, teachers should undergo professional development. Anderson (2002) brings to focus the idea that constant training, reflective practice as well as peer collaboration can make teachers prepared to embrace the power of IBL strategy. Inquiry-based teaching methods and principles have higher chances of being adopted when accurate professional development is accorded to the teachers. The perspectives and contribution of teachers are crucial to successful incorporation of inquiry-based learning. IBL should focus on empowering teachers using support systems or information about the curriculum, training opportunities and practice as a collaborative process in order to increase student involvement effectively in such schools as Sukkur and in elementary school. By rethinking their roles as learning facilitators, teachers may create classrooms where inquiry becomes a powerful tool for engagement and in-depth learning. The literature examines how teachers view and participate in inquiry-based learning (IBL) by drawing on a variety of academic viewpoints. Positive teacher perceptions of IBL improve its implementation fidelity, according to Levy et al. (2013), but Kang, Bryan, and Park (2008) draw attention to the difficulty's teachers have in strict and demanding learning environments. The changing role of instructors as facilitators who encourage student-led inquiry and scaffold learning experiences is further explained by Hmelo-Silver, Duncan, and Chinn (2007). To properly handle complex inquiry environments, teachers must get metacognitive and pedagogical training, according to Zion, Michalsky, and Mevarech (2005). Anderson (2002) goes on to affirm the importance of peer collaboration and ongoing professional development in changing teaching methods. When taken as a whole, these studies provide a thorough grasp of how teachers' attitudes, education, and duties in the classroom greatly affect IBL's ability to successfully engage students in meaningful learning.

2.3 Student Engagement in inquiry-based learning

Inquiry-Based Learning (IBL) is an educational process that is concerned with student-centered questioning, discovery and knowledge creation another important outcome and process. IBL also make it a point to engage the students in their own learning process, which automatically enhances the involvement on both behavioural, emotional and cognitive factors (Fredricks, Blumenfeld, & Paris, 2004). Compared to typical teacher-front teaching methods, the IBL model presents a learning environment that motivates

students to actively engage in learning through asking questions that run their curiosity and relate to their experiences. Research indicates that IBL enhances significant amounts of student participation by fostering a sense of independence, pertinence and constructive contact with the material (Prince and Felder, 2006).Students' cognitive engagement is especially enhanced when they use critical thinking, problem-solving, and analytical abilities to study real-world challenges (Hmelo-Silver, Duncan, and Chinn, 2007). This active mental involvement allows students to move beyond rote memorisation to deeper comprehension and knowledge retention. Emotional involvement rises in IBL settings because to students' sense of ownership over their enquiries. When students are given the ability to choose their own learning paths, they are more motivated, interested, and have a good attitude towards the subject (Walker 2006). Furthermore, the collaborative character of many inquiry activities promotes social engagement by allowing students to share ideas, negotiate meanings, and co-create knowledge (Barron & Darling-Hammond, 2008). However, the relationship between IBL and student participation is not predetermined; it requires careful scaffolding and instructor facilitation. Kirschner, Sweller, and Clark (2006) caution that without proper guidance, open-ended assignments might overwhelm pupils, leading to frustration and disengagement. As a result, teachers play a critical role in developing inquiry activities that balance challenge and structure while delivering prompt feedback. Empirical investigations from a variety of educational environments support these findings. For example, Pedaste et al. (2015) found that well-implemented IBL tactics increase students' persistence, attentiveness, and passion for learning. Similarly, Nasir and Iqbal (2019) discovered that in elementary classrooms, inquiry approaches promoted active involvement and fostered sustained engagement when combined with professional teacher development and supportive learning settings. The literature on student involvement in inquiry-based learning leans heavily on foundational research on engagement's behavioural, affective, and cognitive characteristics (Fredricks, Blumenfeld, & Paris, 2004).

Studies show that IBL promotes autonomy, relevance, and active connection with knowledge, hence increasing cognitive engagement through critical thinking and problem solving (Prince & Felder, 2006; Hmelo-Silver, Duncan, & Chinn, 2007). Student ownership of enquiries and collaborative learning settings leads to increased emotional and social engagement. However, the effectiveness of IBL is dependent on instructor scaffolding and support to avoid student overwhelm in open-ended assignments (Kirschner, Sweller, & Clark, 2006). Empirical research shows that well-implemented IBL techniques increase perseverance, attention, and excitement for learning in a variety of settings (Pedaste et al., 2015; Nasir & Iqbal, 2019).

2.4 Relationship Between Inquiry-Based Learning and Student Engagement

Participation among the students is a significant aspect of academic performance and life-long learning. It involves behavioural, emotive and cognitive elements that denote active and meaningful engagement in the learning process by students (Fredricks, Blumenfeld, & Paris, 2004). Inquiry-Based Learning (IBL) is a pedagogy of teaching where the students are at center stage and research is showing that this way of teaching can enhance these aspects of engagement by promoting inquisitiveness, independence, and intrinsic knowledge. IBL inspires a student to generate questions, solve problems, and construct knowledge in an active and collaborative environment. Such a method inherently promotes cognitive interaction because in cases of STEaR, a student is expected to reason, interpret evidence, and synthesise information instead of using the passively received information (Hmelo-Silver, Duncan, & Chinn, 2007).

It is also regularly empirically demonstrated that IBL increases the level of student engagement. Prince and Felder (2006) reveal that students who are engaged in an inquiry learning program are motivated, highly participate, and they achieve more academically. In a similar vein, Pedaste et al. (2015) also found

out that the students in IBL classes showed more attention, determination, and curiosity during tasks of learning since during IBL classes, the students are motivated to explore the real-life challenges, which are connected to their experience. Participation is of special significance to autonomy in IBL. The self-determination theory, put forward by Deci and Ryan (1985), is that learners feel more motivated when they feel to be independent, competent and connected. IBL environments create such conditions by promoting student choice, fostering competency through guided inquiry, and encouraging cooperation. These variables are consistent with the psychological demands that create intrinsic motivation and ongoing engagement. Furthermore, IBL has been found to close the gap between theoretical knowledge and practical application, increasing engagement through contextualised learning. Students are more likely to become invested in their education when they perceive how what they are studying applies to real-world problems (Barron and Darling-Hammond, 2008). This relevance boosts academic attention as well as long-term retention and information transfer. However, other experts warn that the usefulness of IBL in increasing engagement is dependent on proper implementation. Without enough structure or instructor support, students may feel overwhelmed, leading to disengagement (Kirschner, Sweller, & Clark, 2006).

