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UNVEILING THE COMPLEXITIES OF INSTRUCTIONAL LEADERSHIP IN INTERNATIONAL BACCALAUREATE MIDDLE YEAR PROGRAMME: A QUALITATIVE EXPLORATION

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Abstract:
This qualitative exploration delves into the intricate world of instructional leadership within the International Baccalaureate (IB) Middle Year Programme (MYP) in selected IB international schools in Malaysia. Through in-depth interviews and focus group discussions with Middle Year Programme Coordinators (MYPCs) and teachers, this study seeks to uncover the practices, challenges, and strategies of instructional leadership in this unique educational context. Grounded in theoretical perspectives such as the Path-Goal Theory and the model of instructional leadership, the research framework provides a comprehensive understanding of instructional leadership dynamics within IB schools. By examining the experiences and viewpoints of middle-level school leaders on instructional leadership, this study contributes to the broader discourse on educational leadership and informs the development of effective leadership strategies in IB educational settings.

Keywords: Instructional leadership, International Baccalaureate, Middle Year Programme, qualitative research, educational leadership, Malaysia, Path-Goal Theory, IB schools, leadership strategies, qualitative exploration.

Introduction

The landscape of educational leadership has evolved significantly over the years, with various leadership paradigms emerging to meet the diverse needs of educational institutions (Tan et al., 2022; Zuze & Juan, 2020). Among these paradigms, instructional leadership holds particular significance, as it directly impacts teaching and learning processes (Paletta et al., 2020; Sindhvad et al., 2022). However, within the context of International Baccalaureate (IB) schools, instructional leadership takes on a unique dimension, given the distinctive curriculum and pedagogical approaches employed in IB programmes (Cheng & Wu, 2020; Kocak & Ozdemir, 2020). This qualitative research seeks to explore the intricacies of instructional leadership within the IB Middle Year Programme (MYP), focusing on selected IB international schools in Malaysia.

Need for Exploration in the knowledge base of IB Schools

According to a growing body of research, school administrators in the twenty-first century must exhibit instructional leadership competencies (Paletta et al., 2020; Sindhvad et al., 2022; van Schaik et al., 2020). According to these academics, this is because 21st-century schools demand that kids exhibit greater levels of intellectual achievement. It's interesting to note that during the past seven years, international schools have become more and more popular in Malaysia. Therefore, in order to improve these IB schools and raise them to the standards set by the IB organisation, it is worthwhile to conduct in-depth research on the topic of instructional leadership practices at IB schools, which are among the many international schools (Cheng & Wu, 2020; Kocak & Ozdemir, 2020). Consequently, the purpose of this research is to investigate the instructional leadership of IB Coordinators who are responsible for the Middle Year curriculum's implementation at a few Malaysian IB international schools. Anyone interested in the subject topic will find it interesting to read how Middle Year Programme Coordinators at IB worldwide schools are assisting with teaching and learning during the program's implementation. By examining the experiences and viewpoints of middle-level school leaders on instructional leadership, this study will

fill a vacuum in the literature. The results of this study will add significantly to the current discussion regarding the role of instructional leadership in promoting student learning and achievement by shedding light on the opportunities and difficulties experienced by these leaders in middle-level schools.

Middle Leadership in the IB MYP: Balancing Collaboration and Decisiveness

While numerous theories depict instructional leadership as a collaborative endeavor between principals and communities (Hou et al., 2019; Liu et al., 2021), the specific context of the MYP demands more from Middle Year Programme Coordinators (MYPCs). They must not only act as collaborators but also be prepared to make decisive calls.Effective MYPCs navigate a dynamic landscape. Collaborating with principals, teachers, administrators, and other stakeholders is crucial for identifying challenges and crafting solutions (Hou et al., 2019). This teamwork enables them to tap into diverse perspectives and create a unified path towards shared goals.

However, leadership extends beyond collaboration. As Hansen & Larusdottir (2015) point out, decisive action is often necessary. This might involve tough choices regarding resource allocation or personnel changes, requiring MYPCs to navigate complex situations with clarity and conviction.Furthermore, MYPCs bear the responsibility of designing, implementing, and evaluating instructional programs and materials tailored to student needs. This multifaceted role demands a deep understanding of curriculum development, pedagogy, and assessment practices.

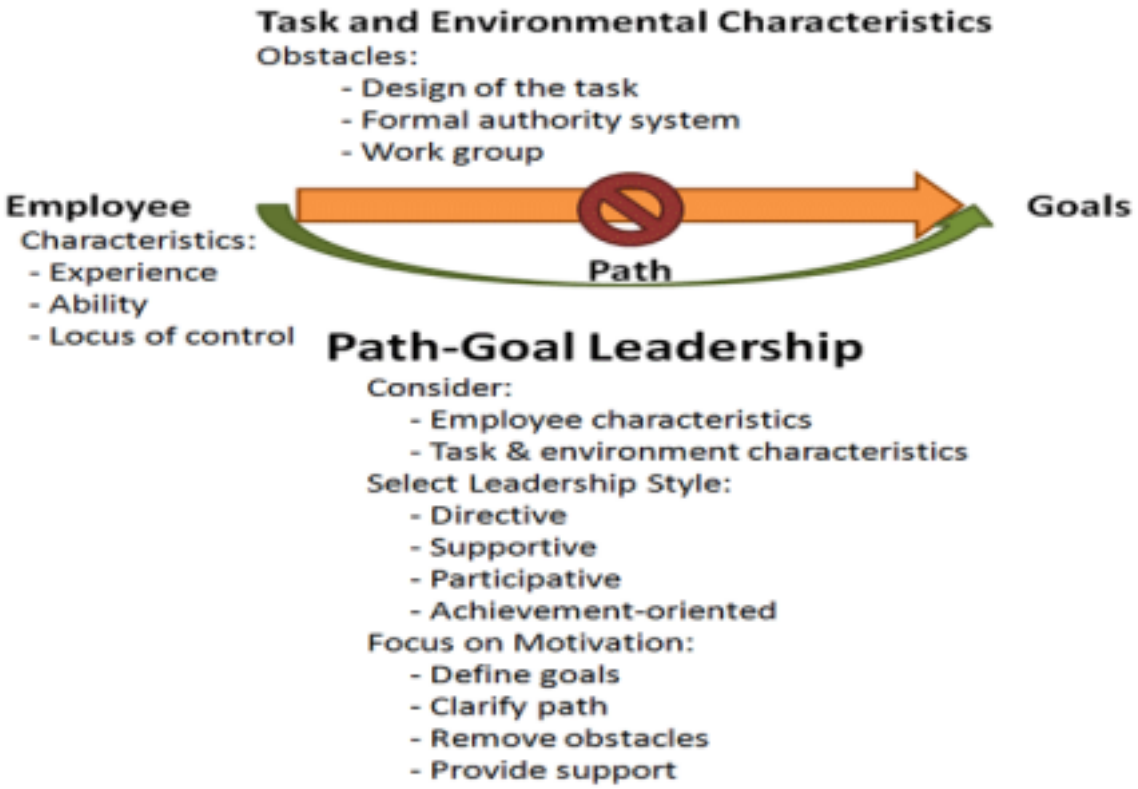
The chosen theoretical framework, House's Path-Goal Theory (1971), acknowledges the critical interaction between leaders and their subordinates. This aspect aligns perfectly with the MYPC's role of motivating and guiding teachers towards achieving shared objectives.

While the theory holds universal applicability across various disciplines (including education), as Figure 1 demonstrates, its emphasis on leader-subordinate dynamics makes it particularly relevant to the MYP context.

In essence, MYPCs operate at a unique intersection of collaboration and decisiveness. Their success hinges on fostering a collaborative environment while possessing the strength to make crucial choices, ultimately ensuring the smooth running and continuous improvement of the MYP program.

Figure 1

Model of Path-Goal Theory of Leadership (House, 1971)



Balancing Collaboration and Decisiveness: Theoretical Underpinnings

Building on the concept of navigating a dynamic landscape, the Path-Goal Theory (House, 1971) serves as the fundamental framework for this study. Its emphasis on the interaction between leaders and their subordinates aligns perfectly with the MYPC's role of guiding and motivating teachers towards shared objectives. As Figure 1 illustrates, the theory's emphasis on leader subordinate dynamics makes it particularly relevant to the MYP context.

However, the Path-Goal Theory alone doesn't fully capture the complexities of MYPC leadership. Therefore, the model of instructional leadership developed by Hallinger & Murphy (1985, 1986a) provides additional reference points. The Path-Goal Theory provides a broader lens to understand the interaction between MYPCs and teachers, focusing on motivation and goal achievement. The Hallinger & Murphy model offers a deeper dive into specific leadership practices, such as curriculum development, professional development, and assessment.

By combining these frameworks, we gain a comprehensive understanding of how MYPCs navigate the collaborative and decisive aspects of their leadership role within the IB MYP setting.Additionally, it's crucial to remember the role of theoretical frameworks in research:

They offer an analytical lens to examine complex phenomena like instructional leadership in their entirety and provide a structure for organizing research findings and connecting them to existing knowledge. Further, they serve as powerful tools for researchers and educators to improve educational practice by informing leadership strategies and

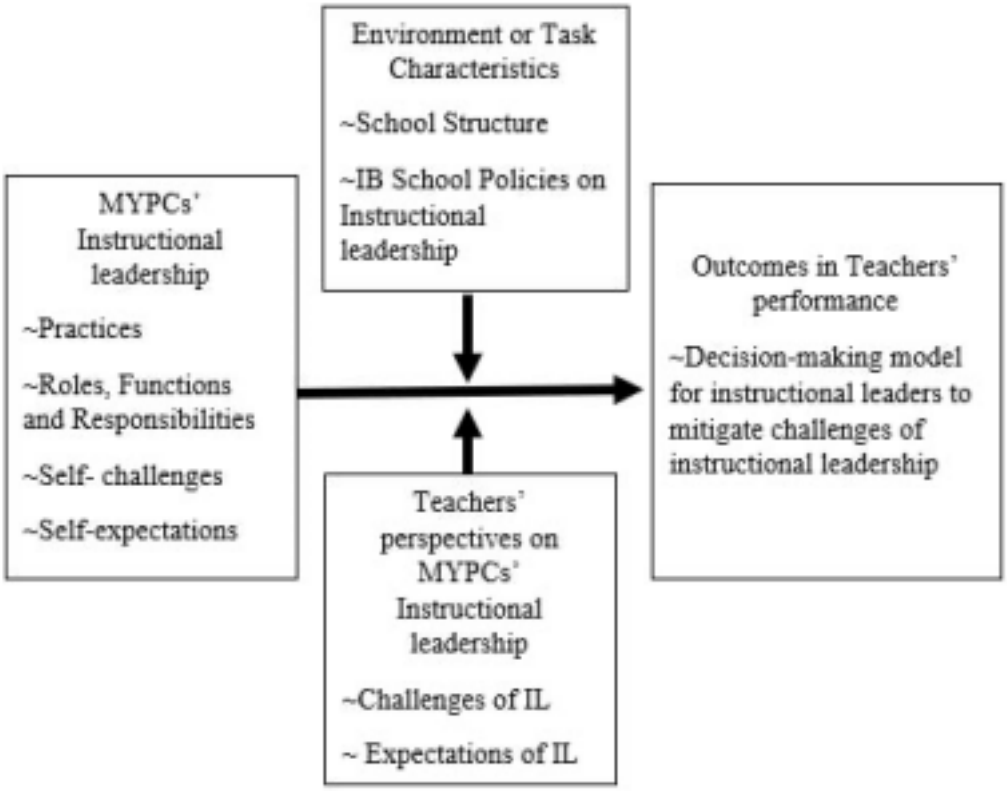
informing future research. Therefore, utilizing these frameworks is not just about applying pre-existing models, but about harnessing their power to gain deeper insights into the unique challenges and opportunities faced by MYPCs in leading their teams towards educational excellence.

Designing a Conceptual Framework

Figure 2 below shows the Conceptual framework as the result of the synthesis between the Path goal theory (Hallinger & Murphy, 1985, 1986b) model of instructional leadership and the key research questions in this study. While the conceptual framework seems to suggest that the arrow is implying the investigations into relationships between variables, the utilization of this qualitative study will only highlight how the unit of analysis is linked together to produce a contextual understanding of the future intent. Hence, it will be carried out through a qualitative study that does not include hypotheses.

Figure 2

Conceptual Framework for the study



From literature reviews, it is widely known that the concepts of instructional leadership are constantly evolving as educators learn more about strategies to improve teachers' performance (Amzat et al., 2022). In essence, the conceptual framework shows this study would investigate how MYPCs as instructional leaders can take proactive steps to:

(a) understand their practices of Instructional leadership,

(b) describe instructional leadership in the environment of IB schools,

(c) to consider teachers 'perspectives on instructional leadership; and

(d) to effectively promote teachers' performance through the designation of a decision making model.

However, the core principles remain the same for instructional leaders, such as school leaders must set the vision for the school, provide support and resources to teachers, create an environment that promotes collaboration and communication among teachers, and work with teachers to identify best practices and implement them in the classroom (Redecker, 2017). These are considered as the sidelines of findings according to the model of instructional leadership (Hallinger & Murphy, 1985, 1986b). In addition, there is a need to investigate the challenges of MYPCs as instructional leaders (Shaked & Schechter, 2017). From literature reviews, the challenges associated with instructional leadership can be divided into two main categories: organizational challenges and personal challenges. Organizational challenges include things like resistance to change from stakeholders or lack of resources (Pettigrew et al., 2001). Personal challenges might include feelings of isolation or doubt about one's abilities. For the MYPCs and teachers, overcoming these challenges starts with acknowledging the realities that are present in their IB context (Shaked & Schechter, 2017). For organizational challenges, this might involve building buy-in from key stakeholders or finding creative ways to stretch limited resources. For personal challenges, it might mean seeking out supportive relationships or professional development opportunities (Dickson et al., 2020b). Whatever the challenge, there is no single

solution. It is hoped that once this study has identified the challenges that the people and organization are facing, they can begin to develop strategies for addressing them through better decision-making (Culver et al., 2021).

As a scope of the study, the purpose of this research is to investigate the instructional leadership of IB Coordinators who are responsible for putting into practice the Middle Year Program at a selection of IB international schools located in Malaysia. To be more specific, what are their practices, challenges and strategies of instructional leadership as per the below objectives:

1. To explore the practices of instructional leadership among Middle Year Programme Coordinator from selected IB international schools

2. To explore the challenges of instructional leadership among Middle Year Program Coordinator from selected IB international schools
3. To contextualize a decision-making model for Middle Year Program Coordinators to mitigate challenges and expectations of instructional leadership among selected IB international schools

As summarized according to Figure 2 above, the proposed conceptual framework for this study provides a guide for understanding, designing, and conducting research. It includes the key areas and

propositions that define and explain MYPCs practices, challenges and strategies of instructional leadership in the context of their IB schools.

Need for Research in IB Schools

The next vital need towards the formation of a research framework is to justify the context of the investigation. As mentioned earlier in the conceptual framework, this study is descriptive and exploratory research which simply seeks to describe or articulate patterns of behaviour (Stefánsdóttir et al., 2022). In practice, the qualitative researcher strives to understand the participants' perspectives and experiences as they interact with their environment. In doing so, the qualitative researcher develops a deep understanding of the issues under study (Merriam, 1998). Hence, a case study approach will be appropriate. Case studies teach students to think critically, use their imagination, and should provide learners with real-life examples of how the real world works (Leek, 2022). Oftentimes, teacher or student groups need to work together towards a common goal, and collaborative teamwork can be developed through instructional materials such as case study videos that show different individuals working together towards a desired outcome (Fagerdal et al., 2022). By reading about how these approaches have been successfully implemented in real-world settings, educators can get a better sense of what might work in their classrooms. This may include conducting interviews with key participants, collecting data from published reports, or observing the program in action. After all of the necessary information has been gathered, the author should then begin drafting the case study. The finished product should provide readers with a clear overview of the program or approach being examined, as well as any lessons that can be

learned from its implementation. In this study, conducting a case study on instructional leadership can be a very beneficial way to improve our leadership skills. By observing and analyzing the behaviour of successful leaders,scholars can learn what works and what does not work in various situations. Additionally, case studies on instructional leadership can provide insight into the decision-making process of leaders and how they handle different challenges (Castelblanco Pérez, 2022). Alternatively, a case study may be used at different stages in the research process (Pun, 2022). Depending on which stage they are used they can help reveal gaps within service provision or help in identifying an emerging good practice which could be replicated elsewhere (Feng et al.year?). The use of case studies can also help to identify barriers and facilitators within specific settings.

Need for Research Framework in IB Schools

Selecting Context and Participants for the study

At this juncture, the research framework will be discussed. For this sample of the study, three IB private schools will be selected from three major cities located strategically in Peninsular Malaysia. They are purposely selected from Penang city (located in the northernmost major city in Malaysia), Kuala Lumpur city (a central part of Klang Valley) and Johor Bahru city (a southern major city) in Malaysia. Each school's 4 teachers will be selected for in-depth focus interviews.

It is proposed that in terms of sampling procedures, purposive sampling will be used in choosing the participants because it allows researchers to study phenomena that are not easily measured using quantitative methods

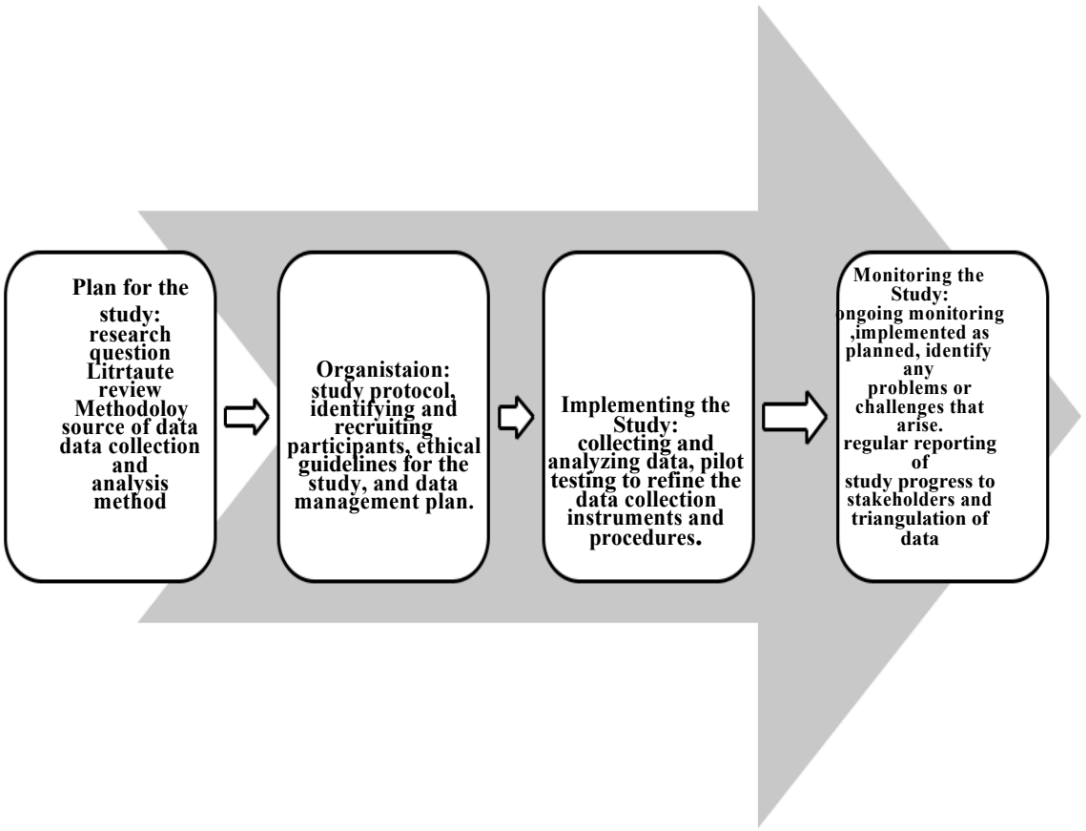
(Denieffe, 2020). This type of sampling allows researchers to select participants who are more likely to have experienced the phenomenon being studied (Audemard, 2020). In addition, this type of sampling allows researchers to select participants who are most likely to be knowledgeable about the topic being studied. However, there are also some disadvantages to purposive sampling. Firstly, because participants are not chosen at random, there is always the possibility that bias has been introduced into the sample (Jin et al., 2021). Secondly, purposive samples are often small in size, which limits their statistical power. As such, because data collected through purposive sampling is not generalizable to a wider population, this method is only suitable for exploratory research.