As a result, scaffolding and effective facilitation are essential for ensuring that all students benefit from inquiry-based practices. Nasir and Iqbal (2019) found that when teachers use inquiry approaches, students participate more actively and are more interested in learning activities. However, they also emphasise the importance of professional development and institutional support in order to continue such participation. The literature on student involvement and inquiry-based learning is founded on both theoretical frameworks and empirical research. Fredricks, Blumenfeld, and Paris (2004) provide a foundational definition of student engagement across behavioral, emotional, and cognitive dimensions, while Hmelo-Silver, Duncan, and Chinn (2007) highlight how IBL fosters cognitive engagement through active learning processes. Walker (2006) supports the emotional benefits of IBL by connecting student ownership to personal relevance.

Prince and Felder (2006), together with Pedaste et al. (2015), provide empirical evidence that IBL enhances motivation, participation, and academic outcomes. Deci and Ryan (1985) use self-determination theory to explain how autonomy and competence, when promoted in IBL situations, increase intrinsic motivation. Barron and Darling-Hammond (2008) emphasise the need of connecting learning to real-world contexts to increase engagement and retention. However, Kirschner, Sweller, and Clark (2006) warn that without sufficient scaffolding, IBL might result in confusion and disengagement. Nasir and Iqbal (2019) demonstrate that while IBL increases student participation in the Pakistani context, its success is dependent on teacher preparation and institutional support.

Research supports the notion that differentiation within IBL improves inclusive education. Hume and Coll (2010) point out that inquiry approaches can be tailored to different academic levels and talents, ensuring that both high-achieving and struggling students are challenged and encouraged. Differentiating material, method, product can be done through tiered questions, alternate scaffolds or choice boards, depending on the individual needs. The methods bring about inquiry to every student, including those with unique educational needs or with language problems. Many of the issues to do with differentiation in IBL, however, are contingent on how well the teacher can plan and handle different queries. As Carolan and Guinn point out, teachers need to be adept to formative assessment and responsive education so that they are able to identify the current level of students and use it as the core of support (2007).

This requires the need to move away with the teacher-centered teaching aspect towards a facilitating and responsive aspect to the student. In inquiry classrooms teacher need to monitor student they are interacting, and giving immediate feedback and also creating an activity that does not deny most of the learning paths, and is also aligned to the curricular needs.

Although it has the potential, adoption of differentiated inquiry poses problems. According to research done by van Joolingen, et al., (2005) and Milner-Bolotin (2012), most teachers perceive being ill-equipped in classrooms with differentiated inquiries, particularly when the classrooms are big or lack sufficient resources. Lack of sufficient time to plan, professional training and access to adaptive materials typically restrict the amount of rigor and continuity in differentiated implementation of IBL. Consequently, some students might not be individually guided on achieving success through an inquiry framework.

2.5 Differentiation in Inquiry-Based Learning

Differentiation in education involves making training compatible to personalities, preferences and abilities of the individual students. Inquiry-Based Learning (IBL) specifically requires differentiation since students have many ways of exploring, questioning, and solving problems. Diverse teaching is simply encouraged by IBL as it allows pupils to follow investigations at their rate, choose subject matter of individual interest and generate meaning in a range of ways (Tomlinson, 2001). Such flexibility enables the learners having different background experiences, preparation, and learning styles to identify more with the program. Allowing a diverse range of learning profiles is one of the main advantages of IBL. Bell et al. (2010) also believe that inquiry-based environments encourage differentied learning, with the focus on student autonomy and open-ended tasks.

Hypothetically, students, as an example, can show their understandings through the development of written reports, models, presentations, or digital media, depending on their talents and interests. The multimodal approach has not only the effect of enhancing a more active engagement, but it also fosters the case of equity in learning.

Study favors the idea that IBL inclusive education is enhanced by differentiation. Hume and Coll (2010) indicate that even the methods of enquiry can be modified to suit the respective levels of the respective academic standards and abilities, giving a high-achiever and a poor student equal push and challenge. Teachers might differentiate material, the method, and the product, through a differentiated tiering of questions, different scaffold or choice boards based on individual needs. These strategies enable inquiry to be accessible to every student and even students with special learning needs or language problems. Effective difference in IBL on the other hand depends mainly on the planning skills of the teacher. Carolan and Guinn (2007) point out that in a formative assessment and responsive education approach, instructors have to be knowledgeable about to work at the students current level and adapt support to their needs. This implies the change of teacher-centered teaching to more facilitated and student responsive style. Inquiry classrooms, teachers have to monitor the interaction among learners, give feedback on time and plan activities that are flexible to take as many learning paths as possible without considering curricular demands. Acceptance of differentiated inquiry has its issues in spite of the promise. Van Joolingen et al. (2005) and Milner-Bolotin (2012) also add that the majority of teachers feel ill-equipped to deal with differentiated enquiries, especially when they have large or low resourced classrooms. Lack of planning time, training and access to adaptive materials often restrict breadth and uniformity of differentiated implementation of IBL. Consequently, certain students might not get personalised assistance that they need to succeed in an inquiry-based environment. The concept identified by Tomlinson (2001) of differentiation in

education focuses on adapting instructions to address needs of diverse students, and is also congruent with flexibility that comes with inquiry-based learning. Bell et al. (2010) claim that due to the nature of IBL environments, the diversity of learning is naturally promoted, since in this learning environment, increasing autonomy and the diversity of means of expression are promoted. Hume and Coll (2010) still would agree that inquiry approaches can be differentiated to suit the abilities of different students thus helping both the high-achievers and the disadvantaged. As stressful by Carolan and Guinn (2007), formative

evaluation and responsive teaching are highly important towards effective differentiation within IBL situations. However, van Joolingen et al. (2005) note implementation issues, citing the complexity of managing varied learning routes, and Milner-Bolotin (2012) emphasises teachers' lack of preparation and institutional support for differentiated instruction. Together, these researchers highlight both the potential and the challenges of introducing differentiation into inquiry-based pedagogies.

THEORETICAL FRAMEWORK

Constructivist and social constructivist theories, which serve as the cornerstone of inquiry-based learning (IBL), are the basis for this study. Through experiences and introspection, students actively construct their own knowledge and understanding of the world, according to Jean Piaget's constructivist theory. IBL supports this by placing students at the centre of the learning process and motivating them to investigate, pose queries, and work through problems in order to learn more. The study's foundation is strengthened by Lev Vygotsky's social constructivism. His Zone of Proximal Development (ZPD) theory places a strong emphasis on the value of social interaction and learning scaffolding. In IBL classrooms, students engage in peer discussions, collaborative group work, and guided exploration facilitated by teachers, making learning a socially mediated process. Furthermore, the Self-Determination Theory (Deci & Ryan, 1985) advances our understanding of how students are motivated and involved in this setting. According to this theory, when students' needs for autonomy, competence, and relatedness are met, their intrinsic motivation increases. By giving students options, encouraging active inquiry to build mastery, and promoting group learning, IBL naturally meets these needs. This method is aided by John Dewey's experiential learning theory. Dewey placed a strong emphasis on learning by doing, reflecting, and making connections to real-world experiences—all of which are crucial elements of IBL activities. His thesis backs up the idea that students engage in practical, reflective inquiry when they learn.

When combined, these concepts offer a strong basis for examining the ways in which IBL influences student engagement on a cognitive, emotional, and behavioural level. They support the study's focus on comprehending students' actual experiences with IBL and offer recommendations for analysing data on the effects of inquiry-based methods on students' motivation, engagement, and academic performance.

CHAPTER THREE METHODOLOGY

3.1 Philosophical Stances

It is expected of a researcher to comprehend the ontological and epistemological perspectives utilized in social research. It talks about how knowledge is expressed and made. This study takes a constructivist ontological stance because, as a researcher believe that certain objects are invented or constructed by the mind rather than simply discovered and do not exist independently of minds. Experience can aid in the formation of knowledge, which is a mental construct. I believe that social interaction produces knowledge, which is the human mind's construction. The information delivered is not fixed; rather, it is constantly being updated. New knowledge is formed as a result of individual experiences, which aids in the interpretation of particular events. When choosing a qualitative method, this ontological stance helps. Interpretive epistemology was the approach taken in this study. Since reality might be deciphered according to various points of view, everybody has an alternate perspective and sees the world in an unexpected way. The interpretivist holds the belief that it is possible to effectively comprehend the experiences, actions, attitudes, and beliefs of participants from their perspective. As a consequence of this, I have employed a qualitative approach that is based on an epistemological perspective and according to Schwandt (1997) assists in revealing the events and experiences deeper significance. In order to fully comprehend the world, one must interpret it.

3.2 Research Method

This study required the use of a qualitative

method due to its objectives, research questions, and nature. Understanding people's inherent meanings of the world is made easier by this approach. Additionally, qualitative research provides more specific and in-depth information about the subjects. As indicated by Steinberg (2004), a specialist can gather as much data as is plausible with the assistance of a meeting device. By asking open-ended, why- and how-centered questions, this information can be gathered. The nature of qualitative research necessitates the use of broad questions, which make it easier to gather comprehensive data on the participants' perspectives and experiences. In a similar vein, Elliott and Timulak (2005) suggested employing qualitative methods to describe the provided phenomena' situational complexity. Furthermore, the researcher believes that without employing the qualitative research method, it is impossible to identify the most significant and contentious aspects of the subject matter (Levy, 2006). The research focus is one of the many distinctions between the quantitative and qualitative methods of study. According to Graneheim and Lundman (2004), the qualitative research method emphasizes the research process, whereas the quantitative research method emphasizes the research results. Instead of solely concentrating on the results, a qualitative research approach was utilized so that researchers could become a part of the process and comprehend it; As a result, the research procedure is the primary focus. Hoepfl (1997) says that qualitative research lets researchers learn a lot about the people who take part in the study. In a similar vein, the qualitative approach is superior to the quantitative approach because the objective of the subject matter is to comprehend the complexity of the circumstance. This method was used to examine impact of IBL on student engagement and learning outcomes in elementary school students in Sukkur.

3.4 Research Approach

A case is an illustration of a circumstance that is thought to be a bounded system (Gay, Mills, & Airasian, 2012, (Merriam, 1998), an integrated system (Stake, 1995; Smith, 1978), or an integrated system they have perspectives on the case that are similar and have clear boundaries. Yin (2003; on the other hand, 2009) has provided a detailed definition of the case as "a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clear and the researcher has little control over the phenomenon and context," and he refers to it as a "comprehensive research study." These authors offer a variety of perspectives on the topic. It is a qualitative approach, according to Yin, in which the researcher uses comprehensive data gathered with a variety of tools to try to inquire about a single case or several cases. Lewis, 2015). Gay et al. say that (A case study is a detailed research study that tries to analyze by addressing how and why issues pertaining to the phenomenon being studied arise. This definition comes from Yin (2003) and (2009) (p. 343). (Stake, 1995) It is the study of comprehending challenges or issues faced by a single case under specific circumstances. It is a thorough and comprehensive examination of a unit with restricted limits. It very well may be a program, individual, foundation, local area, or strategy. (Merriam, 1998, 2009; Yin, 2009; Stake, 2005, p. 15). Zainal (2007) says that case studies are a type of research design that lets researchers look at data in a particular setting. It examines the geographic area of the researched setting. Additionally, the researcher must conduct in-depth data analysis for a specific location. In order to conduct a critical analysis of parental involvement and investigate the actual situation, the researcher has chosen a small sample for in-depth research.