Data Collection Process

For data collection, interviews with participants in the study will be carried out. In qualitative research, interviews are known as a common data collection method used in qualitative research (McLellan et al., 2003). Interviews allow researchers to ask questions and probe for a deeper understanding than what might be possible through observation alone. However, interviews can be biased if not conducted properly, and they often require more time and resources than other methods such as focus groups or document analysis (Prior, 2018). In addition, conducting online interviews is an appropriate way to collect in-depth information from individuals about their experiences and opinions, especially during the Covid-19 pandemic that resulted in the Movement Control Order in Malaysia. Secondly, the researcher intends to conduct focus group interviews to triangulate from teachers' perspectives (Rabiee, 2004). This type of data collection can provide rich insights into people’s thoughts and

opinions on a given topic. However, focus groups can be expensive and time-consuming to organize, and they may not produce representative results if the group dynamics are not carefully managed. As a process, it involves bringing a group of teachers together to discuss the practices, challenges and better suggestions for instructional leadership in their schools. This can be a great way to generate ideas and get feedback on specific issues (Orvik et al., 2013). The responses of the participants will only be audio-recorded and not video-recorded due to the school's policy and the participants' consent. Finally, the audio will be transcribed for further analysis with ATLAS. ti software. Once the researcher has decided on a method of analysis and is familiar with the basic and relevant functions of the software, the researcher will start coding the data according to certain themes or categories (Denecke & Nejdl, 2009; Schwartz & Ungar, 2015). This is ultimately done by assigning codes to specific passages or segments of text within their dataset. As a methodological illustration, Figure 3 provides the process flowchart as a reference guide.

Figure 3



Proposed Research Framework

The research Framework above was modified from the works of Latham,2020 e-book "the Research Canvas".

Plan for Study: This element of the framework includes developing a clear research question, selecting an appropriate case study method, identifying potential sources of data, and determining the data collection and analysis methods that will be used.

Organizing the Study: This element of the framework includes preparing a detailed study protocol, identifying and recruiting participants, establishing ethical guidelines for the study, and developing a data management plan.

Implementing the Study: This element of the framework involves collecting

and analyzing data, using a variety of methods such as interviews, surveys, observations, and document reviews. It may also include the use of pilot testing to refine the data collection instruments and procedures.

Monitoring the Study: This element of the framework includes ongoing monitoring of the study to ensure that it is being implemented as planned, and to identify any problems or challenges that arise. It also includes regular reporting of study progress to stakeholders and conducting quality control checks on the data collected.

This framework provides a structure for conducting a case study, but the specific steps and activities involved in each element may vary depending on the specific case study and the research question being addressed. It is important to be flexible and adaptable throughout the study process to ensure that the research objectives are met.

Conclusion

This research framework is the preliminary approach to conducting a study on the practices, challenges and strategies of instructional leaders s at the IB MYP in a private education group of international IB schools. In this article, the researcher has presented some detail on each step of the technique, beginning with the background with the theoretical and conceptual framework and this is continued with the population and sampling procedure, as well as the process of data collection and analysis method.

As argued, the research framework in International Baccalaureate (IB) schools is an important field of study that has not received enough attention. Therefore, the purpose of this research is to investigate the methods used by the instructional leaders at three Peninsular Malaysian private schools that are part of the International Baccalaureate programme.

Purposive sampling, in-depth focus interviews, and focus group interviews will be used to collect information from four instructors at each school. The study's overarching goals are to frame a focused research topic, pick an acceptable case study methodology, locate relevant data sources, and establish procedures for collecting and analysing the data. The team also plans to create an ethical framework for the research, a data management strategy, and a complete study protocol.

It has also rationalized the following methodologies such as interviews, questionnaires, observations, and document reviews. As suggested, this study will also include frequent reporting of study progress to stakeholders and continuing monitoring to ensure the research is being executed as intended. As significance, this research will add to what is already known about instructional leadership in IB schools, especially in Malaysia. In addition, it will provide light on the difficulties instructors confront and the ways in which instructional leadership may be strengthened in IB schools. Looking in the future, this study is a rallying cry for researchers to delve into the importance of a research framework in IB schools and aid in the development of effective instructional leadership strategies.

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EXPLORING PEDAGOGICAL LEADERSHIP IN EDUCATIONAL CONTEXTS: A SYSTEMATIC LITERATURE REVIEW

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Abstract:
Pedagogical leadership plays a pivotal role in shaping the landscape of teaching and learning within educational institutions. This paper presents a systematic literature review spanning from 2017 to 2021, aiming to elucidate the diverse characteristics and dimensions of pedagogical leadership as delineated within international academic discourse. Drawing from reputable databases such as Web of Science (WoS), EBSCO, and SCOPUS, this study synthesizes insights from scholarly articles to provide a comprehensive understanding of pedagogical leadership. The analysis encompasses definitions, conceptual frameworks, educational challenges, study objectives, search methodologies, key findings, discussions, implications, and conclusions. The findings underscore the multifaceted nature of pedagogical leadership and its significant impact on teaching, learning, and educational outcomes. Moreover, the study highlights the need for further research to develop robust instruments for measuring and operationalizing pedagogical leadership in diverse educational settings.

Keywords:Pedagogical leadership, educational leadership, systematic literature review, teaching and learning, educational outcomes, leadership paradigms, teacher development, instructional effectiveness, professional growth, educational challenges.

Introduction

Educational leadership plays a pivotal role in shaping the landscape of teaching and learning within schools (Contreras, 2016). Despite its predominantly indirect influence, educational leadership stands as the second most significant factor impacting student learning outcomes, following classroom instruction, with particularly profound effects observed in low-performing schools (Day et al., 2009; Leithwood et al., 2004). Within the realm of educational leadership, the concept of pedagogical leadership has garnered increasing attention, primarily centered on enhancing the core activities of teaching and learning. Pedagogical leadership intersects with various dimensions of educational practice, including teacher development (Berestova et al., 2020a), teacher competency (Berestova et al., 2020a; Manuel Roca-Piloso & Anibal Alonso Betancourt, 2020), pedagogical models (Andrews & Abawi, 2017), and teacher leadership (Ho, 2010; Leithwood et al., 2004). Moreover, as scholars delve deeper into this domain, additional facets of pedagogical leadership, such as its role in fostering teacher collaboration and instructional innovation, continue to emerge (Gonzalez Fernandez et al., 2019). However, despite burgeoning scholarly interest, the concept remains somewhat nebulous, prompting ongoing efforts to elucidate its underlying principles and implications (Male & Palaiologou, 2015). Given the evolving nature of pedagogical leadership and the quest for greater conceptual clarity, this research endeavors to conduct a systematic literature review spanning the last five years, exploring diverse characteristics and dimensions of pedagogical leadership elucidated within international academic discourse.

Definition and Conceptual Framework

Pedagogical leadership, broadly defined, encompasses leadership actions aimed at facilitating the teaching and learning process within educational settings (Contreras, 2016). Within scholarly discourse, pedagogical leadership often intersects with other leadership paradigms, including instructional leadership (Moral, 2018; Stein & Nelson, 2003), distributed leadership (Jappinen & Maunonen-Eskelinen, 2012; Yang & Lim, 2020), transformational leadership (Rojas Carrasco et al., 2020), and professional learning communities (Vijayadevar et al., 2019).

At its core, pedagogical leadership merges the principles of pedagogy, which encompass the knowledge, philosophy, and practices underlying the learning process, with leadership, which involves guiding individuals or organizations towards achieving specific goals. Therefore, pedagogical leadership entails leading educators to enhance their teaching and learning practices, ultimately contributing to the delivery of quality education.

While some scholars perceive pedagogy and instruction as largely synonymous (Andrews & Abawi, 2017; Carlsson, 2021), others emphasize distinctions between the two domains. For instance, pedagogical tasks are often associated with values and norms, whereas instructional tasks focus on imparting knowledge and skills (Manuel Roca-Piloso & Anibal Alonso Betancourt, 2020; Farrell, 2017; Stein & Nelson, 2003). Additionally, pedagogical leadership is distinguished from instructional leadership, which typically involves the management of curriculum and instruction by school principals (Muli et al., 2017; Carlsson, 2021).

In practice, pedagogical leadership entails supporting classroom teachers in implementing curriculum effectively (Ho, 2010), while also assuming diverse roles and functions within educational organizations (Glickman & Burns, 2020).

Addressing Educational Challenges

One of the predominant challenges confronting the global education landscape is the need to transcend the limitations of a monolithic educational model (Rogers & Grunewald Nichele, 2020). Research focusing on cross-cultural perspectives assumes paramount importance in this regard, as it offers insights into diverse approaches adopted by nations and cultures to structure their formal education systems and attain educational excellence (Garba et al., 2015).

Furthermore, stakeholders often advocate for transformative measures within educational institutions (Gonzalez-Fernandez et al., 2020). Conventional public schooling has drawn criticism for its perceived rigidity and teacher-centric approach (Manuel Roca-Piloso & Anibal Alonso-Betancourt, 2020). School leaders face the formidable task of striking a balance between conceptual responsibilities, instructional leadership, and administrative duties (Bond & Giles, 1997; Muli et al., 2017).

Nevertheless, there remains a pressing need to conceptualize and comprehend the implications of pedagogical leadership fully. This necessitates an initial exploration of the constituents of pedagogical leadership within the existing body of knowledge and an examination of how pedagogical leadership can influence teachers' professional growth, instructional effectiveness, and ultimately, student outcomes.

Study Objective

In light of the preceding discussions, this paper aims to explore diverse scholarly articles on pedagogical leadership, with a particular focus on its pivotal role in facilitating effective teaching and learning practices. It will encompass an examination of the insights gleaned from empirical research to inform the development of a model that holds relevance within educational contexts. Consequently, the primary research question guiding this inquiry is formulated as follows:

What are the key components of pedagogical leadership as delineated in recent articles sourced from online databases such as Web of Science (WoS), EBSCO, and SCOPUS?

Search Methodology (PICO Method):

The PICO Method, recognized for its problem-based approach, was utilized for conducting a systematic literature review. PICO stands for Population, Intervention, Control, and Outcome. In this study, the Population consisted of educational journal articles published in reputable peer-reviewed databases. The Intervention focused on exploring the impact of pedagogical leadership on teaching and learning, while articles from predatory journals were excluded. The Outcome sought to identify various aspects such as the meaning, process, characteristics, and domains of pedagogical leadership. Search criteria included specific keywords, publication years (2017-2021), geographic regions, research methodologies, language (English), and availability of full text and references.

Summary of Search Results:

The search yielded results from three prominent online databases: Web of Science Core Collection (WoS), Education Research Complete @EBSCOhost, and SCOPUS. Notable journals were identified across all sources, covering diverse topics related to educational leadership and pedagogy. The publications were geographically diverse, spanning regions such as the United States, Finland, the United Kingdom, and others. The years of publication ranged from 2017 to 2021, with a significant number of articles published in 2019. The search results provided valuable insights into the current state of research on pedagogical leadership practices worldwide.

Key Findings:

Recent studies spanning from 2017 to 2021 have extensively explored the concept of pedagogical leadership (PL), emphasizing its theoretical, conceptual, and empirical dimensions. Scholars have predominantly defined pedagogical leadership as a collaborative process encompassing planning, decision-making, action, and evaluation, with the aim of defining shared goals for schools and improving access to high-quality educational opportunities for all students. This collaborative approach underscores the importance of the educational community's commitment to professional development opportunities for teachers.

Pedagogical leadership is often associated with distributed, participative, and situated types of leadership, yet there remains a lack of clear conceptualization in some studies. It is sometimes perceived as overlapping with other leadership types such as instructional, transformational, distributed, and situational leadership. Despite its elusive nature, scholars recognize the need for further exploration of the relationship and impact between leadership and pedagogy.

Analysis of 33 articles resulted in 335 codes, with a rigorous iterative coding process reducing them to 32 distinct and non-overlapping codes relevant to the research question. Inter-coder reliability tests conducted among three experts in education demonstrated substantial agreement, as

indicated by Cohen's Kappa Statistic readings ranging from 0.71 to 0.78. The selected codes were grouped into three major themes and corresponding subthemes, providing insights into the multifaceted nature of pedagogical leadership. These findings contribute to a deeper understanding of pedagogical leadership and its implications for educational practice.

Table 3: Results from Intercoder Reliability Test

Inter-coder Agreement	Cohen's Kappa Statistic	Strength of Agreement
IC1 and IC2	0.73	Substantial
IC1 and IC3	0.78	Substantial
IC2 and IC3	0.71	Substantial

Illustration of Major Themes and Subthemes

The selected codes, grouped into three major themes and subthemes, are presented in Table 4, showcasing their distribution and density across the selected articles. Each sub-category within these themes represents distinct aspects of pedagogical leadership as identified through the systematic literature review.

The analysis presented in Figures 1, 2 and 3 categorizes the emerged codes into three major themes, each encompassing sub-categories for a comprehensive understanding of pedagogical leadership:

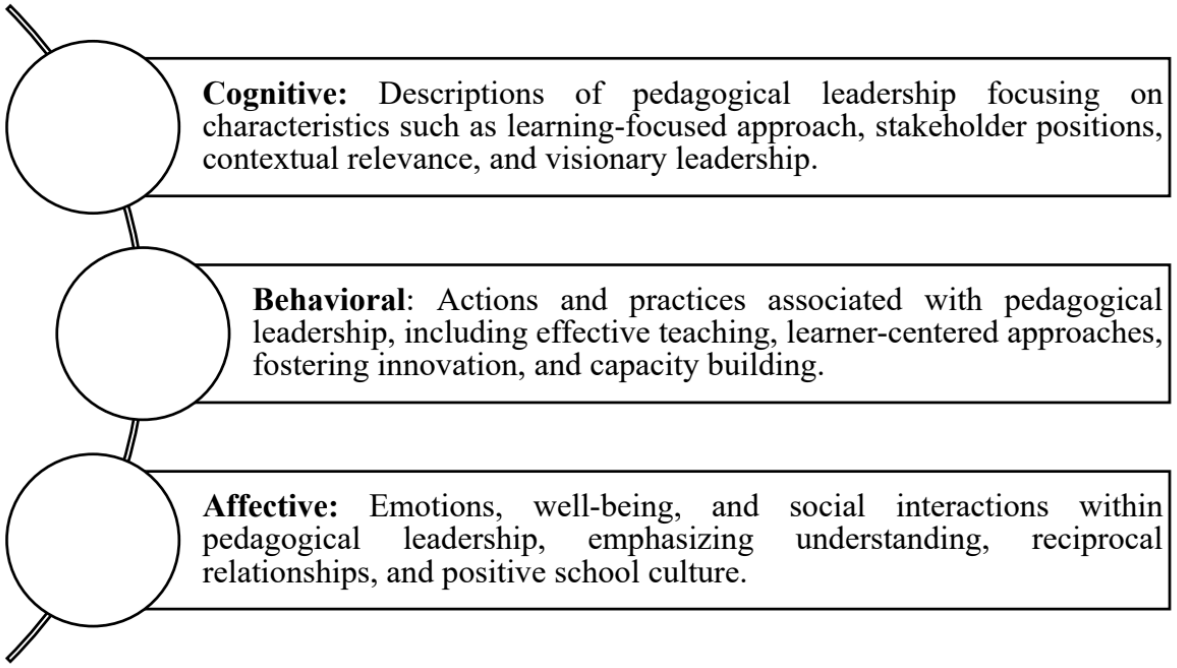
I. Characteristics of Pedagogical Leadership

Pedagogical leadership is a multidimensional strategy that is critical to the growth and success of educational institutions. This idea may be defined in three dimensions: cognitive, behavioral, and emotional. The cognitive part refers to the intellectual engagement with pedagogical leadership, emphasizing characteristics such as taking a learning-focused approach, evaluating the views of many stakeholders, retaining contextual relevance, and aiming for visionary leadership. These traits are critical for

leaders seeking to negotiate the intricacies of educational institutions and effect substantial change.

The behavioural component includes the practical activities and practices that define instructional leadership. This involves implementing effective teaching practices, adopting learner-centered approaches that address students' needs and potentials, encouraging creativity, and increasing institutional capacity. These strategies help to create an atmosphere that encourages learning and teaching excellence. Meanwhile, the affective domain addresses the emotional and social components of leadership in the educational context. It highlights the significance of promoting understanding, establishing reciprocal connections between educators and students, and creating a healthy school culture that promotes the emotional well being of all stakeholders. These characteristics constitute a complete framework for understanding and executing good educational leadership. Figure 1 summarized the key points as a diagram.

Figure 1: Characteristics of Pedagogical Leadership

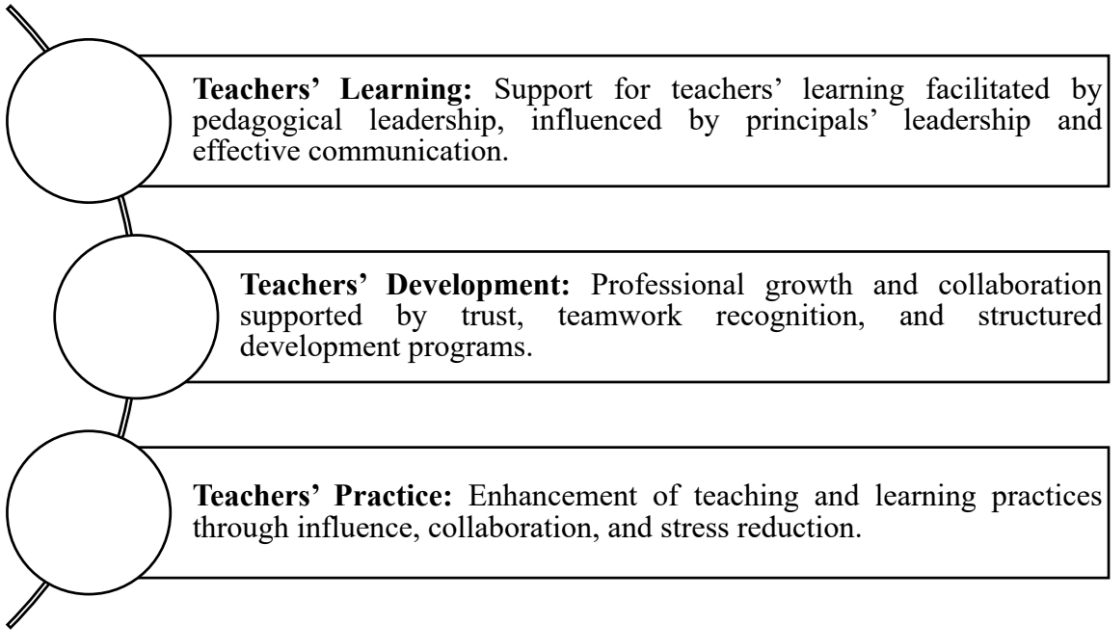


II. Enablers of Pedagogical Leadership

Pedagogical leadership is a multidimensional notion that may be viewed from a variety of perspectives, including cognitive, behavioral, and emotional dimensions. The cognitive side entails a strong emphasis on learning, with leaders prioritizing educational results and knowledge growth. Understanding and embracing stakeholder viewpoints is essential for ensuring that leadership choices and initiatives are relevant and responsive to the educational environment's particular context. Visionary leadership is also essential in this area, driving educational institutions toward forward-thinking objectives and fostering an academic excellence culture.

Pedagogical leadership may be defined as particular activities and practices that have a direct influence on teaching and learning. This involves a dedication to effective teaching approaches and a learner-centered approach that prioritizes students' needs and potential. Such leaders also play an important role in promoting innovation and creativity inside their organizations, pushing instructors and students to try new ideas and techniques. Furthermore, they concentrate on capacity development, which involves improving educators' skills and competences in order to enhance overall educational results. In the emotional dimension, pedagogical leadership stresses the significance of emotions, well-being, and social connections in the educational context. This entails cultivating understanding, empathy, and reciprocal connections among all members of the school community, resulting in a healthy and supportive school culture. This element emphasizes the importance of emotional intelligence in leadership, specifically its influence on building a supportive and motivating educational environment. The following Figure 2 summarized the key points as a diagram.

Figure 2: Enablers of Pedagogical Leadership



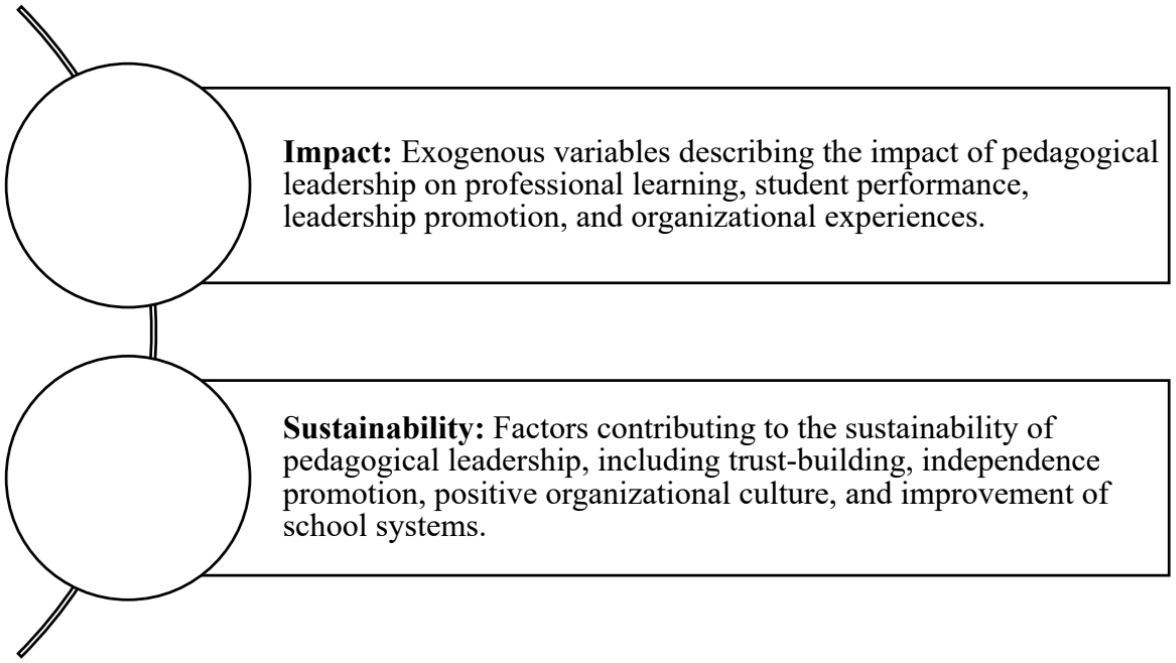
III. Impact of Pedagogical Leadership

The term of "impact" in pedagogical leadership refers to leadership's effect on numerous external aspects within an educational system. These exogenous factors include improved professional development for educators, which may lead to more effective teaching techniques and practices. Furthermore, the influence on student achievement is an important metric, typically perceived as a direct outcome of the school's teaching and leadership. This area also includes promoting staff leadership and improving overall organizational experiences, demonstrating how pedagogical leadership goes beyond immediate classroom activities to embrace larger organizational transformation and growth.

"Sustainability" in the context of pedagogical leadership refers to the factors that enable the long-term sustainability and effectiveness of leadership methods. Building trust between leaders, staff, and students is essential for establishing a climate that encourages independence and autonomy, resulting in a deeper feeling of agency among educators and learners. A healthy company culture is also important because it develops an engaged and supportive environment that promotes long-term educational achievement. Finally, constant development of school

systems guarantees that pedagogical leadership is sensitive and flexible to the changing demands of the educational environment, ensuring its long-term relevance and effectiveness.
Figure 3 summarized the key points as a diagram.

Figure 3: Impact of Pedagogical Leadership



Discussions

Analysis of studies on Pedagogical Leadership (PL) within the timeframe of 2017-2021 reveals a relatively smaller volume compared to other leadership domains such as Instructional Leadership, Distributed Leadership, and Transformational Leadership. The data presented in Figures 1, 2 and 3 underscores the emerging nature of PL within the scholarly landscape. International research highlights the significance, effectiveness, and evaluation of PL practices. However, due to its overlap with other leadership types, such as Instructional Leadership and Distributed Leadership, there is a lack of a standardized instrument for measuring PL. Particularly in Asia, literature on PL is scarce in mainstream databases, suggesting a potential need to explore regional and local databases for insights into PL terminology and concepts. Moving forward, future research might employ targeted searches using specific terms to uncover latent discussions on PL within local contexts.

Many findings underscore the importance of PL in impacting student achievement and teachers' professional development. However, there

remains ambiguity regarding the specific dimensions of PL and the lack of discriminant indicators for its measurement. While thematic analyses of reputable journal articles offer initial insights into potential indicators, further refinement and validation by field experts are necessary to develop a robust research instrument for PL. While additional steps and processes are required to operationalize this idea fully, such endeavors fall beyond the scope of this article.

Implications

The examination of Pedagogical Leadership offers valuable insights for school leaders seeking to navigate the complexities of their educational communities and enhance teaching and
learning processes. By understanding how school communities learn effectively, leaders can adapt to changing demands and foster greater autonomy, accountability, and stakeholder satisfaction within their institutions. Furthermore, studies in pedagogical leadership underscore the importance of refining strategies for implementing professional development, performance evaluation, and assessment policies across all levels of the organization.

The three identified subthemes, supported by corresponding codes as outlined in Table 3, serve as foundational domains for further exploration and development. It's essential to recognize that while this study adopts a deductive approach rooted in theoretical triangulations, it does not fully encompass the contextual nuances and practical considerations present in educational settings. Nonetheless, these findings offer valuable guidance for the design and validation of future instruments aimed at measuring pedagogical leadership, particularly in terms of content, face, and factor analysis.

For researchers, this study opens avenues for conceptualizing instruments that delve deeper into the domains of Characteristics, Enablers, and Impact of pedagogical leadership. Moving forward, there is a clear need for quantitative explorations aimed at identifying measurable and observable indicators that can provide a comprehensive understanding of pedagogical leadership. Such endeavors will contribute to advancing scholarly discourse and facilitating evidence-based practices in educational leadership.

Conclusions

Pedagogical leadership emerges as a multifaceted and intricate social process, demanding adaptability, creativity, and community engagement. Effective pedagogical leadership is a continuous journey characterized by ongoing learning, practical application, meaningful interactions, and thoughtful reflections. This article serves as a theoretical compass, offering insights gleaned from a synthesis of existing knowledge on the constituents of pedagogical leadership.

External stakeholders, including parents, government bodies, and private sectors, exert significant influence on the strategic and operational decisions of educational institutions. Concurrently, school leaders wield considerable responsibility in guiding teaching and learning initiatives through pedagogical leadership practices. Their roles encompass supervision, development, and assessment of educators within the unique cultural and contextual framework of their schools.

Despite the evolving landscape of education marked by increasing complexity, autonomy, and accountability, pedagogical leaders must navigate these dynamics adeptly. They must cultivate a collaborative community of leaders capable of shaping the quality of education and driving positive change within their institutions. Given the diverse interpretations of pedagogical leadership, it becomes evident that there is no singular model or approach. Instead, pedagogical leadership demands attributes such as patience, confidence, creativity, and a clear vision for both students and educators. Leaders bear the responsibility of fostering a supportive and empowering environment, where mutual respect and collaboration thrive, transcending traditional power dynamics.

In essence, pedagogical leadership necessitates not only authority but also empathy, understanding, and a commitment to collective goals. By embodying these principles, leaders
can inspire and empower their teams to achieve excellence in teaching, learning, and overall educational outcomes.

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ENHANCING PEDAGOGICAL LEADERSHIP IN MALAYSIAN IB SCHOOLS: A CONTEXTUAL MODEL EVALUATION

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Abstract

Pedagogical leadership has emerged as a vital concept in contemporary educational discourse, intersecting with various leadership paradigms. In Malaysia, significant investments have been made in education reform, particularly highlighted in the Malaysian Education Blueprint (2013-2025), emphasizing access, quality, equity, unity, and efficiency. Amidst this backdrop, pedagogical leaders are increasingly recognized as strategic enablers of educational advancement and professionalism among teachers. However, while pedagogical leadership frameworks are abundant in Western contexts, their application and understanding in Malaysian IB schools remain limited. This paper presents a critical evaluation of a conceptual model of pedagogical leadership within a private Malaysian IB school, derived from a holistic case study approach. Through thematic analysis, the model's components were refined, incorporating Eastern philosophy to align with the school's ethos and needs. The evaluation, based on focus group discussions, highlights both positive perceptions and limitations of the model, emphasizing the dynamic nature of leadership and its context-specific

application. The findings underscore the need for continual refinement and contextualization of pedagogical leadership models in diverse educational settings.

Keywords: Pedagogical leadership, Malaysian IB schools, Conceptual model evaluation, Contextualization, Focus group discussions.

Introduction

Pedagogical leadership, a burgeoning concept within contemporary educational discourse, is increasingly acknowledged for its evolution and intersection with various leadership paradigms such as transformational, instructional, and distributed leadership (Male & Palaiologou, 2015; Rojas Carrasco et al., 2020; Ghavifekr et al., 2019; Yang & Lim, 2020). In Malaysia, the government's substantial allocation of approximately 15.6 percent from RM50.4 billion in the 2021 budget reflects a commitment to education reform (Normah, 2020). The Malaysian Education Blueprint (2013-2025) articulates a vision aimed at enhancing the education system's access, quality, equity, unity, and efficiency. Within this framework, recent research underscores the pivotal role of pedagogical leaders as strategic drivers facilitating teachers' professionalism and educational progress (Leo, 2015; Muli et al., 2017). Additionally, pedagogical leaders are instrumental in enhancing effectiveness and efficiency within school communities, as highlighted in studies by Dwivedi, Chaturvedi & Vashist (2020) and Heikka et al. (2019a, 2019b). The imperative for pedagogical leaders of the 21st century lies in their ability to cultivate relevant skills and adopt forward-thinking mindsets, thereby enabling school transformations from mediocrity to excellence (Greenhill, 2010).

Background

The concept of pedagogical leadership, as recognized by scholars, entails individuals' efforts to facilitate school transformation through various means such as teacher training, pedagogical practices, collaborative group work, and professional development initiatives (Male & Palaiologou, 2017; Fonsén & Ukkonen-Mikkola, 2019). Central to pedagogical leadership is the cultivation of a positive school culture marked by ongoing enhancements in academic pursuits and organizational processes, ultimately leading to improved teacher and student outcomes (Bøe & Hognestad, 2017). The absence of pedagogical leadership results in organizations operating solely through repetitive management processes, which fail to address present and future challenges crucial for their survival and success (Bush &

Glower, 2016; Peng et al., 2016). This importance is underscored in

numerous national education policies (Gento Palacios et al., 2020).

Moreover, while recent scholarly focus on pedagogical leadership has predominantly originated from Western perspectives (Male & Palaiologou, 2015, 2017; Bøe & Hognestad, 2017; Leo, 2015; Fonsén & Ukkonen-Mikkola, 2019), the understanding of pedagogical leadership in Malaysia remains in its nascent stage (Rahman et al., 2017; Samad et al., 2017). This lack of emphasis may obscure the significance of pedagogical leadership amidst the broader discourse on instructional, distributed, transformational leadership, and professional learning communities (Safiek, 2020; Rasidi et al., 2020; Sabri & Baba, 2017; Balachandran & Mohammad, 2021), thus highlighting a gap necessitating further research to deepen comprehension and application of pedagogical leadership in the Malaysian context.

Furthermore, building upon a comprehensive case study conducted in a private Malaysian International Baccalaureate (IB) School, the final phase of the research endeavors to assess a contextually grounded model derived from thematic analysis of preceding inquiries. The development of this research-based contextual model of pedagogical leadership aims to empower pedagogical leaders in addressing organizational challenges related to teaching and learning by providing a structured framework for decision-making and action-taking. Understanding the genesis and components of this model is essential for readers to grasp its implications within the Malaysian IB Education landscape.

Explanation of the Pedagogical Leadership Model in the Context of Malaysian IB Education Provider

The initial conception of this model, stemming from earlier phases of study, aimed to elucidate and bolster understanding of pedagogical leadership within the school's leadership community. Functionally, it serves to enhance the school's standard operating procedures and supplements its existing pedagogical leadership framework endorsed by the International Baccalaureate Organization (IBO). Additionally, it enables the school community to anticipate areas for pedagogical

leadership development and cultivate a sustainable pool of future leaders. Initial data analysis, derived from interviews with the school's pedagogical leaders regarding their strategies, challenges, and suggestions for mitigating leadership obstacles, yielded a prototype model of pedagogical leadership. Transcripts were categorized into four overarching themes: (a) Becoming (the qualities a pedagogical leader should
embody), (b) Doing (the actions a pedagogical leader should undertake), (c) Achieving and Evaluating (the goals and assessment criteria for pedagogical leadership), and (d) Reflecting for Tomorrow (the forward-thinking considerations for pedagogical leadership).

Figure 1: *The four themes emerged on Pedagogical Leaders in the Malaysian IB Education Group*

Subsequent data analysis refined the model, aligning it with four key themes depicted in Figure 2: (a) Competency and Dedication (derived from 'Becoming'), (b) Delivery and Implementation (derived from 'Doing'), (c) Performance and Development (derived from 'Achieving & Evaluating'), and (d) Growth and Sustainability (derived from 'Reflecting for Tomorrow'). Each quadrant, represented within a circle,

symbolizes the cyclical nature of pedagogical leadership, transitioning either clockwise or counterclockwise based on situational needs. Adjacent to each quadrant are code groups extracted from participant transcripts, organized to support the respective quadrant.

Furthermore, insights from reflective journal entries, interviews with the school chairman and senior pedagogical leaders, prompted the integration of Eastern philosophy, particularly Confucian teachings, into the model. This unique fusion aimed to cater to pedagogical leaders within the Mandarin Language Department. Aligning the four quadrants of the Pedagogical Leadership Model with Confucius's philosophy yielded congruence in nature and function: (a) Individual level (aligned with Self-cultivation in Confucian teaching), (b) Departmental level (aligned with Family in Confucian teaching), (c) School level (aligned with Nation Governing in Confucian teaching), and (d) Global level (aligned with Global Peace in Confucian teaching). This integration underscores the dynamic and unique nature of leadership as a journey, emphasizing continuous change and development across three dimensions. Additionally, insights from existing IB guidelines and handbooks for pedagogical leaders were integrated into each quadrant, gleaned through document analysis conducted in earlier research phases.

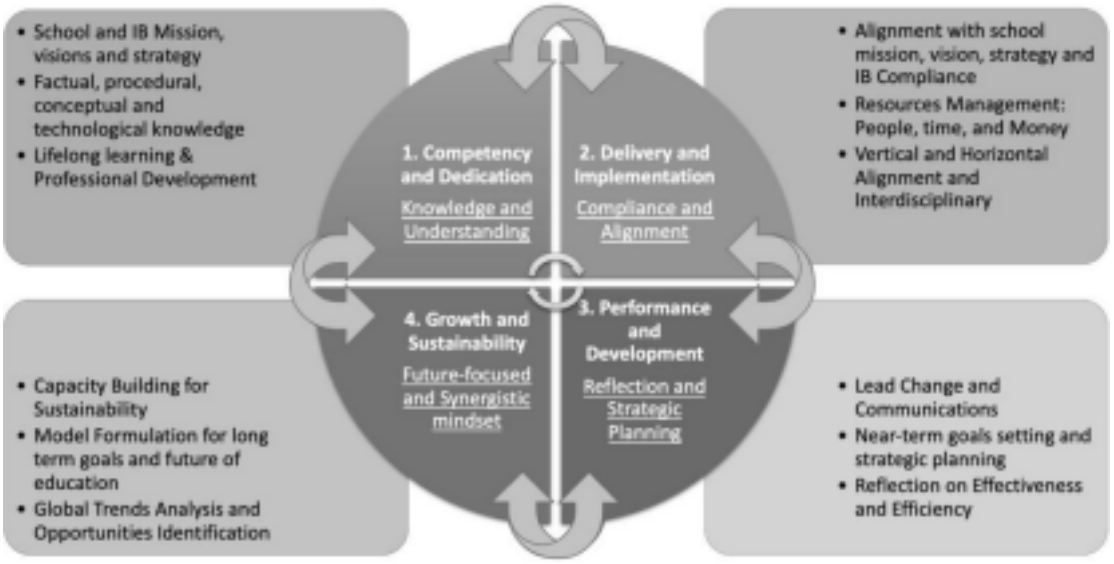

Figure 2: *The Enhanced Model of Pedagogical Leadership*

The below is based on the standards and implementation within the pedagogical leadership Model

Criterion for Quadrant 1 (Competency and Dedication)

This criterion, depicted in Figure 3, outlines the standards for Quadrant 1 of the Pedagogical Leadership Model, focusing on Competency and Dedication. Educational Leader (Pemimpin Pendidikan) 2021, Volume 9, Page 58 provides a detailed explanation of the criteria set forth within this quadrant, emphasizing the essential qualities and commitments required of pedagogical leaders.