3.5 Tools for Data Collection

Interviews that were semi-structured were used to gather data. Semi-organized interviews depend on questions that could go either way in which the scientist poses an inquiry and the member has space to respond to it exhaustively (Knott · 2022). In qualitative research, this type of interview is used (Gill · 2008). An in-depth and explicit understanding of the participant's perspectives can be gained through semi-structured interviews (McIntosh · 2015). The researchers can add additional questions based on the interviewee's responses to the semi-structured interview

(Legard, Keedan, & Ward 2003). Open-ended questions centered on why and how can be used to gather information during semi-structured interviews. According to Edwards and Holland (2013), research participants have a lot of room to respond in semi-structured interviews.

3.6 Participants of the Study

Interviews were conducted seventh-class students and Teachers until the saturation of the data. Saturation in qualitative research happens when the same subjects come up repeatedly in observations or interviews (Saunders, 2018). Researchers stop finding new themes, ideas, opinions, or patterns as they interview more and more participants. Saturation happens when talking to a growing number of people results in diminishing returns for the researchers.

3.7 Procedure for Data Collection

At the dates and locations given by the research participants, the researcher arrived at the Sukkur public school. The area where the researcher and research participants had built a relationship was where the formal conversation takes place. The following phase started after the subjects felt at ease around the researcher. The researcher informed the participants about the study's topic and purpose. Each participant had access to a permission form. They'll read the consent form carefully before signing it. The audio recorder was played in order to capture the participants' responses. The interview always started with a sincere appreciation of the participants' time. It makes it possible for participants to comprehend how they contributed to the study. In addition, the researcher requested that the interview transcription be reviewed and returned as quickly as feasible. The researcher appreciates all of the participants' availability at a particular time and their voluntary participation in this study.

3.8 Data analysis

A thematic analysis was used. The information gathered from interviews was organized and classified into major themes. However, the process of data analysis began with the transcription of interviews. Most of the interviews were fully transcribed, while others were partially transcribed based on the entire conversation. The interviews had been conducted in Sindhi and Urdu, the participants' mother tongues; however, they were translated from Urdu and Sindhi into English.

3.9 Ethical consideration

Participants' and institutes' privacy were protected in this study by not mentioning their identities. The interviews were conducted based on ethical issues, so they wouldn't impair the pupils' cognition. A welcoming environment would be provided for respondents in order to obtain correct information and responses. The background and names of the participants were taken care of by the study.

CHAPTER FOUR FINDINGS/RESULTS

The following are the themes, identified from the data.

4.1 Inquiry-Based Learning Enhances Student Curiosity and Questioning Skills

Inquiry-Based Learning (IBL) is distinguished by an emphasis on inquiry and questioning, which was reflected in both student and instructor answers. *Student (2), stated, "We get to ask questions and do things ourselves,"* implying that the IBL approach encourages her to take the initiative in her learning. Similar sentiments were echoed by a student (3) who said, "We were made to inquire how to go about using the formula and trying it out." These student thoughts show that IBL enables students to construct their personal understanding based on active questioning instead of passively receiving information. Questioning was also identified as important by teachers in IBL. Teacher (2) explained that IBL implies teaching students to become inquisitive and posing questions such as why and how, and curiously this shows that curiosity is a starting point.

Teacher (3) has added that when students pose their own questions, they are more confident and willing to learn, stressing the fact that not only providing students with the desire to learn more academic knowledge but also self-confidence. The above results are in agreement with the

constructive education theories, especially those that were emphasised by Vygotsky and Piaget, who put the importance of experiencing and asking questions in exploration and learning. By designing questions on their own, students will be more inclined to find those solutions that are personally adjusted and therefore more interested and involved in the process. The role of the teacher changes to the facilitator of learning as she uses scaffolding the enquiries of students. In addition, question asking stimulates thinking.

It is not only that students seek factual answers as they are learning how to analyze, evaluate as well as synthesize. Student (5), wrote of her experience with making a volcano model: "I did not know what would occur when we poured the baking soda and vinegar in it." This is the example of how students use hypotheses and experimentation to make conclusions regarding basic elements of scientific research. Including student (6) who stated, we wrote what we observed and questioned why they look different indicates how IBL can build interest in and a need to observe nature. These are the approaches that can be used to encourage scientific literacy at a young age. IBL promotes an environment where learning takes place where inquiry and questioning are vital. Students react enthusiastically, inventively and more cognitively aware upon the chance of exploring their ideas given to them by the teachers. The cross-stimulation of student involvement and instructor monitoring leads to a better and more sustainable learning process. In order to get the best use of inquiry-based methods, the schools are compelled to allocate adequate time and resources to employ the strategies properly.

4.2 Enhanced Student Engagement Through Enjoyment and Motivation in IBL

Another important theme that was observed during analysis of response to Inquiry-Based Learning (IBL) was student enjoyment and motivation. Students in inquiry activities reported that their learning inquiry activities was well enhanced and interesting. Student (2), remarked, "It is fun since we get to wander and find answers by ourselves. It is as though it is like a puzzle. This is one of the statements which defines how IBL turns a traditional training into something truly interesting and entertaining. As soon as students have a chance to control the learning process themselves, they are often more excited and curious. Student (1), replies with, I think it is fun to do something by ourselves. I like my questions and discussions with my group." Students are not merely consumers of information they are active controller who love the process of discovering and discussion. This kind of transition builds interest and participation in the continuation especially by younger students. Pupil motivation also increased by a great proportion as observed by teachers. Teacher observed that students get more motivated. They take greater responsibility for their own learning and rely less on their teachers." This phrase implies that IBL promotes intrinsic motivation, in which students are motivated by internal drives to learn and succeed. Teacher (4) agreed, stating, *"Even students who are usually quiet participate more when they're exploring or doing group work."* This suggests that IBL has the ability to engage a broader range of learners, including individuals who do not generally participate in traditional classroom settings. These findings are consistent with Deci and Ryan's Self-Determination Theory, which holds that motivation is increased when people feel autonomy, competence, and relatedness. IBL naturally includes all three components: students make decisions (autonomy), learn skills through problem-solving (competence), and collaborate with peers (relatedness). The end effect is a classroom climate in which students feel empowered and eager to learn. Furthermore, hands-on activities and real-life applications are frequently related with IBL, which contributes to improved satisfaction. When students can understand the significance of what they are learning, they are more likely to stay engaged. *Teacher (1) stated that class was "exciting" when they conducted exercises and answered questions, demonstrating that engagement is intimately related to the experiential character of IBL, where the idea of enjoyment and motivation is highly supported.*

4.3 Fostering Collaborative Skills Through Inquiry-Oriented Classrooms

The aspect of collaboration emerged as the key element of Inquiry-Based Learning (IBL) both through the lenses of students and teachers. Students (6) indicated that cooperative problem-solving and teamwork were quite fundamental in their learning processes. According to student (3), she said, I like to ask questions and give a conversation with my group, which showed the social and interactive aspect of IBL. Group work gives an opportunity to experience different point of view and learn something new, having different people to share and discuss possible solutions and overall provides a deeper understanding of the subject. Another reason stresses by teachers is the collaborative essence of IBL. According to teacher (3), the most essential aspects of inquiry based learning highlight the role of teamwork, teacher as a facilitator and tasks that have a real world context. This indicates why group dynamic is crucial during inquiry process. Students are urged to develop information in co-creation in these settings thereby boosting not only their learning in academic fields but also in social situations like communication, bargaining as well as empathy. According to teacher (2), even the quiet students tend to talk more when they are involved in exploration or working in groups. It implies that the presence of collaborative structure in IBL design facilitates the process of learning and makes every learner share their insights, irrespective of the degree of their confidence. This classroom democratisation works towards the creation of inclusive learning communities. This theme is supported by Zone of Proximal Development (ZPD) theory proposed by Vygotsky. In the case where they are working collaboratively, peers are in a position to assist one another in work, which they may not have the capacity to do alone, and this increases their level of learning. Students will support the comprehension of one another. Special joint actions were discussed also during student interviews. Students were able to explain a scientific experiment whereby they were supposed to form groups of students and identify what plants need in order to survive. She explained that she made the guesses, then tried them out, showing how scientific thinking involves children actively engaging in group inquiry. Such form of collaborative inquiry does not only enhance conceptual knowledge but also builds accountability and shared sense of purpose. Also, collaborative work in IBL often mimics the real-world problem-solving process, so it makes learning more realistic. Teacher (1) said, students are more responsible and do not rely on the teacher as much, which indicated that collaborative inquiry made students both independent and collaborative. Students develop skills that will be useful outside of the classroom as they collaborate to examine problems and deliver findings.

Collaboration is more than just a component of IBL; it is a driving factor that increases its effectiveness. When students participate in meaningful group activities, they improve their cognitive and interpersonal skills. Teachers function as facilitators, creating collaborative assignments and guiding group interactions to guarantee successful outputs. The findings confirm that promoting cooperation through IBL prepares students for lifelong learning and cooperative work in a variety of circumstances.

4.4 IBL Encourages Independent Thinking and Problem-Solving

Inquiry-Based Learning (IBL) creates a learning environment in which students are encouraged to think freely and solve problems via critical inquiry. Students indicated that having the opportunity to investigate and find answers on their own really improved their capacity to think for themselves. *Student (2) stated, "We asked why rain happens and watched videos to find out,"* implying that he used a variety of resources and reasoning to get answers independently. Such activities in still confidence in children to handle challenges without relying exclusively on the teacher. Teachers also confirmed the benefits of IBL. *Teacher (3) explained, "Instead of lecturing, I encourage students to think, question, and investigate."* His perspective aligns with the core philosophy of IBLshifting the responsibility of learning from teacher to student. *The teacher emphasised that IBL*

promotes "critical thinking and allows students to take ownership of their learning," a feeling shared by other educators as well. This concept is consistent with educational philosophies like Dewey's experiential learning, which holds that pupils learn best via experience and reflection. When students are given authentic challenges to tackle, they are more likely to use higher-order thinking abilities such as analysis, evaluation, and creation. *Teacher (4) described a classroom experience in which students measured classroom items and had to "figure out the area," requiring them to apply math abilities to real-life scenarios.* Problem-solving assignments provide children with a sense of accomplishment and agency. As children solve problems they develop perseverance and learn to adapt methods once initial methods are unsuccessful. An example of student who talked about how she had to grow plants in a scientific project and find out what makes them grow alive. We did our guesses and we tested them and that was what was important, the hypotheses and experimentation in scientific problem solving she said. According to the teachers, one of the best outcomes of IBL is that the pupils achieved not only independence in ideas, but also became independent in controlling their learning process. Teacher (1) observed, "They feel more engaged in the learning which makes the learning more relevant as they relate it to real life." Such connection between more abstract concepts and their real-life application enable pupils to perceive learning as something meaningful and purposeful. In addition, the students in their efforts to find a solution to difficult topics often come to the realisation that there are numerous solutions or interpretations and this makes them become more cognitively flexible. They know how to consider other positions, how to prove their thoughts, how to build their knowledge on facts. These activities are critical in long-term learning and adaptability in future schooling or workplace. IBL will help develop independent thinking skills and problems solving as the students are placed at the centre of learning. It allows individuals to probe, find answers and to construct knowledge through active engagement and it supports people in asking questions, seeking answers and constructing knowledge through engagement. The facilitators of this journey are teachers who give opportunity, advice and feedback. The resulting effect of these factors is students who are more prepared to deal with complex situations.