Criterion for Quadrant 2 (Delivery and Implementation)

Figure 4 illustrates the criteria established for Quadrant 2, which pertains to Delivery and Implementation within the Pedagogical Leadership Model. This section, as detailed in Educational Leader (Pemimpin Pendidikan) 2021, Volume 9, Page 59, delineates the

expectations and strategies concerning the execution and enactment of pedagogical leadership responsibilities.

Criterion for Quadrant 3 (Performance and Development)

Quadrant 3, addressing Performance and Development, is expounded upon in Figure 5. Educational Leader (Pemimpin Pendidikan) 2021, Volume 9, Page 60 provides an in depth examination of the criteria encompassed within this quadrant, highlighting the measures and considerations for assessing performance and fostering professional growth.

Criterion for Quadrant 4 (Growth and Sustainability)

Figure 6 presents the criteria for Quadrant 4, focusing on Growth and Sustainability within the Pedagogical Leadership Model.

Novice	Practitioner	Mastery
i. able to understand School Mission, Visions, Strategy and IB Mission, Visions, Programme Standards and Practices, Requirements for Authorization and Evaluation	i. able to describe School Mission, Visions, Strategy and IB Mission, Visions, Programme Standards and Practices, Requirements for Authorization and Evaluation by giving multiple examples	i. able to explain School Mission, Visions, Strategy and IB Mission, Visions, Programme Standards and Practices, Requirements for Authorization and Evaluation by giving extensive examples and making connections in a global context
ii: able to outline limited pedagogical leadership related factual, procedural, conceptual and technological knowledge and limited ability to transfer the knowledge and understanding across different situations	ii. able to discuss substantial understanding about pedagogical leadership related factual, procedural, conceptual and technological knowledge by giving multiple examples and able to transfer the knowledge and understanding across different situations	ii. able to interpret pedagogical leadership related factual, procedural, conceptual and technological knowledge with extensive examples and able to effectively transfer the knowledge and understanding across different situations
iii: able to demonstrate limited commitment on lifelong learning through a range of professional development trainings and action research	iii: able to show higher commitment on lifelong learning through active participation in a range of professional development trainings and action research	iii: able to prioritise commitment on lifelong learning through continuously participating and conducting a range of professional development trainings and action research

Figure 3: *Criterion for Quadrant 1 (Competency and Dedication)*

Novice	Practitioner	Mastery
i. able to deliver and implement the programme in compliance with IB philosophy, Mission, Visions, Programme Standards and Practices, IB Requirements for Authorization and Evaluation and aligned with School Mission, Visions and Strategy **with a lot of guidance from the IB and School**	i. able to deliver and implement the programme in compliance with IB philosophy, Mission, Visions, Programme Standards and Practices, IB Requirements for Authorization and Evaluation and aligned with School Mission, Visions and Strategy **confidently and independently**	i. able to deliver and implement the programme **beyond the expectations** of compliance with IB philosophy, Mission, Visions, Programme Standards and Practices, IB Requirements for Authorization and Evaluation and aligned with School Mission, Visions and Strategy
ii. able to apply **very limited** pedagogical leadership strategies, skills and knowledge for effective management of resources: people, time and money	ii. able to apply and explain **substantial** pedagogical leadership strategies, skills and knowledge for effective management of resources: people, time and money	ii. able to apply and justify **extensive** pedagogical leadership strategies, skills and knowledge for effective management of resources: people, time and money in a **holistic and interconnected approach**
iii. able to outline **partial** vertical and horizontal alignment and **limited** interdisciplinary connections among pedagogical leaders across different departments and grade levels	iii. able to create vertical and horizontal alignment and interdisciplinary connections among pedagogical leaders across different departments and grade levels	iii. able to evaluate and improve vertical and horizontal alignment and **enhance meaningful** interdisciplinary **connections and engagements** among pedagogical leaders across different departments and grade levels

Figure 4: *Criterion for Quadrant 2 (Delivery and Implementation)*

Novice	Practitioner	Mastery
i. able to reflect the effectiveness and efficiency of the **limited** pedagogical leadership practices from a **department or programme perspective** in relation to school performance and development from various stakeholders	i. able to reflect **confidently and independently** on the effectiveness and efficiency of the pedagogical leadership practices from a **school perspective** in relation to school performance and development from various stakeholders	i. able to reflect **critically and creatively** on the effectiveness and efficiency of the pedagogical leadership practices from a **global perspective** in relation to school performance and development from various stakeholders
ii. able to describe near-term goals and outline action plans **lack of clarify and focus** for school performance and development	ii. able to explain near-term goals and strategise action plans for school performance and development	ii. able to prioritise near-term goals and strategise **impactful, realistic, achievable and time-framed** action plans for school performance and development **in line with global development**
iii: able to initiate **limited** change at **department or programme level** with a lot of **support and guidance from school** and communicate among stakeholders	iii: able to lead change **confidently and independently at school level** and communicate **effectively** among stakeholders	iii: able to lead change **beyond school level** and communicate **effectively and on timely-manner** among stakeholders to gain their support

Figure 5: *Criterion for Quadrant 3 (Performance and Development)*

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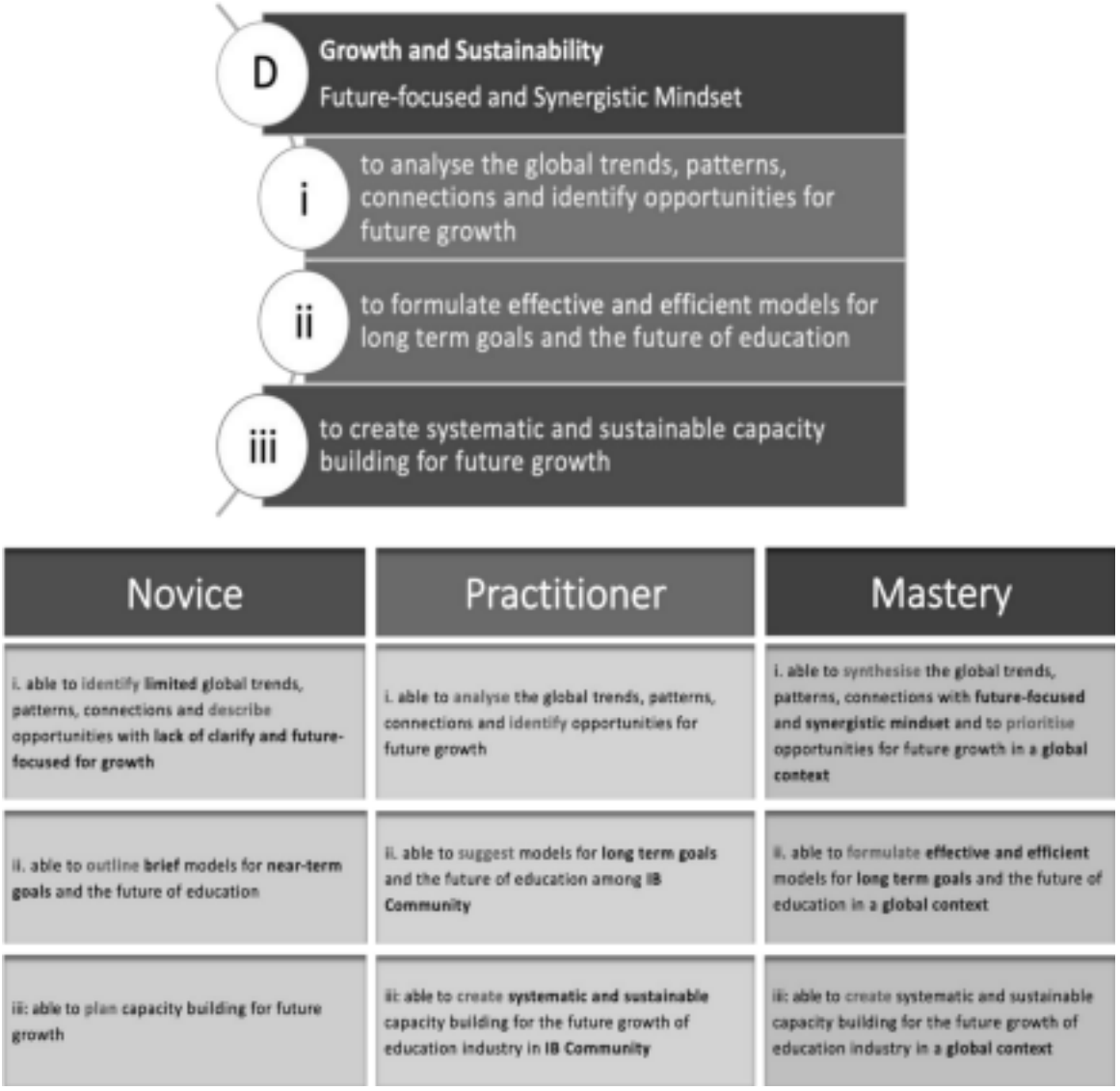

Figure 6: *Criterion for Quadrant 3 (Growth and Sustainability)*

Purpose of this Study

Following the introduction of the Pedagogical Leadership Model for a private Malaysian Education Provider, this paper endeavors to evaluate the model critically through insights gained from a focus group session. Educational Leader (Pemimpin Pendidikan) 2021, Volume 9, Page 61 elucidates the purpose of this study, which aims to harness the perspectives of pedagogical leaders to inform, guide, evaluate, and refine the model. This endeavor is motivated by the scarcity of studies

on pedagogical leadership within Malaysia, particularly among IB schools, accentuating the need for contextually relevant research and application. The article outlines two key research questions derived from a broader study, seeking to elucidate negative perceptions of the model among pedagogical leaders and assess its effectiveness in enhancing understanding of pedagogical leadership within the school community. While the article focuses on these specific questions, it acknowledges the broader research context from which they stem, indicating a wealth of descriptive data underpinning the conceptualization of the Pedagogical Leadership Model, albeit beyond the scope of this article

Methodology

This segment elucidates the methodology employed in the broader study, of which this article is a component, utilizing a comprehensive case study approach within a Malaysian IB education provider spanning from mid-2020 to mid-2021. The study unfolds in three distinct phases:

Phase 1: This phase encompasses participant observation, document analysis, field observations, and reflective journaling.

Phase 2: Involving online personal interviews with nineteen selected pedagogical leaders, supplemented by reflective journaling.

Phase 3: Comprising focus group interviews with twenty-one pedagogical leaders, accompanied by reflective journaling.

Data collection from these diverse sources is meticulously analyzed utilizing ATLAS.ti Qualitative Data Analysis Software (version 9)

employing methodological, data, researcher, and theoretical triangulation techniques. This multifaceted triangulation approach aims to conceptualize a comprehensive model of pedagogical leadership, informed by the strategies, challenges, and practicalities encountered by pedagogical leaders within the school.

The recorded interviews and focus groups undergo transcription, coding, and thematic analysis to address each research question holistically. For the purposes of this article, data subsets are selected through iterative and reflective methodologies to illuminate the content, processes, and contextual study of pedagogical leadership within the private Malaysian IB education provider.

Findings

Research Question 1: Negative Perceptions of Pedagogical Leaders on the Model of Pedagogical Leadership

Some participants expressed reservations about the comprehensiveness of the Model of Pedagogical Leadership, suggesting that it may not adequately address all dimensions of pedagogical leadership. One participant, referencing their interview script, highlighted that the model might not fully capture the diverse expectations and suggestions of different pedagogical leaders, stating:

"The Model may not be able to answer all the questions concerning pedagogical leadership, nor does it represent all expectations or suggestions of different pedagogical leaders." (Participant R19, Reference 83:2)

Similarly, another participant agreed, stating that the model might fall short in addressing all challenges faced in pedagogical leadership, as mentioned in their interview:

“The highest level of leadership is leadership with 'heart', with unconditional and unquestionable love and dedication of AGAPE. Use your heart, your feelings, step out from your comfort zone into that unknown over the cliff. That is what you believe in in your lifetime.” (Participant R19, Reference 83:3)

Moreover, concerns were raised regarding the universal applicability of the model across different departments, programs, or schools. Participant R15 suggested that not all leadership knowledge is explicit and can be documented or portrayed in a model, emphasizing the importance of soft skills, such as interpersonal skills, which are essential for effective leadership:

“In Quadrant 1, I would suggest including interpersonal skills essential for building relationships. Similarly for other quadrants lack of soft skills which are a combination of people skills, social skills, communication skills, character or personality traits, attitudes, mindsets which are desirable in any leader.” (Participant R15, Reference 93:30)

Research Question 2: Understanding Enabled by the Conceptualized Model

Participants acknowledged that the conceptualized model could enhance existing standard operating procedures for pedagogical leadership within the school. One participant, referring to their interview, noted that the

model aligns with the beliefs of the school and reflects the principles and practices of the International Baccalaureate (IB) framework:

“When I look at the four quadrants that she has, yes, it's for IB school. And at the same time, it also reflects our standards and practices, and the principles and practices that we have in our IB documents. So, it is in line with the beliefs of our school.” (Participant R1, Reference 83:8)

Another participant described the model as comprehensive, particularly in an international school setting, focusing more on leadership aspects rather than teaching and learning concepts:

“This Model is more like a comprehensive model of leadership in an international school setting - it is a conceptual model mostly reflecting leadership aspects and not so much on the concept based on teaching and learning.” (Participant R12, Reference 90:31)

Furthermore, participants highlighted the model's potential contribution to teacher training and evaluation, particularly in the Mandarin Department. Participant R4 expressed confidence that following the model could guide individuals to become effective leaders, not only within the school but also within the broader IB community:

“We can use this in the education area, and then how are we going to do like training or like how the pedagogical leadership can grow. And I think it's like, if we follow this, the model actually, I think we can know how to be a very good leader. And we can contribute not only to the school but also can contribute to the community like the IB community. So this is the impressive, impressive part for me.” (Participant R4, Reference 83:9)

The chairman of the school, drawing from their interview, provided insightful commentary on blending Western and Eastern philosophies within the model, emphasizing the dynamic nature of leadership across different stages of life:

"If you take the First Quadrant, as some young buddy, you know, coming to education, coming to the teaching profession, that's the self-improvement time... So it is so dynamic. When you are about 40- 50 years old, it is when you are in the Third Quadrant. Then the last quadrant is perhaps when you're 50 years, 60 years or beyond,
like me. So is where you start talking about a visionary, a worldwide global issue of education, on professional, on something like that." (Participant R19, Reference 83:5)

Discussion

Educational institutions operate within intricate systems that require continual adaptation and refinement to progress effectively (Muli et al., 2017). Moving forward, pedagogical leaders must delineate the components of high-quality educational reforms and translate these visionary ideals into actionable strategies within their school environments to realize their objectives (Glickman & Burns, 2020). Throughout this process, it is imperative for pedagogical leaders to remain vigilant in identifying and addressing obstacles that impede goal attainment. Additionally, forthcoming research endeavors should explore innovative approaches to mitigate persistent challenges within educational organizations, particularly in areas such as technology integration and resource management (Bond & Giles, 1997; Pettersson, 2021).

Furthermore, there is a pressing need for schools to implement robust mechanisms for assessing the progress of both educators and students. By accurately gauging the advancement of teachers and learners, educational institutions can ascertain their respective positions within the learning continuum. Should individuals demonstrate signs of lagging behind in specific subject areas, pedagogical leaders play a pivotal role in facilitating remediation efforts, providing ample time and resources for targeted learning interventions. Collaborating closely with teachers, pedagogical leaders can foster an environment conducive to innovation, enabling educators to explore and implement strategies tailored to the unique needs of their students (Radinger, 2014).

Conclusions

In the pursuit of 21st-century competencies, the development of personal, social, and emotional skills alongside moral sensitivity holds paramount importance. Pedagogical leaders must possess a keen awareness of their school's current standing, future objectives, and the requisite strategies to achieve these goals, while also delineating clear lines of responsibility for educational outcomes (Fernandez et al., 2019; Radinger, 2014). Subsequent research endeavors could delve into establishing implementation timelines and projecting the anticipated impacts, leveraging descriptors and rubrics to aid academic departments in formulating annual pedagogical plans. Moreover, initiatives aimed at enhancing teachers' professional growth necessitate pedagogical leaders' proactive engagement in fostering innovation, guiding the teaching-learning process, nurturing a culture of continuous learning, and fostering inclusivity within educational institutions

(Atasoy, 2020).

Alternatively, endeavors in this direction may involve the provision of training and capacity building programs on pedagogical leadership, featuring a structured framework conducive to self-directed learning and instructional facilitation.

Any prospective model or framework pertaining to pedagogical leadership should integrate mechanisms for self-reflection, distill key insights, offer guidance for future training initiatives, and foster a comprehensive understanding of pedagogical leadership principles, frameworks, and practices. To date, extensive research has been conducted on concept-based learning and teaching methodologies. Diverging from traditional objectives-based content programs, which predominantly focus on factual knowledge and skill acquisition, concept based curricula prioritize the comprehension of overarching concepts. This model embraces a holistic approach, emphasizing the centrality of conceptual understanding while acknowledging the significance of factual knowledge and skills. However, it is crucial to recognize that certain components of pedagogical leadership, particularly those of a tacit nature, may evade explicit representation and can only be comprehensively grasped through firsthand observation and experiential practice.

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TEACHER-READINESS IN STEM TEACHING IN SELECTED PRESCHOOLS

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Abstract

This study examined teacher-readiness in teaching science and technology (STEM) subjects among preschool teachers. Readiness aspects investigated were topical content knowledge, instructional strategies, resources available to teachers, school infrastructure, training, and chances for professional growth. The study used a mixed-methods approach in which data were collected through survey and interviews on a sample involving 51 teachers from 29 preschools in the district of Hulu Langat, Selangor, Malaysia. Based on data analysis, results indicated that teachers lack the ICT skills necessary for teaching STEM subjects, and they were also concerned about how technology might affect STEM education. Programmes for internal training should be the vital means of professional growth because the lack of specialised STEM educators seemed to be a major factor in the STEM education gap since it could limit teachers' access to professional development opportunities that would improve their subject-matter expertise and abilities. Analysing technology aversion could reveal obstacles to enhancing ICT competence. To fill in subject knowledge gaps, especially in engineering and technology, the study suggests integrating soft

skills into STEM teaching approaches. In order to facilitate teachers' professional development, school training departments ought to prioritise networking and self-directed learning. Flexible work arrangements should be considered to enhance work-life balance and facilitate teachers' continuous professional development (CPD) initiatives. Understanding the differences in experience levels among teachers from different educational backgrounds could accommodate the needs of both beginner and experienced teachers.

Keywords: Continuing professional development, science teaching, ICT skills, soft skill

Introduction

The main aim of this study was to explore effective methods for preparing a group of certified preschool teachers for careers in STEM fields. The research highlighted the importance of recruiting, developing, retaining, and advancing high-quality preschool educators to adequately prepare children for STEM learning. Effective teachers play a crucial role in influencing students' academic success, serving as role models, and shaping educational practices, as stated by Mincu (2015). The benefits of a teacher preparation program include age-appropriate use of technology, personalized learning strategies, opportunities for professional growth, and collaboration. Further investigation is needed to fully understand how technology impacts academic performance. Specifically, this study examined preschool teachers' readiness for STEM education by addressing three research questions:

1. Their current understanding and skills in the STEM concepts,
2. Challenges faced in integrating ICT into STEM education, and
3. Available professional development opportunities.