4.5 Fostering Integrated Learning Through Inquiry-Based Approaches

One of the most important issues highlighted by the investigation is the role of IBL in cross-disciplinary learning giving students the possibility to establish the linkages between disciplines. Inquiry-based projects often require that students use skills in multiple disciplines, instead of treating knowledge in separate compartments. This enhances learning in addition to making it more authentic and pertinent. Student (5) said that in one of her projects she monitored the growth of plants in science lab and plotted the outcome using bar graphs in maths class. She explained that in one of the science classes they did math, which demonstrates how students who study different majors realize and celebrate the intersection of fields. Similarly, Teacher (2) noted, “We used English to explain our science experiment,” indicating that IBL tasks also reinforce communication and literacy skills. Teachers reinforced this notion by creating classes that purposefully blended themes. *Teacher (2) explained, "I assigned them to produce a report on their group's scientific results.* This assisted them in both science and English. *Teacher (3) stated, "We developed a project in which students had to examine past inventions and construct small models. "They combined history, science, and arts."* These examples demonstrate how IBL activities can cross domains, enabling students to view learning as interrelated. Cross-disciplinary learning is pedagogically consistent with integrated curriculum design's holistic approaches, which encourage students to transfer information between settings. Such approaches are based on the premise that real-world situations are complicated and nuanced, necessitating the application of a diverse set of skills and understandings. Furthermore, students were

ecstatic when they realised how multiple topics helped them understand a topic better. *Student (6) stated: "We had to sketch, write, and calculate. It made the project more fascinating."* This suggests that engaging many intelligences through cross-disciplinary assignments can adapt to different learning styles while increasing overall engagement. Finally, IBL promotes cross-disciplinary learning by encouraging students to use a diverse set of abilities in relevant circumstances. This theme emphasises that integrating topic areas not only broadens student learning, but also reflects how information is applied in real-world settings. The role of teachers is important to come up with interdisciplinary tasks to relate ideas and make understanding sharper, learning more complete, dynamic, and meaningful.

4.6 Inquiry-Based Learning Enhances Comprehension and Knowledge Retention

The other significant trend, based on the results of the data, is the increase in clarity and memorization level of the students due to the intervention of the Inquiry-Based Learning (IBL). Students often reported that teachings have been easier to recall when they were participants of the learning process. According to students (2) they said that when we are carrying our experiments, I do not just read the book but I retain a lot of information meaning that practical activities enhance the cognitive linkages and help in the long-term memory. This tendency was observed by teachers as well. Teacher (3) explained it by saying that a pupil who gets answers by his or her own efforts does not easily forget them. They discuss those events for days." This supports the theory that active participation in learning activities results in stronger mental associations than passive learning. Teacher 4 continued, "Concepts stick better when students investigate and present their findings." It becomes their knowledge, not the teacher's.

These findings are consistent with cognitive learning theories, which emphasise the importance of active processing in memory retention. When students engage in problem-solving, experimentation, and reflection, they more effectively transfer information from short-term to long-term memory. *Students recalled carrying out an evaporation experiment and commented, "I still remember how we tested what dries faster,"* demonstrating how experiential learning embeds knowledge more permanently. Furthermore, integrating several senses and modalities with IBL, such as visual observation, kinaesthetic manipulation, and verbal explanation, improves memory by forming new brain connections. *Student (3) reported making diagrams of plant parts and labelling them after studying real plants, stating, "It helped me remember all of them easily."*

IBL improves pupils' comprehension and helps them retain knowledge for longer durations. Concepts become more relevant and memorable as students engage in active inquiry, multisensory experiences, and take control of their learning. Teachers can capitalise on this by creating activities that promote not only inquiry but also reflection and synthesis, resulting in deeper and more enduring learning results.

4.7 Student Engagement Strengthened Through Practical and Interactive Learning

Both students and teachers firmly agreed that hands-on and active learning practices significantly increase classroom engagement. The responses of the students showed a consistent eager theme when the students were physically engaged in learning exercises. Student (2) was enthusiastic enough to say: "It is enjoyable since we have to discover the answers ourselves." It is as though it is a puzzle. Working in an inquiry mode is full of adventure and investment by its nature, which is what his analogy exemplifies. Teachers also indicated an overall improvement of student concentration and participation in hands-on sessions of learning. Teacher (2)n continued to say, children should be focused when they take part in an experiment or a study. They are also eager to observe the outcomes since they become real scientists."

Moreover, experiential learning lets students make sense of theoretical information in the real-world contexts, as abstract concepts are brought from the hypothetical constructs to the reality.

The case of a student who was involved in a project on clean water portrayed how her group discussion and creation of posters enabled her to better comprehend what the topic entailed. According to her, she and her colleagues were asked a question, why not everybody had clean water and made posters on how to get solutions, which proves that active chores can result in their critical thinking and sympathetic empathy. Educators verified that giving students an opportunity to touch materials and control areas of their study enhances interest. The teacher said: "even the most reserved students become participatory when they are doing something as opposed to the simple listening." This transition portrays a larger pedagogical advantage: students come off the passive stage. Such opinion is evidenced by the educational psychology research results indicating that physical activity combined with cognitive stimulation leads to improvement of concentration and delightful learning. Most inquiry-based tactics often entail movement, collaboration and problem solving so they are more intriguing compared to the traditional methods of learning which is a lecture. In conclusion, practical and participatory learning is better than ever heard of in increasing engagement and developing a closer bond with the subject. Children have a desire to learn when they receive the materials and autonomy to learn, investigate, and design. This theme highlights the need to come up with inquiry activities that are interactive and student focused as a way of ensuring high degrees of interest and engagement in the classroom.

4.8 Time and Curriculum Constraints Challenge IBL Implementation

Although to them it is well known that Inquiry-Based Learning (IBL) has several good benefits, students and teachers alike noted that it is time and curricular demanding to implement Inquiry-Based Learning (IBL) effectively. This topic was the popular one in interviews with teachers because this issue was often raised: how difficult it is to complete the syllabus in such a limited period of time. Teacher (2) stated: Sometimes we would like to do other project but curriculum is too tight and the topics are to fly through. In this point of view, we have a conflict between innovative teaching and rigid academic timelines.