The research aimed to identify areas of teacher unpreparedness, understand barriers to integrating ICT, and assess the effectiveness and accessibility of professional development opportunities. The findings could potentially enhance preschool STEM education through targeted interventions, policy adjustments, and improved practices.

STEM education has been prioritized by the Malaysian government across all educational levels, including preschool, due to its connection to STEM expertise, innovation, and economic growth. STEM education encourages students to actively construct their own knowledge, reducing the

reliance on teachers for knowledge dissemination. Preschool teachers, particularly those in rural or low-income areas, may lack exposure to STEM subjects and feel uncertain about their knowledge. This study focused on preschool teachers' readiness to implement STEM education techniques in Hulu Langat, Selangor, Malaysia. Previous research by Sanders (2008) and Roehrig, Moore, Wang, and Park (2012) has emphasized the importance of strategies such as active learning, experiential learning, and student-centred approaches to enhance STEM teaching.

Literature Review

This section critically reviewed recent studies on preschool teachers' readiness for STEM education strategies at both global and local levels. It examined essential components necessary to address STEM proficiency and ICT skills, emphasizing the need to dispel misconceptions about technology use and promote collaborative professional development opportunities to enhance teachers' STEM proficiency.

Globally, research by Nadelson et al. (2009) has shown that many preschool teachers feel unprepared to teach STEM subjects due to limited formal education and training. While most states require basic training, many teachers lack confidence and expertise. Studies from Idaho, Turkey, and South Africa have revealed that preschool teachers perceive STEM concepts in terms of skills, career opportunities, and teaching methods. In South Africa, inadequate STEM teaching is attributed to teachers' struggles with ICT integration. Access to an ICT literacy program could lay the foundation for ongoing professional development. However, low requirements for STEM study in teacher certification programs may leave teachers feeling underprepared. According to Jarrett (1999), teacher

education programs significantly influence confidence levels, with additional coursework and professional development in STEM topics boosting teachers' confidence in STEM instruction.

Regionally, the rapid expansion of STEM education in Asia has increased demand for qualified preschool STEM educators. However, teachers often struggle to grasp the interconnectedness of STEM subjects, making teaching in STEM areas challenging. A study in Thailand by Pimthong and Williams (2018) found that preschool teachers prioritize real-world relevance in STEM education but struggle to define it. The study suggests that teachers should be well-versed in STEM education and integration concepts, rather than relying on siloed approaches. In Bandung, Indonesia, Shidiq and Nasrudin (2021) found that preschool teachers' limited understanding of various ICT technologies hinders their readiness to adopt STEM subjects. Despite the development of robust STEM integration teaching resources, teachers face challenges in implementing their plans consistently. Continuous professional development is essential to bridge the gap between planning and execution. Teachers are eager to engage in STEM-related professional development opportunities, often through face-to-face interactions.

In Malaysia, schools prioritize STEM education to support the country's science-based economy. However, according to Ramli et al. (2017), teachers are not fully prepared to implement STEM education due to a lack of extracurricular materials, reluctance to teach other subjects, and limited access to technology resources. Professional development is crucial for enhancing teachers' confidence in STEM instruction and providing them with up-to-date knowledge and instructional strategies. Regular assessments

of teacher preparedness are essential for effectively modernizing the education system. Preschool educators in Malaysia are exploring effective strategies for teaching STEM subjects, but further research is needed to understand the impact of technology on instructional outcomes and to overcome existing obstacles. This could raise awareness, inform policy-making, and promote a culture of continuous improvement.

Theoretical Framework of the Study

This study employed two theories to explain and evaluate preschool teachers' readiness for STEM education. Firstly, the pedagogical theory provided a framework for examining effective educational methods, focusing on six factors for fostering creativity: teaching techniques, physical context, timing and planning, assignments, evaluations, and feedback as proposed by Dineen and Niu (2008). This theory offered specific strategies for promoting learning, such as direct instruction, inquiry-based learning, collaborative learning, problem-solving instruction, and blended learning, while also emphasizing the importance of creating a supportive educational environment and utilizing educational technology. Secondly, the Pedagogical Content Knowledge (PCK) theory underscored the intersection of subject matter knowledge and pedagogical expertise in teaching. This theory required teachers to have a deep understanding of content and effective teaching methods. High PCK teachers could simplify complex concepts, develop instructional materials, identify appropriate learning activities, and adjust methods to accommodate diverse student experiences and learning styles, as outlined by Shulman (1986). This approach aimed to effectively engage students in learning processes

The Technological Content Knowledge (TPACK) framework by Koehler and Mishra (2009), suggests that teachers need to integrate three essential areas of knowledge for effective STEM education: Content Knowledge (depth of knowledge and application of theory), Pedagogical Knowledge (knowledge of instructional strategies, assessment procedures, classroom management), and Technological Knowledge (understanding the limitations and potential of technological tools).

Conceptual framework of the Study

Figure 1 illustrates the theoretical and conceptual frameworks TPACK and TCK, which are derived from TPACK and aimed at preparing preschool teachers for STEM education. TPACK focuses on the preschool context, while TCK emphasizes teachers' understanding of technology and its application in STEM. PCK assesses teachers' readiness to integrate pedagogical content knowledge into STEM education. The study seeks to examine how teachers' PCK influences their preparedness for successful STEM teaching. TPK emphasizes teachers' awareness of fundamental scientific concepts, technological principles, mathematical fundamentals, and engineering design processes. These findings will assist school administrators in devising strategies to enhance TPK development and support preschool teachers in STEM education.

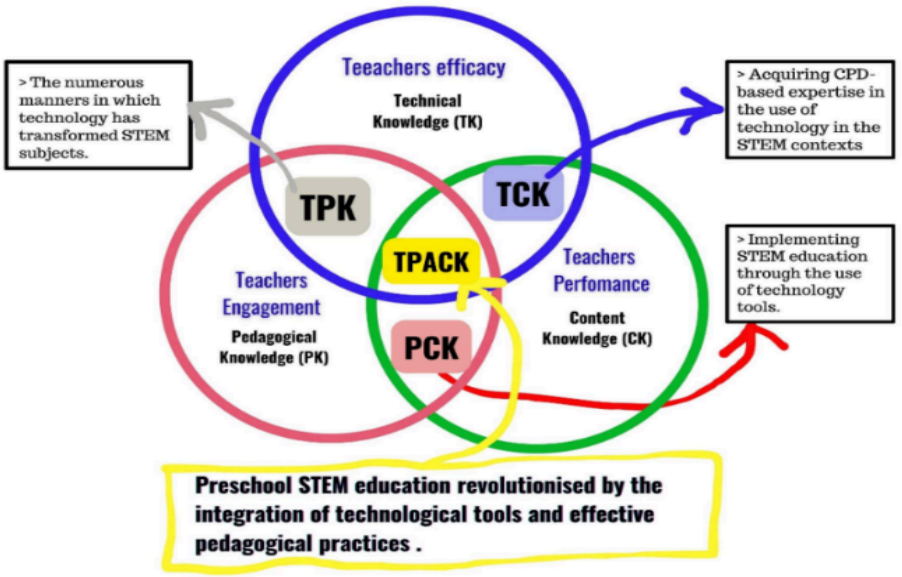


Figure 1

Conceptual framework in preschool teachers' readiness in STEM education.

According to constructivist theory, teachers must acquire STEM concepts and develop a thorough understanding through a constructivist approach. This approach fosters student learning by creating a challenging environment, responding to students' mental activities, and modelling and questioning their comprehension, as noted by Green and Gredler (2002). Preschool teachers can enhance their skills, confidence, and pedagogical strategies through STEM activities, problem-solving tasks, and inquiry-based learning.

Research Methodology

The research employed both quantitative and qualitative techniques, combining these methods to understand school reform implementation and the intersection of rural sociology and regional economics. Triangulation

was utilized to validate findings and enhance credibility by comparing results from various data sources and minimizing the influence of any single technique. Grounded theory, as described by Charmaz (1996), was used as a research methodology that systematically analysed evidence to comprehend individuals' experiences and understandings. It established connections between different ideas, forming a foundational framework that influenced behaviour and social-psychological aspects. This study utilized grounded theory to investigate challenges in teachers' confidence in teaching STEM subjects, their skills judgments, and learning from others. The iterative process of comparison, coding, and categorization enabled a comprehensive examination of qualitative data. The insights gained can inform teacher preparation, professional growth, and educational material development, thus facilitating advancements in early childhood STEM instruction.

Population and Sample

The study investigated STEM teaching strategies in rural preschools in Hulu Langat, Selangor, Malaysia. The research population comprised preschool teachers involved in STEM education. Previous research had identified teachers' skills as the primary barrier for private preschool teachers in Hulu Langat, impacting their lesson planning. Purposive sampling was utilized to select rural participants with expertise in STEM education. This sampling method allowed for a unique and cost-effective approach to data collection, enhancing efficiency and producing high-impact results. The study aimed to provide comprehensive knowledge and understanding of preschool teachers' preparedness for STEM education.

Data Collection Method

The study explored preschool teachers' readiness in STEM practices using both quantitative and qualitative methodologies. Data were collected through surveys and interviews, with Google Forms chosen for confidentiality and cost-effectiveness. Phone interviews expedited feedback. Open-ended online survey questionnaires, as depicted in Figure 2, were employed to understand STEM components, while closed-ended Likert scale surveys were used to investigate teachers' expertise in pedagogy and ICT integration. Semi-structured interviews addressed concerns about Continuing Professional Development (CPD) and the growing demand for skilled STEM teachers in Hulu Langat.

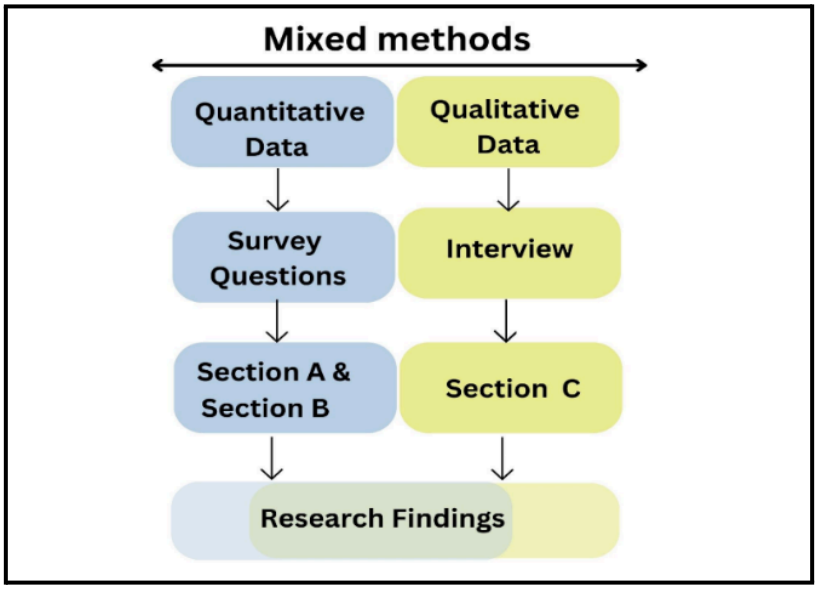


Figure 2

Types of instrumentation and data used

Semi-Structured Interview (Qualitative Data)

The research employed grounded theory and case study analysis to examine the experiences of preschool teachers. Conducted in English, the interviews were conducted with permissions granted by the school administration. The interviews focused on professional development and teaching techniques. Data analysis utilized descriptive coding methods proposed by Taylor and Gibbs (2010), and participants provided contact information for further communication. The study ensured the confidentiality of individual personal information. Subsequently, the data underwent multiple readings to categorize and analyse the interview responses. Descriptive codes provided flexibility in data interpretation, closely tied to responses. Thematic analysis and quantitative analysis were employed to elucidate qualitative data results, while confidentiality was maintained during interviews. Thematic analysis expounded upon qualitative results, while quantitative analysis scrutinized Likert-scale responses.

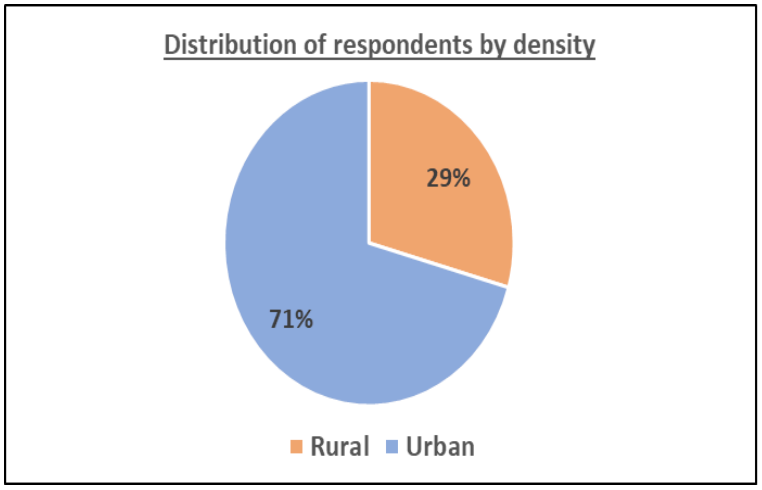
Reliability and Validity

This mixed-method study focused on reliability and validity in research. Reliability pertained to the consistency and stability of measurements utilized, while validity concerned the accuracy and meaningfulness of observations. The Likert-type scales employed in the study significantly impacted the credibility and comprehensibility of the collected data. The survey instrument's reliability in assessing teachers' preparedness in STEM concepts was found to be excellent, with a Cronbach's Alpha coefficient of 0.964. However, the reliability of section B, which concentrated on

integrating ICT into teaching STEM, demonstrated moderate internal consistency. The study also underscored the importance of specific instruments such as mechanical recording and 'rich' data in mitigating threats to validity and enhancing research reliability. Descriptive coding and content validity were utilized to evaluate the reliability of semi-structured interviews, revealing a strong level of reliability in the survey instrument, despite potential differences in measurement scales.

Result and findings

This section provides an explanation of data, hypothesis testing, and argument, ensuring the findings align with data assessments regarding respondents' distribution across various aspects. A total of 51 teachers from 29 STEM-focused preschool from Hulu Langat district participated in this research. To allow the research to choose respondents that best fit the survey's profile and collect data in a personalised method, purposive sampling was used throughout the research.



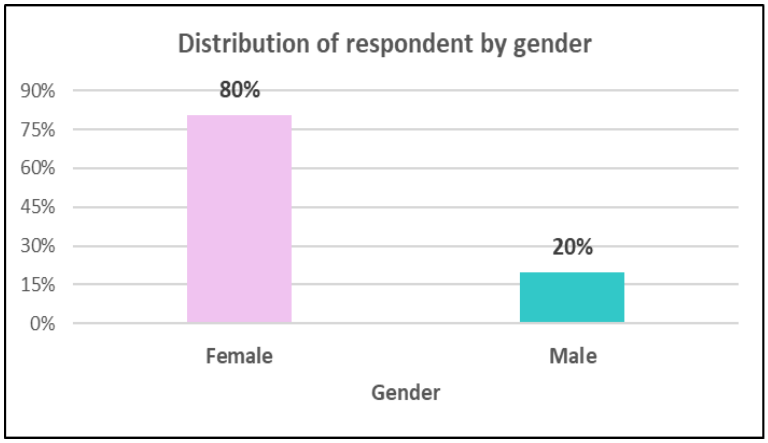
Density

	N	%
Rural	15	29.4%
Urban	36	70.6%

Figure 3

Distributions of respondents by density

The sample data in Figure 3 shows that 71% (N=36) of respondents live in urban areas, with 29% (N=15) from rural areas. This is due to the larger population densities in urban areas, which have led to the establishment of multiple preschools. Online surveys are used to access urban respondents with internet availability, ensuring data reliability and generalizability. Emphasizing density in survey research helps identify challenges and apply effective strategies.



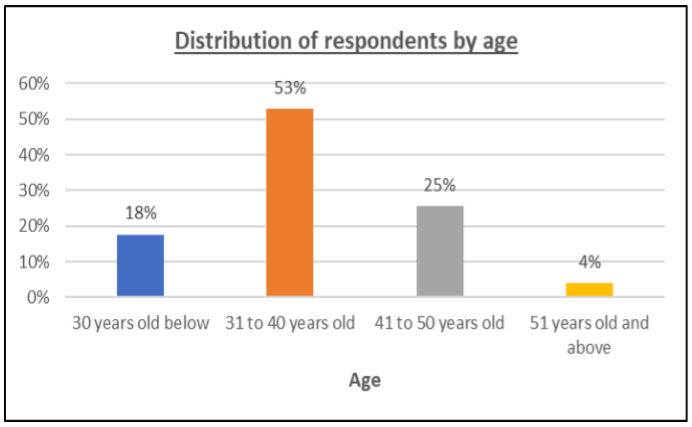
Gender

	N	%
Female	41	80.4%
Male	10	19.6%

Figure 4

Distributions of respondents by gender

Figure 4 presents data from a survey performed with 51 respondents, primarily consisted of females, with 80% (N=41) being female and 20% (N=10) being male. The gender distribution provides insight into individual experiences, responsibilities, and beliefs. Female respondents are more likely to pursue careers in preschool teaching and engage in online communities or research activities, indicating a stronger preference for females.



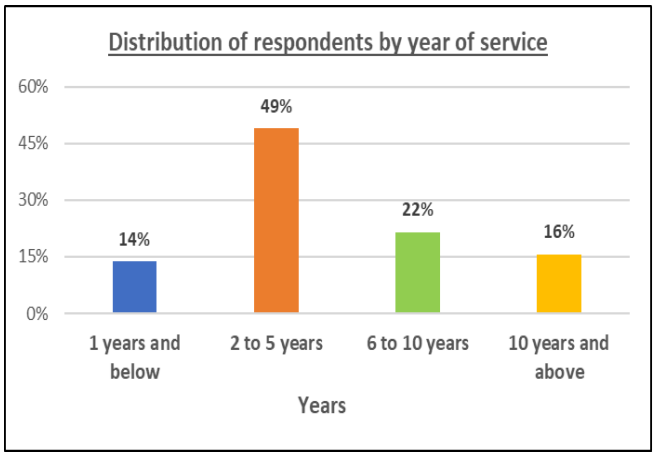
Age

	N	%
30 years old below	9	17.6%
31 to 40 years old	27	52.9%
41 to 50 years old	13	25.5%
51 years old and above	2	3.9%

Figure 5

Distribution of respondents by age

As indicated in Figure 5, the majority of respondents aged 30 and below have responded to a questionnaire, with 18% (N=9) responding. This is due to surveys focusing on subjects of interest to individuals in their thirties and forties. This age group also tends to have greater professional responsibility in their workplaces, making them more inclined towards career advancement subjects. As a result, they are more responsive to surveys, with 53% (N=27) responding between 31 and 40 years old and 25% (n=13) between 41 and 50 years old.



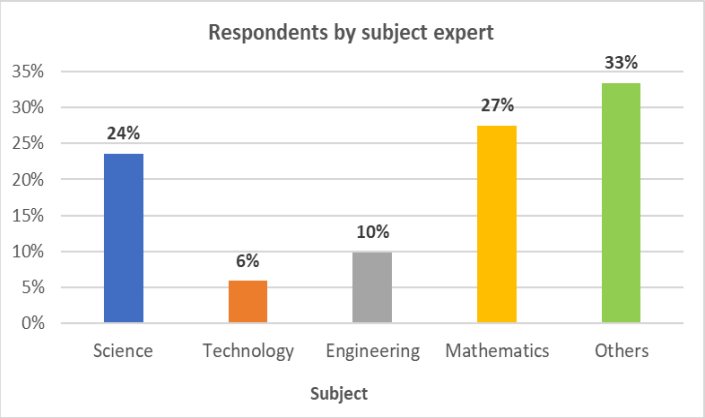
Service

	N	%
1 years and below	7	13.7%
2 to 5 years	25	49.0%
6 to 10 years	11	21.6%
10 years and above	8	15.7%

Figure 6

Distributions of respondents by year of service

Figure 6 presents an analysis of respondents according to their years of experience in the teaching field. Based on the data, 14% (N=7) of the respondents in the research survey had one year or less service in teaching field. Following that, 49% (N=25) fell between 2 to 5 years, 22% (N=11) between 6 to 10 years, and 16% (N=8) were from 10 years and above. The respondents who had a teaching experience ranging from 2 to 5 years were at the highest ranking, with a total of 49% (N=25). This phenomenon could perhaps be attributed to the inclination of teachers in their early careers to exhibit higher responsiveness towards change and innovation. These early-career teachers often sought feedback on new approaches and practices. Incorporating the length of service in the survey enhances the study's efficacy and provides insights into how experience shapes views, attitudes, and practices. The survey yields data on respondents' expertise levels, providing valuable insights into their experiences.



Respondents by subject expert

	N	%
Science	12	23.5%
Technology	3	5.9%
Engineering	5	9.8%
Mathematics	14	27.5%
Others	17	33.3%

Figure 7

Distribution of respondent by subject

In Figure 7, the graph shows that 33% (N=17) of subjects are not directly related to STEM education, with 27% (N=14) in mathematics, 24% (N=12) in science, 10% (N=5) in engineering, and 6% (N=3) in technology. This suggests a lack of competence in engineering and technology fields, potentially due to the emphasis on pedagogy and child development in early childhood education programs. The absence of subject matter specialists could lead to low-quality education in STEM fields.

Table 1

Subject expertise in cross tabulation by gender

Gender * Subject expert Crosstabulation

		Subject					Total	
		Science	Technology	Engineering	Mathematics	Others		
		N	N	N	N	N	N	%
Gender	**Female**	10	1	2	12	16	41	80.4%
	Male	2	2	3	2	1	10	19.6%
Total		12	3	5	14	17	51	100.0%

Moreover, social prejudices and gender biases influence beliefs about engineering and technology fields, leading to a decrease in highly skilled preschool teachers. Table 1 shows limited representation of male respondents in Technology and Engineering, indicating a lack of significant contribution. This differentiation is often linked to gendered conflict, with women portrayed as proficient in professions relying on social connections, and males as more capable in technical expertise.

Table 2

Distribution of academic qualifications across length of service

Academic Qualification * Length of service in teaching field Crosstabulation

		Length of service in teaching field								Total	
		1 years and below		2 to 5 years		6 to 10 years		10 years and above			
		N	%	N	%	N	%	N	%	N	%
Academic Qualification	Diploma	0	0%	3	12%	1	9%	0	0%	4	8%
	Bachelor's Degree	2	29%	7	28%	4	36%	3	38%	16	31%
	Master's Degree	3	43%	11	44%	4	36%	5	63%	23	45%
	Doctor of Philosophy	0	0%	1	4%	1	9%	0	0%	2	4%
	Others	2	29%	3	12%	1	9%	0	0%	6	12%
Total		7	100%	25	100%	11	100%	8	100%	51	100%

As indicated by Table 2, the study analyses the distribution of respondents across various academic qualifications and their length of service in the educational profession. A sample of 51 participants was analysed, with the duration of employment classified into four categories: "less than 1 year," "2 to 5 years," "6 to 10 years," and "more than 10 years." The data shows that 43% of respondents held a Master's Degree, while 36% had a Bachelor's Degree. The majority of respondents had a Master's Degree, with 63% having a tenure of 10 years and beyond. The majority of respondents held a Doctor of Philosophy degree, indicating a high level of experience. The study suggests a potential relationship between extensive teaching experience and academic qualifications, suggesting the need for teacher development programs that cater to the unique needs of teachers from diverse educational backgrounds.

Table 3

Distribution of academic qualifications across age

Academic Qualification * Age Crosstabulation

		Age									
		30 years below		31 to 40 years		41 to 50 years		51 years and above		Total	
		N	%	N	%	N	%	N	%	N	%
Academic Qualification	Diploma	1	11.1%	3	11.1%	0	0.0%	0	0.0%	4	7.8%
	Bachelor's Degree	3	33.3%	10	37.0%	2	15.4%	1	50.0%	16	31.4%
	Master's Degree	2	22.2%	9	33.3%	11	84.6%	1	50.0%	23	45.1%
	Doctor of Philosophy	0	0.0%	2	7.4%	0	0.0%	0	0.0%	2	3.9%
	Others	3	33.3%	3	11.1%	0	0.0%	0	0.0%	6	11.8%
Total		9	100.0%	27	100.0%	13	100.0%	2	100.0%	51	100.0%

Meanwhile, the data from Table 3 shows a diverse distribution of academic qualifications among preschool teachers. The age group aged 30

and younger had the highest representation, with 37% holding a Bachelor's Degree. The age group aged 41 to 50 has the highest representation, with 85% holding a Master's Degree. Two respondents aged 51 and above had different educational backgrounds, indicating a diversity in educational backgrounds. The school management should consider designing professional development programs and enhancing recruitment strategies to attract teachers with the necessary skills and expertise for STEM subjects, considering age-related perspectives and preferences.

Table 4

Descriptive statistics and reliability analysis in STEM concept readiness

Descriptive Statistics

	N	Maximum	Mean	Std. Deviation
1. I have a fundamental understanding of the STEM disciplines.	51	5	3.53	1.102
2. I have completed undergraduate education in STEM fields and have equivalent knowledge in STEM concepts	51	5	3.06	1.363
3. I have a profound and comprehensive understanding of STEM concepts.	51	5	3.29	1.238
4. I have a basic understanding of technique, method and strategies in teaching STEM.	51	5	3.53	1.155
5. I have completed undergraduate education in STEM fields and have equivalent knowledge of technique, method and strategies in teaching STEM.	51	5	3.12	1.465
6. I have a profound and comprehensive understanding of technique, method and strategies in teaching STEM.	51	5	3.29	1.285
Valid N (listwise)	51			

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.964	0.965	6

The study found that participants had a moderate to high degree of agreement with the arguments presented in the Likert-scale responses in Table 4, indicating a strong understanding of STEM principles and teaching techniques. However, there was a marginally lower agreement regarding the completion of undergraduate education in STEM subjects. The survey instrument's reliability was evaluated using Cronbach's Alpha, indicating a

high degree of internal consistency, indicating the scale's effectiveness in assessing the intended research hypothesis.

Table 5

Descriptive statistics and reliability analysis of ICT integration into teaching STEM

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
7. I refer to curriculum materials like textbooks, lesson plans, and digital tools.	51	2	5	3.94	1.008
8. I refer to technological tools for interactive learning and educational software.	51	2	5	3.94	0.947
9. I do not have any resources or materials to practice STEM teaching effectively.	51	1	4	2.24	1.069
10. I apply ICT skills with various digital tools and resources in the classroom.	51	2	5	4.18	0.865
11. I use Online learning Management System (LMS) platforms to manage and organize course content, assignments, and student progress.	51	2	5	4.06	0.881
12. I use digital assessment tools to streamline grading and provide timely feedback to students	51	2	5	4.06	0.881
13. I can find appropriate digital resources and educational technology tools that align with STEM teaching.	51	2	5	3.94	0.881
14. I do not have adequate knowledge in the use of ICT tools.	51	1	4	2.12	1.143
Valid N (listwise)	51				

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.618	0.690	8

As depicted in Table 5, the study reveals a positive attitude towards integrating ICT resources in teaching STEM subjects, with participants showing significant involvement in using educational resources and incorporating technological tools for interactive learning. However, there is a discrepancy in participants' perspectives on resource accessibility for effective STEM instruction. The study also shows a high tendency to use ICT skills in educational settings, with high scores for ICT skills

application, Online Learning Management System (LMS) platform usage, and digital assessment tools adoption. The reliability of the survey is moderate, indicating potential for professional development.

Table 6

Descriptive statistics and reliability analysis of CPD

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
15. I participate in-service training courses.	51	1	5	3.59	1.099
16. I collaborate with other teachers, both within and outside the school, to share lesson plans, teaching strategies, and best practices.	51	2	5	4.06	1.008
17. I often attend/engage workshop, seminars and trainings that focused on STEM and staying up-to-date in CPD.	51	1	5	3.59	1.043
18. I provide and involve with collaboration and networking that focuses on STEM as part of my CPD.	51	2	5	3.53	0.987
19. I engaged in educational research and publication in STEM teaching and learning as part of my CPD.	51	1	5	3.18	1.352
20. I am facing challenges in accepting professional development.	51	1	5	2.29	1.285
Valid N (listwise)	51				

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.719	0.745	6

Thorough investigation as shown in Table 6, examines the attitudes and participation in professional development programs related to STEM education. Participants reported average engagement in in-service training courses and collaboration with other teachers. They were more likely to attend STEM conferences, seminars, and trainings. They also provided professional services, participated in networking, and produced publications in STEM settings. However, they had difficulties accepting professional growth. The reliability statistic showed high dependability even with variations in measurement scales. 39 participants were interviewed to investigate challenges affecting STEM educational settings readiness and CPD.

1. What are the challenges that you face in your current profession in acquiring the complete STEM framework?

	N	%
Absence of Interdisciplinary Knowledge	3	7.7%
Lack of technological advancements	18	46.2%
Limited access to resources	6	15.4%
Time constraint	12	30.8%

2. What are the possible actions to work around the limitation to acquire STEM framework?

	N	%
Collaborative learning	9	23.1%
Continuous professional development	15	38.5%
Mentorship	9	23.1%
Online educational resources	6	15.4%

3. Which technology approaches have been proved to be effective in teaching STEM currently?

	N	%
Coding and programming tools	7	17.9%
Digital classroom	5	12.8%
Online interactive learning apps	21	53.8%
Online simulation tools	6	15.4%

4. How to improve the effectiveness of current ICT practices?

	N	%
Community of practice	5	12.8%
Competency standards	3	7.7%
Enhancement of ICT infrastructure	14	35.9%
Hands-on Trainings	11	28.2%
User-centered design	6	15.4%

5. What are the limitation to acquire ICT Skills in your current profession?

	N	%
Fear of technology	9	23.1%
Inadequate internet access	8	20.5%
Inadequate proficiency	7	17.9%
Limited training resources	12	30.8%
Time constraint	3	7.7%

6. What are the possible solution of having insufficient resources and materials?

	N	%
Allocation of financial resources	6	15.4%
Inadequate technological resources	14	35.9%
Networking to facilite exchange of information	13	33.3%
Self-initiated efforts to seek out resources	6	15.4%

7. How do you participate in professional development in the present situation?

	N	%
Functional courses	3	7.7%
Increased duties and responsibilites	3	7.7%
In-house trainings	14	35.9%
Networking	7	17.9%
Participation in professional development actvities	6	15.4%
Self-paced learning	2	5.1%
Skill based trainings	4	10.3%

8. What are the challenges that you are facing in accepting professional development?

	N	%
Challenge of work-life balance	7	17.9%
Lack of motivation	5	12.8%
Limited resources	12	30.8%
Organizational changes	2	5.1%
Time constraint	9	23.1%
Transformation in teaching strategies	4	10.3%

Figure 8

Percentage distributions of challenges based on semi-structural interview

Based on the statistic in Figure 8, the study reveals that obtaining the full STEM framework presents numerous challenges, including technological advancements, time constraints, lack of interdisciplinary knowledge, and limited resource access. Preschool teachers are often unprepared and inexperienced, leading to a lack of preparedness and capability in STEM teaching. In the meantime, the discussion is corroborated by the result if the interview, a teacher who teach technology stated that:

> *"I teach technology, but it's challenging for me to do so because I didn't have my degree in that field. I must have further guidance about the concept of teaching technology".*

Consequently, the findings suggest that future research should focus on examining STEM theory and practices, enrolling teachers in graduate

courses, evaluating teaching methods, and addressing technological barriers. It also suggests interdisciplinary training programs to enhance pre-school teachers' understanding of the entire STEM framework. The study found that continuous professional development, collaborative learning, mentorship, and online instructional tools are effective methods for addressing limitations in acquiring the complete STEM framework. Meanwhile, the subsequent questionnaire sought to discover the effective technological methods for teaching STEM subjects.

The results also showed a diverse range of approaches, with online interactive learning applications being the most popular (53.8%). Strategies for improving existing ICT practices were suggested, including enhancing infrastructure, providing hands-on training, recognizing community of practice, user-cantered design, and competency standards. Barriers to acquiring ICT skills included limited training resources (30.8%), fear of technology (23.1%), and inadequate internet access (20.5%). Techniques to overcome these challenges included inadequate technology resources, establishing networks for information exchange (33.3%), allocating financial resources (15.4%), and adopting self-initiated effort (15.4%). In-house trainings were the most common method, followed by networking, professional development activities, skill-based trainings, and self-paced learning. Interviews revealed challenges in accepting opportunities for professional growth, including lack of resources (30.8%), time constraints (23.1%), and work-life balance concerns (17.9%). School management should consider implementing measures to alleviate these struggles, evaluate organizational support, and assess the effectiveness of personalized professional development initiatives. Whereby, in the situations where

teachers are unable to preserve work-life balance, one of the female interviewees stated that:

> *"I have many things on my plate, with lesson planning, grading and administrative tasks. And, I find it challenging to find time for my family because the duties of teaching extend beyond regular school hours".*

Additionally, one more interviewee from a different school stated:

> *"In addition to teaching in the classroom, I also have to show up to meetings and take part in committee activities at the school. Almost all of the activities took place after school hours".*

Furthermore, the study indicated that 41 out of 51 respondents are female, suggesting the need for flexible work schedules for female teachers. The research also highlights a lack of highly qualified STEM teachers in preschools, indicating a need for recruitment and ongoing professional development. The findings suggest that school administrators should consider these factors to improve work-life balance and enhance teachers' understanding of STEM concepts.

Recommendations

The study findings suggest the integration of soft skills into STEM education methods so as to bridge the knowledge gap in engineering and technology fields. Preschool educators can enhance their acquisition of soft skills through various strategies, including inviting guest speakers or professionals to share experiential knowledge. Play-based learning activities, such as robotic coding and building blocks, can engage children and foster skills like creativity, confidence, teamwork, system thinking, and ethical considerations.

Additionally, teachers can engage in action research projects to enhance STEM teaching through soft skills. However, the study revealed a lack of safety protocols during STEM activities. Prioritizing safety, age-appropriateness, and alignment with children's developmental stages is crucial. Teachers should undergo professional training to stay updated with safety regulations in STEM educational practices. Further research could explore safety regulations, including the use of non-hazardous materials and adequate first aid training. Integrating safety protocols into preschool STEM teaching can create a secure, supportive, and intellectually stimulating educational environment, ensuring children's safety and facilitating effective learning experiences. Emphasizing safety standards and professional practices is recommended by schools, teacher training institutions, and STEM educators, as suggested by Love, Duffy, Loesing, Roy, and West (2020).

Limitation

Despite its limitations, this study effectively addressed the research hypotheses and problem statement by obtaining interview data from voluntary schools in the Hulu Langat district. However, the findings may not be generalizable to all school districts or states. Additionally, the survey included participants from various fields of study, not limited to STEM subjects, making it challenging to draw specific conclusions regarding the impact of each element individually.

Conclusion

The literature review highlights a lack of ICT skills expertise among preschool teachers, potentially hindering their readiness to teach STEM lessons. Teachers often perceive technology as a barrier to STEM-based education, a concern addressed by analysing the causes of technology phobia, as discussed by Shidiq and Nasrudin (2021). Currently, in-house training is the primary strategy for professional development opportunities. Understanding these preferences can aid in designing customized approaches. Professional development training can enhance teachers' expertise in areas such as subject knowledge, planning, and career development. The research initiative aims to equip highly skilled teachers with resources to teach STEM courses in preschools using diverse creative concepts, aligning with the findings of Nguyen and Redding (2018) that recruiting STEM graduates with the necessary skills and expertise can improve the quality of STEM education.

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EDUCATIONAL DRAMA AND ITS EFFICACY ON SOCIAL, EMOTIONAL, AND INTERCULTURAL COMPETENCIES AMONG PRIMARY SCHOOL STUDENTS: A QUASI-EXPERIMENTAL STUDY

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Abstract

This empirical study, conducted at an American International school in Malaysia, examined the efficacy of online educational drama in fostering social, emotional, and intercultural (SEI) learning among 26 international students aged 8-12 at the primary level. Utilizing a mixed-methods convergent intervention design, it combined a pretest-post-test quasi-experimental approach with structured observations. Students were divided into two age groups (8-10 and 10-12) and further split into control and experimental groups. The experimental group was subjected to a 12-week online drama program, incorporating Information and Communication Technology (ICT) tools, drama techniques, and Social and Emotional Learning (SEL) activities, whereas the control group continued their drama lessons in regular classrooms. It was anticipated at the

beginning of the study that there would be no significant difference of learning efficacy in the SEI dimensions between the two groups. Post-intervention observations and analysis, however, revealed varied impacts of the intervention on SEI competencies. Younger students showed improvements in self-awareness, social awareness, and relationship skills, whereas older students exhibited mixed results in these areas, along with a decline in intercultural competencies. Observational data indicated high engagement levels despite technical challenges and distractions. Overall, the intervention was engaging but produced mixed outcomes on SEI competencies between ages, with notable technical difficulties affecting the experience. These findings suggest the need for ICT training for both students and teachers, the use of online drama as an engaging educational tool, and the integration of intercultural learning into SEL curricula.

Keywords: educational drama, online learning, socio-emotional and intercultural development

Introduction

Informed by Dewey and Addams, a school curriculum that emphasizes social and emotional learning (SEL) is deemed vital for the holistic development of learners, as acknowledged by leading educational organizations like CASEL (Elias et al., 1997; CASEL, 2020). SEL nurtures competencies crucial for navigating diverse environments, including intercultural communication (ICC) (Kozina, 2020; Durlak et al., 2022). The shift to virtual learning necessitates innovative approaches, with online educational drama emerging as a potential solution (Gatsakou et al., 2022; Tan et al., 2022). However, challenges persist, including self-regulation, online-offline relationship balance, and teacher training (Kamei & Harriott, 2021). Thus, addressing communication in this new context is crucial. Furthermore, advancements in information and communication technology (ICT) present both opportunities and challenges for online learning (Rawal & Deardorff, 2021). The study proposes leveraging educational drama to develop social, emotional, and intercultural (SEI) competencies in virtual settings, building on established frameworks and techniques (Deardorff, 2006; Weissberg et al., 2015; Hall et al., 2021; Piriyaphokanont & Sriswasdi, 2022).