Educators also noted that, despite the fact that IBL encourages deep learning, the methodology can be time-consuming and this is the case in situations where pupils need extra support with inquiry skills. Teacher (4) also said that, "teaching students by making them inquire is time consuming as compared to direct teaching." Otherwise, without it they would not have any understanding." This has been a typical issue with educational practice integrating breadth of knowledge with depth of understanding. Even the students used indirect allusions to the problems concerning time. According to students (2) we do not have these fun activities every week, sometimes we have them which also means that these tactics are not used frequently but on rare occasions. This was confirmed by student, as she responded that, it is mainly inquiry projects in science we do, and not all subjects. These remarks show that certain disciplines do not incorporate IBL equivalently, often because of the time impediment. The implementation of IBL into the lesson plan without being pressured to do it appears to necessitate the changes in the educational process, which are systematic in terms of allocating time and defining the success of the educational process. These barriers can be resolved through a more accommodating framework in which IBL can be developed thoughtfully and help establish inquiry as an inseparable and long-term component of the learning process. In addition, the obligation of stress testing the child for standardized testing often forces teachers to default to rote teaching, limiting the options for inquiry that come from the students. The teacher noted, "These exam preparations make it hard for us to try new things. We must ensure that students remember the facts. This highlights a systematic problem whereby assessment practices and assessment criteria often unintentionally further entrench the practices of conventional instruction. To remedy these issues, educators need support from the educational organization in the form of flexible timetables, professional learning, and curriculum that prioritizes inquiry over merely covering the content. As teacher (1) points out, "if

we could have more flexibility with how we deliver content, IBL could be integrated into each lesson."

CHAPTER FIVE

Discussions

IBL dramatically improves student engagement. Students said they enjoyed learning activities that allowed them to ask questions, explore, experiment, and share their results with others. These findings confirm Fredricks, Blumenfeld, and Paris' (2004) three-part engagement model—behavioral, emotional, and cognitive—all of which were clearly supported in IBL contexts. Learners enhanced their participation in class, indicated enjoyment for hands-on activities, and displayed a greater knowledge of subject through exploration and problem-solving. IBL addresses not just students' academic demands but also their psychological needs for autonomy, competence, and relatedness, as outlined by Deci and Ryan's (1985) Self-Determination Theory. When students are granted latitude to pursue subjects of personal interest, encouraged by peers and scaffolded by teachers, their enthusiasm to study improves. Students' phenomenological perspectives, such as feeling like "real scientists" or defining inquiry as "solving puzzles," demonstrate genuine engagement and ownership of their learning. Teachers in IBL classrooms are more than just information transmitters; they are also facilitators, mentors, and promoters of student inquiry. Teachers in the survey noted that, while IBL requires more preparation and flexibility, it results in increased student independence and responsibility. This transition is consistent with Hmelo-Silver, Duncan, and Chinn (2007)'s finding that effective inquiry facilitation necessitates a balance of teacher guidance and student autonomy. However, numerous teachers reported that a lack of professional development and inadequate institutional support hampered their ability to consistently use IBL. This echoes the issues expressed by Zion, Michalsky, and Mevarech (2005), who emphasised the significance of metacognitive training and scaffolding skills for educators in inquiry-based classrooms. In Pakistan, where many teachers are acclimated to traditional, exam-focused teaching approaches, this transformation necessitates both a mental adjustment and structural assistance. The value of collaboration in IBL situations was emphasised by both teachers and students. Group work, peer discussions, and collective problem-solving in projects were reported as empowering opportunities to learn from each other, develop communication skills, and foster social engagement.

The findings support Vygotsky's (1978) social constructivism conclusion that cognitive development occurs through interaction with a more knowledgeable peer or adult within the learner's zone of proximal development (ZPD).

The collaborative inquiry experiences not only promote academic growth but also foster a classroom community. Hesitant or apathetic students often become more involved when working with classmates. The findings from this study provide evidence that inquiry-based learning (IBL) can act as an instrument for inclusivity allowing all students to have a voice and role in their learning progress. The student data indicated that IBL emphasizes independent critical thinking and problem-solving key skill sets for 21st-century learners. Inquiry-based learning tasks support higher-order learning as students are engaged in hypothesis testing, experimentation, and reflecting on their natural world around them. In this regard, Alfieri et al. (2011) argued these skills involve higher-order thinking and move beyond rote knowledge and understanding to more meaningful and transferable learning.

The teachers also agreed that inquiry tasks made students link their learning to real-world experiences. For example, projects in science, math, and reading supported students in recognizing the interconnectedness of their coursework. Not only does this cross-disciplinary learning support engagement, it can foster the complexities associated with real-world problem solving (Wiggins and McTighe, 2005). The other key benefit of IBL , evident to both teachers and children, was increased retention of memory and/or understanding of the concepts. It was noted that children still remember the inquiry activities more easily than other lessons from

textbooks, and sometimes refer to their past experiments and group work.

These findings support the conclusions made by Pedaste et al. (2020), who note that experience and hands-on learning generate stronger cognitive connections in students than passive learning. As noted by several studies lasting effects of memory are achieved through multisensory learning, and while seeing, doing and explaining as the modes of learning and engagement.

The studies also identified IBL emphasised differentiated learning to allow for students who varied in existing skills and learning styles. Teachers were able to match the classes to what students needed with the help of tiered questioning, group roles and graphics. These techniques related to Tomlinson's (2001) differentiation principles and provided ways for each learner to access and engage with the curriculum in a meaningful way.

Hume and Coll (2010) noted that Inquiry Based learning tasks naturally promote difference because the tasks can be differentiating or scaffold through the task. In the context of their studies, having students from various language, cultural and socio economic backgrounds it was of utmost importance to teach in diverse and inclusive classrooms.While the research presents strong evidence of the benefits of IBL, it also identifies significant barriers to the frequency and success of IBL use. The lack of lesson time as well as the curriculum rigidity with the added exam pressure were common barriers that teachers identified. These barriers aligns with Kirschner, Sweller and Clark (2006) concerns that poorly scaffolded inquiry is likely to create cognitive confusion which can lead to a decline in effectiveness.