Previous attempts to implement educational drama interventions for SEL within a multicultural environment were curtailed by challenges exacerbated by the shift to online delivery during the COVID-19 pandemic. Limited guidance and technical difficulties hindered effectiveness, highlighting the need for comprehensive research to validate and optimize such interventions (Kumar, 2019; Robbie & Warren, 2021). These problems initiated an inquiry into the use of online educational

drama to promote SEI learning supported by a literature review of global, regional, and local studies. However, there is a gap in studies addressing the participants' specific intercultural needs and how the competencies influence each other.

Durlak et al. (2022) suggest that future research should encompass diverse cultural contexts and determine the most effective program components within these environments. Rodríguez-Izquierdo (2018) thinks things should be taken further by suggesting that SEL practices be integrated into ICC learning and vice-versa. Such directions are reflected in efforts such as Erasmus+'s HAND in HAND, which evaluates SEI competencies (Kozina, 2020). These developments pave the way for research into novel program implementation techniques, such as online educational drama for SEI learning within the context of an American school in Malaysia.

Research is being conducted to explore these relationships, but none satisfy the contextual challenges posed by this study's research questions. Sajnani et al. (2020), Kumar (2019), and Mehrotra et al. (2020) suggest more experimentation with different online drama techniques in differing contexts to develop SEI competencies; however, they also focus on different populations or aspects of SEI learning, such as communication skills in higher education, or SEL in primary students outside the multicultural context. Tan et al. (2022) come closest to the demographics of the current study by evaluating drama techniques for SEL learning with virtual reality technology; however, their study focused on promoting skills in teenagers within a specific Singapore school as opposed to primary students in an American school in Malaysia. Given the gaps in

existing research, this current inquiry into SEI learning and educational drama may contribute to the field by identifying challenges and opportunities associated with practicing online educational drama for SEI learning, examining the impact of this process on SEI competencies, and assessing its overall effectiveness.

Research Aims and Questions

This study aims to enhance understanding of the role of online educational drama in SEI learning. It seeks to build on existing research by assessing the effects of such interventions on SEI learning, identifying the associated challenges and opportunities, and evaluating the strategies employed. In pursuit of these aims, the following research questions were developed:

1. Does online educational drama contribute to developing learners' SEI competencies?
2. What challenges and opportunities are presented by online educational drama for developing these competencies?
3. How effectively do students use intervention strategies to develop SEI competencies?

Conceptual Framework

The main aim of this study was was to assess the effectiveness of online educational drama techniques to enhance these competencies while exploring the associated challenges and opportunities. Figure 1 depicts the

study's conceptual framework, a synthesized model based on CASEL's model of SEL (CASEL, 2020), Deardorf's model of ICC (Deardoff, 2006), Heathcote & Bolton's theories on Drama in Education (Heathcote & Bolton, 1994), Boal's Forum Theatre (Boal, 1979), and the model of Experiential Learning Cycle within the Community of Inquiry for online learning (Hall et al., 2021). The model suggests that experiential learning within the community of inquiry, educational drama activities coupled with socio-emotional activities employing an intercultural lens exert certain impacts on SEI competencies. Furthermore, it is an expression of the intervention implemented on the dependent variable of SEI competencies using the independent variable of online educational drama.

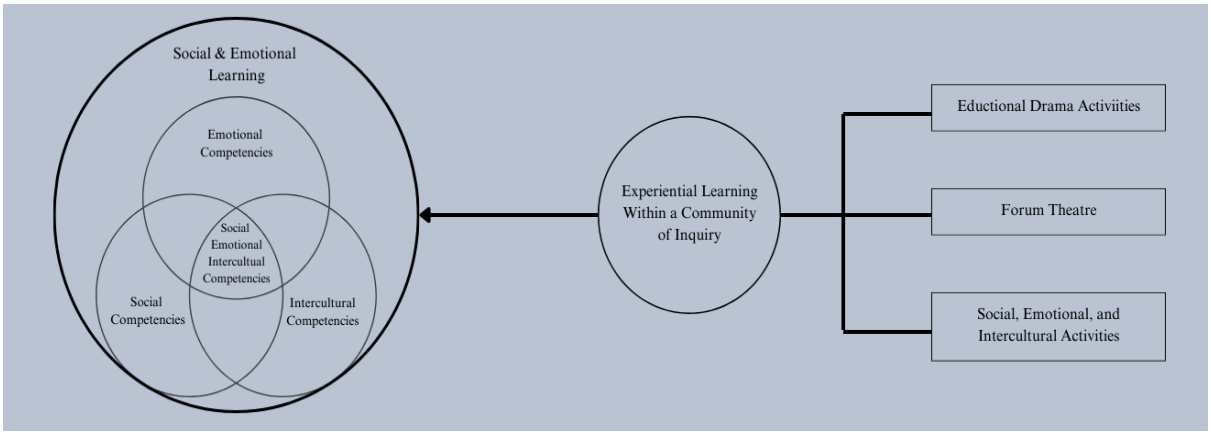

Figure 1

Expression Pathway Of Socio-Emotional And Intercultural Competencies Through Educational Drama in an Online Environment

Research Methodology

The study employed a mixed-methods approach, focusing on a diverse group of students in an international school in Malaysia. The approach employed the convergent intervention design integrating quantitative pretest-post-test analysis with qualitative observational checklists (Creswell, 2021). A quasi-experimental pretest/post-test design assessed the intervention's impact on SEI competencies. Thematic coding on qualitative observations, when converged with quantitative results, allowed for an in-depth evaluation of the intervention strategies used.

Data collection involved administering a pretest and post-test questionnaire to both control and experimental groups. This questionnaire was adapted from the Erasmus+'s HAND in HAND project, assessing scales specific to the measured competencies defined as *Self-Awareness, Self-Management, Social Awareness, Relationship Skills*, and *Intercultural Competence* (Roczen et al., 2020). Within these scales, subscales further specified learning outcomes such as *positive identity from confidence* for the *Self-Awareness* subscale or *Critical Consciousness* for the *Egalaterianism* subscale (Roczen et al., 2020). Questions comprised a 4-point or 5-point Likert scale generated from questions stems such as "To what extent do you agree with the statement?", "How well does this statement describe me?" and "How often is the following true?" (Roczen et al., 2020).

Responses to the 4-point and 5-point scales were normalized to a percentage for statistical analysis. Statistical analysis, including mean comparisons, *t*-tests, and correlation analysis, was conducted using SPSS

(Cohen et al., 2017; Rogers & Revesz, 2019). Qualitative data was analyzed using ATLAS.ti software.

Participants were primary students from an American International School in Malaysia. 26 students were randomly divided into control and experimental groups according to age and Grade level. The study focused on students aged 8 to 12, representing grades 3 to 6, ensuring diversity in age and grade levels (Bhardwaj, 2019). Experimental and control groups were split within these age and grade levels as groups A (grades 3 & 4) and B (grades 5 & 6).

The intervention spanned three phases: introduction, preparation, and practice. Utilizing Zoom and various educational tools, students engaged in team-building activities, roleplays, and conflict-resolution exercises over 12 weekly sessions. Each phase was tailored to the experimental groups' specific needs and developmental levels, with content adapted from Harmony's established SEL curricula (Yoder, 2022; Morrison et al., 2019).

Two observers conducted structured observations during intervention sessions using a predefined thematic framework. Data collected through field notes were analyzed thematically using ATLAS.ti software. The Thematic analysis focused on identifying challenges, opportunities, and behavioral patterns related to SEI competencies during the intervention (Creswell, 2021; Cohen et al., 2017). This methodology addressed qualitative and quantitative outcomes to fully evaluate and give insights into the online educational drama's effectiveness in promoting SEL competencies. However, limitations include sample size, lack of

quantifiable instruments, funding constraints, and the researcher's relative inexperience in experimental research (Müller et al., 2020).

Ethical research practices were employed to protect all parties, including before, during and after the intervention. Ethical considerations included obtaining informed consent, ensuring participant anonymity, and providing support services during the intervention to address potential distress (Cohen et al., 2017; Kellehear, 2020).

Research Findings

This section is presented in three parts: the quantitative part with tables representing paired *t*-tests between control/experimental conditions for groups A and B; the Qualitative part with results of the thematic coding; and finally, an integration part of quantitative and qualitative represented in a joint display.

Part 1: Quantitative Analysis and Findings

The quantitative data analysis conducted using SPSS revealed significant findings regarding the effects of the intervention on Social and Emotional Intercultural (SEI) competencies for both Group A and Group B. A general description of intervention issues is presented below.

For Group A, the intervention seemed to stabilize or improve certain SEI competencies, such as *Self-Awareness*, *Self-Management*, and *Relationship Skills*. However, there were declines in some areas, particularly in the *Intercultural Competence* scale, indicating mixed impacts. Inferential statistics showed higher impact sizes in the

experimental group, suggesting that the intervention played a part in developing or mitigating certain competencies. Technical difficulties were noted to have a significant impact, leading to distress and disengagement among participants. Overall, the data suggested that the intervention had a variable impact on SEI competencies, with some areas showing improvement or stabilization while others experienced declines.

For Group B, the intervention had a more mixed impact on SEI competencies, with both increases and declines observed in different scales and subscales. While there were improvements or stability in some areas, like *Self-Awareness* and *Social Awareness*, there were also declines in others, particularly in *Relationship Skills* and *Intercultural Competence*. Technical difficulties were also present in Group B but to a lesser extent than in Group A, still impacting engagement and causing disengagement and distress among participants. Inferential statistics showed minimal impact from the intervention, with mostly weak relationships between tests and insignificant results in many cases. Overall, the data suggested a varied intervention influence on SEI competencies in Group B, with both positive and negative effects observed.

The integration of quantitative and qualitative findings provided further insights into the impact of the intervention on SEI competencies. It highlighted the convergence and divergence between the two data types, indicating where findings aligned and differed. For example, both groups showed *high engagement* during the intervention, but *technical difficulties* negatively impacted engagement and performance differently in each group. The integration helped provide a comprehensive understanding of

the intervention's effects, considering both quantitative outcomes and qualitative observations of participant behavior and experiences.

Results from Statistical Analysis

All descriptive and inferential analysis was conducted using SPSS software. Each scale and subscale underwent paired and unpaired *t*-tests, revealing descriptive and inferential statistical results between tests and groups. What follows is a summary of the results of that analysis.

Table 1

Paired t-tests between pretest and post-test for Group A control and experimental conditions.

Summary of Group A

Group A	***Scale***	***Subscale***	***MΔ***	***SD***	***t***	***p* (*t*-value)**	***R***	***p* (*r*-value)**
Control	Self-Awareness	*Self-Awareness*	-6.21	16.38	1.00	0.35	0.11	0.82
		Observation	-2.45	22.28	0.29	0.78	0.00	0.99

	Description	-9.79	26.44	0.98	0.36	-0.08	0.87
	Acceptance	-2.50	28.61	0.23	0.82	-0.04	0.93
	Awareness	-2.29	17.83	0.34	0.75	-0.17	0.71
Self-Management	*Emotional Problems*	5.10	12.00	-1.13	0.30	0.54	0.21
Social Awareness	*Perspective Taking*	-4.08	11.53	0.94	0.39	0.56	0.19
Relationship Skills	*Caring*	-4.76	11.97	1.05	0.33	0.58	0.17
Intercultural Competence	*Attitude Towards Immigrants*	-1.19	7.10	0.44	0.67	0.77	0.04
	Egalitarianism	4.29	13.97	-0.81	0.45	0.72	0.07

	Classroom Climate	*Attitude towards Intervention*	-10.71	16.44	1.72	0.14	0.27	0.56
Experiment	Self-Awareness	*Self-Awareness*	-1.19	7.10	0.44	0.67	0.44	0.32
		Observation	-10.61	16.80	1.67	0.15	0.74	0.06
		Description	-4.08	9.46	1.14	0.30	0.49	0.26
		Acceptance	3.21	13.44	-0.63	0.55	0.30	0.51
		Awareness	-2.86	11.31	0.67	0.53	0.45	0.31
	Self-Management	*Emotional Problems*	2.55	8.43	-0.80	0.45	0.66	0.10
	Social Awareness	*Perspective Taking*	-2.85	10.56	0.72	0.50	0.53	0.22
	Relationship Skills	*Caring*	-2.38	11.61	0.54	0.61	0.76	0.05

Intercultural Competence	*Attitude Towards Immigrants*	-4.76	8.13	1.55	0.17	0.79	0.03
	Egalitarianism	-6.43	18.64	0.91	0.40	0.14	0.76
Classroom Climate	*Attitude towards Intervention*	-3.69	6.84	1.43	0.20	0.80	0.03

Table 1 shows how SEI competency scores declined from the pretest to the post-test for Group A's control and experimental groups. This table presents a comprehensive dataset including mean changes (*MΔ*), standard deviations (*SD*), and statistical significance (*t*-values and *r*-values) between tests for both conditions. The data shows a general decline in SEI competencies across the board; however, except for the *Intercultural Competence* scale, the decline was generally less severe in the experimental group.

According to descriptive statistics, the experimental group showed a moderate decline or stabilization in scores, such as the *Relationship Skills* or *Social Awareness* scales, compared to the control group. For instance, *Relationship Skills* displayed a less pronounced decline in the experimental group (*MΔ* = -2.38, *SD* = 11.61) versus the control group (*MΔ* = -4.76, *SD* = 11.97). Moreover, an improvement in the *Acceptance* subscale for the experimental group illustrates a positive change (*MΔ* = 3.21, *SD* = 13.44) compared to the control (*MΔ* = -2.29, *SD* = 28.61), contrasting with

declines in other areas. On the other hand, the experimental group's scores in *Intercultural Competence* declined more than those in the control group. For instance, the *Egalitarianism* subscale demonstrated greater declines for the experimental group ($M\Delta$ = -6.43, SD = 18.64) than the control group ($M\Delta$ = 4.29, SD = 13.97), suggesting the intervention may have had an unintended effect in these areas, indicating a complex influence on participants' perspectives on equality.

Inferential statistics such as t & r values assess the significance of score changes and the strength of correlations between pre and post-tests. They suggest that the intervention impacted these scores as mitigating, positive, and negative influences. For instance, t-tests suggest greater statistical differences in some scales and subscales, such as results for the *Observation* subscale in the experimental group (t = 1.67, p = 0.78) and the control (Control: t = 0.29, p = 0.78). Meanwhile, r-values generally suggest stronger correlations in the experimental group for changes over time. For instance, the results of correlational statistics for the experiment group in the *Relationship Skills* scale (r = 0.76; p = 0.05) show a stronger relationship between tests than the control (r = 0.58, p = 0.17).

However, it's crucial to approach these statistical findings with caution. Many of the observed changes did not meet the standard threshold for statistical significance ($p < 0.05$), implying that while the intervention revealed certain trends, they might not be statistically significant across the board. That is to say, for Group A, there were no significant differences between the experimental and the control group in all aspects of comparison, either at the scale or subscale level indicated in Table 1.

Overall, the intervention appears to have played a differential role in influencing SEI competencies within the experimental group of Group A. While it helped to mitigate the overall decline in competencies or even improve them in specific areas, its impact was not uniformly positive across all scales.

Table 2

Paired t-tests between pretest and post-test for Group B control and experimental conditions

Summary of Group B

Group B	***Scale***	***Subscale***	***MΔ***	***SD***	***t***	***p (t-value)***	***r***	***p (r-value)***
Control	Self-Awareness	*Self-Awareness*	0.00	19.19	0.000	1.00	0.14	0.78
		Observation	5.24	16.99	-0.75	0.48	0.09	0.87
		Description	8.57	14.79	-1.42	0.21	0.20	0.70
		Accept w/o judgment	5.55	29.34	-0.46	0.66	-0.70	0.12

		Awareness	0.67	17.24	-0.09	0.93	-0.81	0.05
	Self-Management	*Emotional Problems*	0.59	24.27	-0.06	0.95	0.15	0.77
	Social Awareness	*Perspective Taking*	-12.38	32.16	0.94	0.39	-0.30	0.56
	Relationship Skills	*Caring*	1.39	14.98	-0.23	0.83	0.41	0.42
	Intercultural Competence	*Attitude Towards Immigrants*	5.56	9.00	-1.51	0.19	0.77	0.07
		Egalitarianism	0.00	35.36	0.00	1.00	-0.51	0.31
	Classroom Climate	*Attitude towards Intervention*	6.95	19.48	-0.87	0.42	-0.41	0.43
Experiment	Self-Awareness	*Self-Awareness*	1.19	31.52	-0.10	0.92	-0.65	0.11

	Observation	0.00	31.25	0.00	1.00	-0.33	0.47
	Description	2.04	28.98	-0.19	0.86	-0.13	0.77
	Accept w/o judgment	0.64	29.95	-0.06	0.96	-0.71	0.08
	Act w/Awareness	3.71	20.99	-0.47	0.66	-0.26	0.57
Self-Management	*Emotional Problems*	2.55	17.94	-0.38	0.72	-0.11	0.81
Social Awareness	*Perspective Taking*	-2.04	17.43	0.31	0.77	-0.27	0.56
Relationship Skills	*Caring*	-1.99	16.01	0.33	0.75	0.21	0.64
Intercultural Competence	*Attitude Towards Immigrants*	-4.17	11.28	0.98	0.37	0.21	0.65

	Egalitarianism	-18.75	20.41	2.43	0.05	0.49	0.26
Classroom Climate	*Attitude towards Intervention*	5.96	21.09	-0.75	0.48	-0.67	0.10

Table 2 shows that analysis of Group B reveals a much more mixed review of the intervention on SEI competencies. The table reveals both increases and decreases in mean scores and standard deviations from pretest to post-test across various scales and subscales for both groups. For example, while both groups exhibited improvements or maintained stability in *Self-Awareness*, the dispersion of scores varied widely, as seen in the *Description* subscale with mean differences and standard deviations (Control: $M\Delta$ = 8.57, *SD* = 14.79; Experiment: $M\Delta$ = 2.04, *SD* = 28.98). This indicates non-uniform changes across the board. In certain areas, each group demonstrated strengths over the other. For example, the experimental group showed relative improvements in *Self-Management* ($M\Delta$ = 2.55, SD = 17.94) compared to the control group ($M\Delta$ = 0.59, *SD* = 24.27), whereas the control group saw better outcomes in *Relationship Skills* ($M\Delta$ = 1.39, *SD* = 14.98) versus the experimental group ($M\Delta$ = -1.99, *SD* = 16.01). However, these changes were characterized by considerable variability, reflecting inconsistent development across competencies.