CONCLUSION

The present research aimed to explore and analyse the impact of inquiry-based learning (IBL) on students' engagement in the context of elementary education in Sukkur, Pakistan. The research adopted a qualitative phenomenological approach to understand the lived experiences of students and teachers teaching using IBL approaches. The research was driven by the demand for a more interactive, student-centered approach to learning strategies in developing countries such as Pakistan, that principally relies on rote memory and examination techniques. The research revealed strong evidence to suggest that IBL is an innovative approach to teaching that has a significant impact on students' engagement at the cognitive, emotional, and behavioral levels. Basically, inquiry-based learning encourages students to ask questions, examine and explore issues from the real-world, and create knowledge through active inquiry. One of the important key findings of research was students in IBL classes have deeper levels of curiosity, critical thinking, and autonomy from other forms of instructional approaches. Thus, students become more engaged in the learning process and lose traditional passive learning behaviors regarding how they impart knowledge but become active learners and decision-makers through the learning process. This shift in role provides opportunity that enhances cognitive engagement challenges students to think deeply about their learning, think critically, and learn by making sense of knowledge by researching and reflecting. In terms of cognitive engagement, the findings from this research corroborate the findings of Hmelo-Silver, Duncan and Chinn (2007), which found that IBL learning supports a higher quality of cognitive engagement and conceptual understanding. Results for emotional engagement showed the same promising results as cognitive engagement. Students reported that having the flexibility to investigate areas of interest contributed to the enjoyment of learning, engagement, and personal relevance. Teacher reports of inquiry-based strategies showed a marked change in student behavior and attitude which resulted in previously quiet or indifferent students now engaging in class discussion. This aligns with Deci and Ryan's (1985) conceptual framework of Self-Determination Theory which posits that learners' motivation will increase when their primary psychological needs of autonomy, competence, and relatedness, are addressed. The format of IBL inherently addresses all three of their psychological needs through allowing ownership of learning, gaining confidence through problem solving, and

working collaboratively with other students. Behavioural engagement was another area impacted by IBL which is often reflected in student participation, effort, and persistence.

When students were given an IBL environment, they were much more likely to stay on task, share ideas, and complete activities. Based on the hands-on aspect of IBL activities, the interactive nature of investigations encouraged students to take more ownership over their learning. In a general sense, teachers reported that pupils were better in terms of reliability around classroom behavior, steady engagement during lessons, and students were almost all keen to report back their findings. This discovery is supported by Fredricks, Blumenfeld, and Paris (2004) who noted that behavioral engagement is a key piece of academic achievement and, in many cases, behavioral engagement is determined by pedagogy. A particularly interesting finding in this study was the significance of collaboration in sustaining engagement. Inquiry tasks routinely involved peer conversation, group activities, and collaborative problem-solving. One of the most positive discoveries from the study is IBL's capacity to foster inclusive and differentiated instruction. Teachers described how inquiry-based tasks could be fashioned to meet the students' varying interests, readiness, and learning styles. The study indicated IBL is beneficial for both top-performing and under-performing students through various group responsibilities, flexible timelines, and scaffolding prompts. This supports IBL as equitable and inclusive pedagogy in the classroom, aligned with Tomlinson's (2001) method of differentiation. The use of qualitative, phenomenology procedures facilitated the investigation to provide deep and multi-faceted descriptions of teachers' and students' experiences with IBL.

The participant voices provide rich evidence of how inquiry shifts attitudes, relationships, and classroom climate, in addition to academic results. These lived experiences provide evidence that students can genuinely increase engagement and interest, even in limited and poorly-resourced systems, but also contribute a meaningful context to the global body of IBL literature.

This study provides evidence that inquiry-based education is a viable instructional approach generating interest from elementary students. Not only does it increase active learning, but it cultivates curiosity, collaboration, independent thinking, and increases engagement and enjoyment in learning. The findings demonstrate the possibilities for IBL to enter the mainstream educational stream with the appropriate supports, training, and curriculum alignment, despite existing structural and systematic issues, especially in conditions like Sukkur.

Limitations of the Study

Although this study provides valuable insights into the ways that Inquiry-Based Learning (IBL) influences student involvement in Sukkur elementary schools, it is important to acknowledge a number of limitations.

The study was conducted using a qualitative phenomenological technique and focused on the lived experiences of a small sample of schools. Although this method provided richness and depth, it limited the findings' applicability to other educational systems, schools, or geographical areas. The experiences of the participants may not be representative of all teachers and students in Pakistan's greater educational system.

The data collection process made extensive use of subjective methods like observations and interviews. Students' and teachers' more positive perceptions of inquiry-based methods may have been influenced by the researcher's presence or a desire to meet perceived expectations. The interpretation of qualitative data involves the risk of researcher bias, despite efforts to maintain credibility through member checking, coding, and thematic analysis. Thirdly, the short duration of the research may have prevented a comprehensive understanding of the long-term effects of IBL on student involvement. Short-term observations may not accurately reflect changes over time because engagement is a dynamic and ever-evolving activity.

Additionally, the study omitted quantitative data that could have supported the evidence base, such as attendance logs, engagement metrics, or test results.

The ability to make statistically sound decisions about the level of IBL's effectiveness is limited by the absence of quantitative validation.

Finally, the study was carried out in a specific educational context the elementary schools in Sukkur which face structural challenges like large class sizes, limited resources, rigorous curricula, and exam-focused teaching strategies. These contextual constraints may have restricted the findings' broader applicability by influencing the application and perception of IBL.

Despite these limitations, the study establishes the foundation for further research and application in related educational contexts and offers significant new data regarding the positive impacts of inquiry-based learning on student engagement.

Recommendations

For Researchers: Study how inquiry-based learning functions in various locales to identify regional difficulties and identify practical teaching strategies that are most effective there.

For Community leaders should spearhead awareness-raising initiatives to assist communities and parents in appreciating the importance of inquiry-based and exploratory learning.

For school administrators: To help teachers improve their teaching and support one another, school administrators should schedule regular time for them to collaborate on IBL lesson planning and exchange ideas.

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