Inferential statistics, such as *t* & *r* values, indicated generally weak associations and minimal statistical differences between pretest and post-test outcomes. For instance, the *Observation* subscale showed

negligible differences in experimental (t = 0.00, p = 1.00; r = -0.33, p = 0.47) and control (t = -0.75, p = 0.48; r = 0.09, p = 0.87) groups. Furthermore, most observed changes did not reach statistical significance ($p < 0.05$), except for a notable decrease in the experimental group's *Egalitarianism* scale ($M\Delta$ = -18.75, SD = 20.41; t = 2.43, p = 0.05), suggesting a significant negative impact from the intervention. However, the significance of this finding is tempered by the correlational analysis (r = 0.49, p = 0.26), which indicates the possibility of random variance rather than a direct effect of the intervention.

Overall, analysis indicates that the intervention's influence on SEI competencies was varied, with the experimental group seeing some maintenance or improvement in certain areas despite a possibly negative impact in others. The results also indicated that for Group B students, there were no significant differences in almost all aspects of SEI competencies between the online drama lessons and the normal classroom drama lessons.

Part 2: Qualitative Key Findings

All thematic coding was conducted using Atlas.ti. Themes are presented with references to the field notes conducted during the intervention. Group A was analyzed before the process was repeated for group B.

Figure 2 shows that thematic analysis of the field notes compiled during the structured participant observation revealed a blend of challenges and opportunities. Results of thematic coding reveal the themes of *high engagement* and *high student technical difficulty* occurring more

than any other themes, giving way to other themes such as *disengagement* and *distress*.

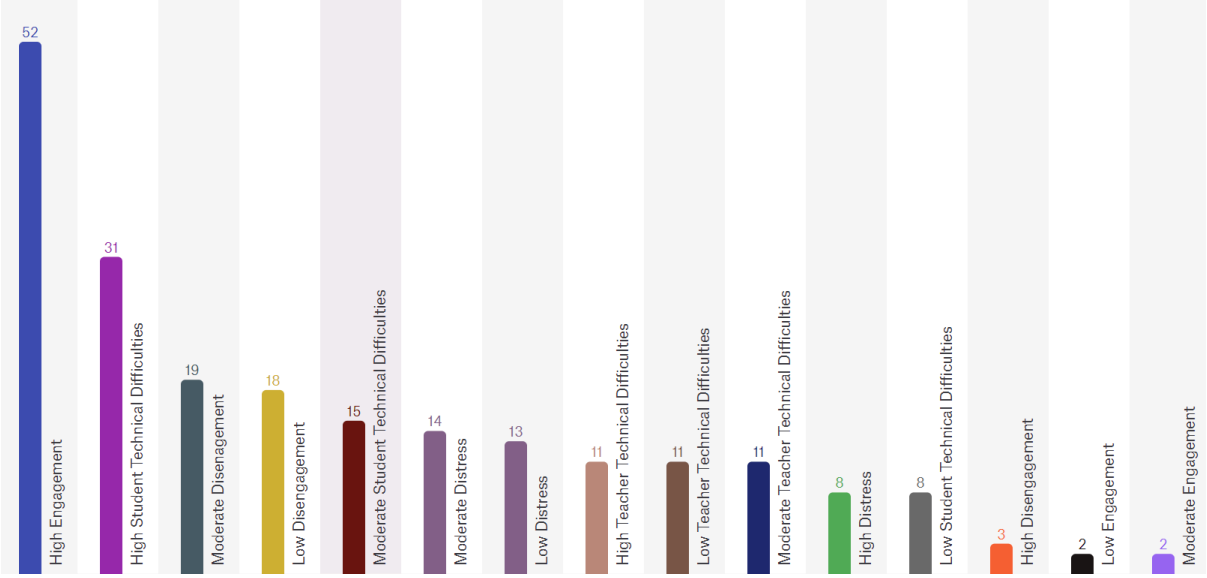

Figure 2

Thematic coding results on field notes from observations in Experiment Group A

The first theme is revealed through high occurrences of engagement during drama activities, such as story reading, roleplay during the STEP process, and the Forum Theatre performances. Active participation was observed during class discussions, and excitement was evident in "self-introductions" and ice-breaking exercises using ICT tools such as Padlet and Jamboard. This engagement was further demonstrated by the eagerness of students to assist each other with technical issues, which not only boosted their technical prowess but also fostered a sense of community and collaborative learning. Moreover, students freely

expressed their thoughts and related personal experiences to class content, enriching the learning experience with diverse perspectives.

However, this engagement was often hampered by significant technical difficulties. Issues ranged from poor internet connectivity to problems with navigating educational platforms like Zoom and Google Classroom. These technical challenges consumed considerable class time, which could have been otherwise used for educational activities, and sometimes led to student distress and disengagement. For instance, in one instance, "the whole class time" was devoted to solving technical hiccups. For some, the frustration with technical barriers also led to moments of stress and anxiety, detracting from the educational experience. These were evidenced by students "turning off cameras" and requiring "time with the emotional support" provided during the intervention.

Thematic analysis of the field notes compiled during the structured participant observation, shown in Figure 3, again revealed *High Engagement* as observed in Experiment Group A. However, this opportunity came at a cost, as thematic coding revealed a complex interchange of *disengagement* and *distress* from bouts of *Technical Difficulties.*

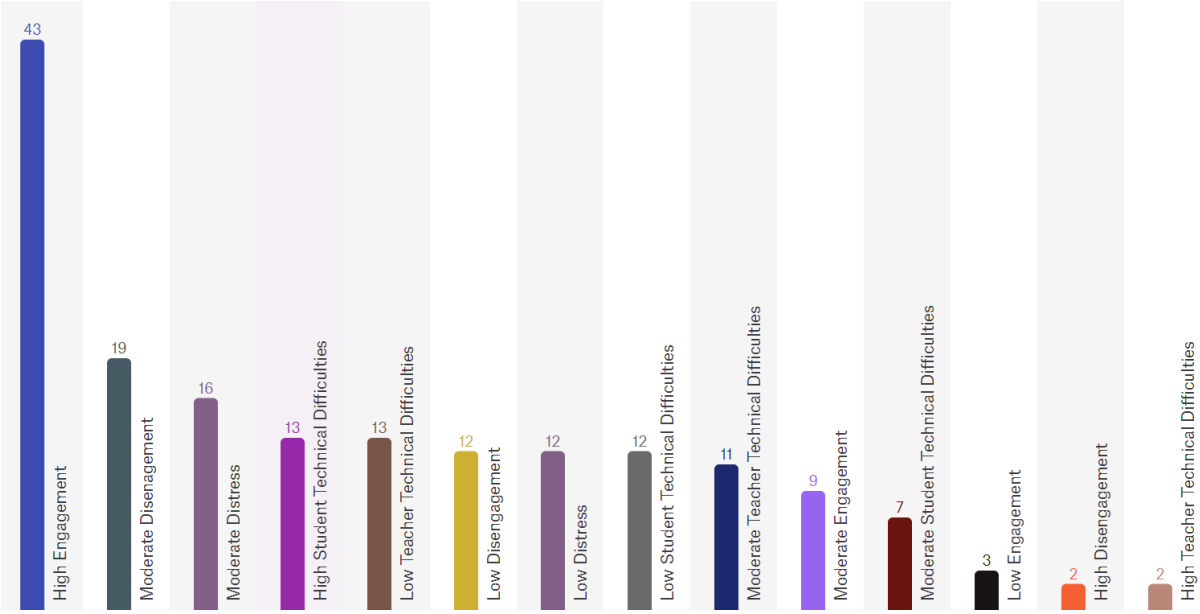

Figure 3

Thematic coding results on field notes from observations in Experiment Group B

High engagement was noted in Experiment Group B, similar to Group A, with a marked preference for interactive online and drama activities. Students showed a keen interest in activities like the "Iceberg Project on JamBoard" and were proactive in sharing personal values. Drama exercises captured their attention, with "reading different scenarios" and using the STEP process when "performing and trying solutions" during Forum Theatre performances. Sometimes, participation was observed after class, with students discussing scenarios and engaging with Google Classroom independently.

However, this heightened engagement became disengagement when lessons were interrupted by technical difficulties. For instance, there were instances with "25 minutes lost to class time" due to internet lags and

platform navigation challenges, which fostered distress, as seen in Jamboard mishaps and connectivity-induced stress. During these technological detractions, Students became distracted by digital features like "filters" and "chats" and, at times, diverted to unrelated online content, leading to moderate disengagement.

These technical problems were lower than in Group A but still significant, revealing a connection between technical troubles and classroom management challenges. Technical glitches hampered individual focus and impacted the class's overall dynamic, creating a feedback loop of disengagement and distress. These disruptions underscore the delicate balance between leveraging technology for engagement and the potential for disengagement and anxiety when technical issues arise.

Part 3: Integration of Quantitative and Qualitative Findings

The following joint display tables show the integration of qualitative and quantitative data. It makes inferences from the two data sets and evaluates the intervention on SEI competencies. The table compares themes and quotations from qualitative data sets with independent *t*-tests from the quasi-experimental intervention. Here, *MΔ* and *SDΔ* show differences between the control and experimental groups. Positive differences in the means show where the experimental group improved relative to the control, and negative differences in standard deviation show a tighter spread around the means. *t* & *p* values show the statistical significance of these differences. As a result of this integration, convergences, and divergences between the experimental conditions and

age groups allow for an in-depth analysis of the impact of the intervention, a report on observed challenges and opportunities, and an evaluation of the techniques used.

Table 3

Integration of quantitative and qualitative findings in a joint display of independent t-tests between condition statistical differences and thematic coding for Group A

Joint Display of Group A Findings

Scale	*Subscale*	*M Δ*	*SD Δ*	*t*	*p*	*Themes*	*Quotations*
Self-Awareness	*Self- Awareness*	5.02	-9.27	0.74	0.47	Engagement	The students responded to the teacher's questions about self-consciousness and gave their full attention during the Sulwe story.
	Observation	-8.16	-5.48	-0.77	0.45	Technical Difficulties, Disengagement, Distress	Participants could not hear anything and showed distress when they could not act at the scene.
	Description	5.71	-16.98	0.54	0.60	Engagement	High engagement, especially during the story and self-talk sharing
	Acceptance	5.71	-15.17	0.48	0.64	Engagement	They were very vocal about the relaxation techniques.
	Awareness	-0.57	-6.52	-0.07	0.94	Technical Difficulties, Disengagement, Distress	lost close to 25 minutes in class time.
Self-Management	*Emotional Problems*	-2.55	-3.57	-0.46	0.65	Technical Difficulties, Disengagement, Distress	In between classes, He put his hands on another student's neck.
Social Awareness	*Perspective Taking*	1.22	-0.97	0.21	0.84	Engagement	Although the class could not act out their ideas, they could point out ideas, such as taking turns to recycle and identifying how the actors were feeling.
Relationship Skills	*Caring*	2.38	-0.36	0.38	0.71	Engagement	Participants cared to include an actor's name (how his name was spelled in the document- how his name needed to be pronounced).
Intercultural Competence	*Attitude Towards Immigrants*	-3.57	1.03	-0.88	0.40	Technical Difficulties, Disengagement, Distress	Participants said that they had been on the receiving end of some rude behavior.
	Egalitarianism	-10.71	4.67	-1.22	0.25	Technical Difficulties, Disengagement, Distress	Muhiman requested to be moved to the control group because his friends were in the control group, which reminded him of COVID-19.
Classroom Climate	*Attitude towards Intervention*	7.02	-9.60	1.04	0.32	Engagement	The students enjoyed watching the performance and were interested in participating as the actors.

Integrating the quantitative results between control and experimental groups with thematic analysis from participant observation, as shown in

Table 3, reveals where findings converge and diverge in understanding the relationship between using online educational drama for SEI competencies.

Data converges when considering engagement in the intervention. Descriptive analysis suggests the intervention may foster Social and Emotional competencies reflected in positive differences between groups for scales and subscales such as *Self-Awareness* ($M\Delta$ = 5.02), *Description* ($M\Delta$ = 5.71), *Acceptance* ($M\Delta$ = 5.71), *Social Awareness* ($M\Delta$ = 1.22), *Relationship Skills* ($M\Delta$ = 2.38, SD = -0.36), and *Attitude toward Intervention* ($M\Delta$ = 7.02). Qualitatively, *high engagement* was evident in drama activities and class participation, aligning with the positive quantitative findings and signifying convergence around beneficial aspects such as community-building and mutual support among students during the intervention. However, the relationship between the intervention and relationship skills and social awareness diverges when inferred from the *t*-test results. Despite positive changes observed in descriptive analysis engagement, the *t*-tests indicate these changes are insignificant as observed differences did not reach statistical significance ($p < 0.05$), suggesting the intervention's limited role in influencing these outcomes.

The data also converges around the negative impacts of the intervention when considering *technical difficulties*. Quantitative measures indicated lower scores in scales and subscales such as *Observation* ($M\Delta$ = -8.16, SD = -5.48), *Self-Management* ($M\Delta$ = -2.55, SD = -3.57), and *Intercultural Competence*, suggesting negative impacts of the intervention. Qualitative reports suggest that technical difficulties disrupt the class, leading to disengagement and distress among the participants. Integration

of the results suggests that the technical problems may have had a tangible impact on students' ability to Manage Emotions.

Interestingly, as indicated by convergence and divergence in skills such as *Social Awareness* and *Relationship Skills*, showing stronger in-group cohesion, this cohesion, coupled with technical problems, disengagement, and distress, may have strengthened outgroup division on attitudes towards immigration and equal rights. Furthermore, the *Intercultural Competence* scale is the only one to become relatively more inconsistent when considering the standard deviation, such as the Egalitarianism subscale ($M\Delta$ = 10.71, SD = 4.67), suggesting that experimental participants diverged further from the mean score from the pretest to the post-test than the control group. These divergences suggest that while the intervention has potential, its quantitative effectiveness is complicated by technical difficulties.

Moreover, except for the *Intercultural Competence* scale, convergence occurs when descriptive statistics like standard deviation suggest that the experimental group's responses became relatively more consistent post-intervention, such as responses in *Self-Management* (SD = -3.57) or *Description* (SD = -16.98), hinting at the stabilizing effect across most scales and subscales. Qualitatively, engagement may influence this stabilization when considering engagement in group cohesion and active participation observed during the intervention. Higher t-values reflect the intervention's influence, although this influence must be cautiously interpreted due to the insignificance suggested by high p-values, indicating that differences could be due to chance.

In summary, the data converges on the positive and negative effects of the intervention manifested by *high engagement* and *technical challenges* reflected in positive and negative differences between groups. However, data diverges in representing the full scope of student engagement and community benefits, described in qualitative observations and descriptive analysis but not as clear during inferential analysis.

Table 4

Integration of quantitative and qualitative findings in a joint display of independent t-tests between condition mean differences and thematic coding for Group B

Joint Display of Group B Findings

Scale	*Subscale*	*M Δ*	*SD Δ*	*t*	*p*	*Themes*	*Quotations*
Self-Awareness	*Self- Awareness*	1.19	12.34	-0.08	0.94	Engagement	Students were eager to share their values and hobbies with the class.
	Observation	-5.24	14.26	0.37	0.72	Technical Difficulties, Disengagement, Distress.	Lost about 25 minutes of class time
	Description	-6.53	14.19	0.50	0.63	Technical Difficulties, Disengagement, Distress.	Most of the class was lost to technical problems. It was solved with 15 minutes left in class, resulting in a rushed production of the activity and miscommunication on how to solve the scenario.
	Acceptance	-4.92	0.61	0.30	0.77	Technical Difficulties, Disengagement, Distress.	The students also used the chat to discuss things unrelated to the lesson.
	Awareness	3.05	3.75	-0.28	0.78	Engagement	They were excited to share their ideas and were keen on being part of the acting.
Self-Management	*Emotional Problems*	1.96	-6.33	-0.17	0.87	Engagement	able to seek teachers' help with using Zoom and Google Classroom.
Social Awareness	*Perspective Taking*	10.34	-14.72	-0.74	0.48	Engagement	The class was active in discussing the STEP process.
Relationship Skills	*Caring*	-3.37	-14.72	0.39	0.70	Technical Difficulties, Disengagement, Distress.	Mostly disengaged while waiting for the scenario to start and using the Zoom chat to send funny messages to each other.
Intercultural Competence	*Attitude Towards Immigrants*	-9.72	1.03	1.70	0.12	Technical Difficulties, Disengagement, Distress.	There was a lot less participation today, perhaps due to the content.
	Egalitarianism	-18.75	2.28	1.19	0.26	Technical Difficulties, Disengagement, Distress.	There was distress when one student took over the Jamboard and put a gun on it.
Classroom Climate	*Attitude towards Intervention*	-0.99	-14.94	0.09	0.93	Technical Difficulties, Disengagement, Distress.	The participant showed distress with rapid breathing when working on his computer.

Integrating the quantitative results between Group B control and experimental groups with thematic analysis from participant observation, as shown in Table 4, reveals interesting differences where findings

converge and diverge relative to Group A. Overall, data again converges positively and negatively in differences between the control and experimental groups. However, as Group A's *technical difficulties* contributed to a *lack of engagement* and *distress*, converging with lower differences between control and experimental groups, Group B's *lack* of *technical difficulties* contributed to more *disengagement* and *distress*, converging with negative differences between control and experimental groups.

Again, data converges when considering engagement in the intervention. Descriptive analysis suggests the intervention may foster social and emotional competencies reflected in positive differences between groups for scales and subscales such as *Self-Awareness* (*MΔ = 1.19*), *Awarness* (*MΔ = 3.05*), *Self-Management* (*MΔ = 1.96*), *and Social Awareness* (*MΔ = 10.34*). Like group A, high engagement was evident in drama activities and class participation, aligning with the positive quantitative findings and signifying convergence around beneficial aspects such as community-building and mutual support among students during the intervention.

There are some noticeable differences in the convergence of qualitative and quantitative findings in Group B. The data also converges around the negative impacts of the intervention when considering technical difficulties. However, these seem to respond to the *lack* of *technical difficulties.* Qualitative reports suggest a more pronounced amount of activity and engagement with technical components unrelated to the activities in class. This disengagement with the class was due to chatting between participants, online search inquiries, and playfulness with online

components unrelated to the activities. Though this disengagement has fewer observed instances than Group A, the number of occurrences may be much more due to the hidden nature of chatting and online search inquiries. Furthermore, these instances resulted from teacher intervention with *student technical difficulties*, meaning that there was more play when students were forced to wait for class to resume after prolonged technical difficulties. This disengagement converges with descriptive analysis, which indicates lower scores in most scales and subscales.

Although there is convergence in descriptive analysis and observational recordings, with the exception of the *Intercultural Competence* scale, lower *t*-tests indicate divergence when considering that the intervention had a limited role. For instance, the highest *t* value is evidenced in *Description* ($t = 0.50$). Curiously, the only instance of convergence between inferential analysis and observed behavior was revealed in high *t*-values with negative differences between groups in the *Intercultural Competence* scale. For example, the *Egalitarianism* subscale saw a large decrease in the mean with a wider spread around that mean with larger statistical differences ($M\Delta = -18.75$, $SD = 2.28$; $t = 1.19$, $p = 0.28$). Although the *p*-values state these are statistically insignificant, when considering how *t*-tests between tests returned statistically significant high *t*-values, it becomes clear that the intervention did have some impact on the drop in scores in the experimental group. However, no observational evidence might explain this drop due to the intervention. Though there is no observational evidence, inferential evidence points to the intervention's direct involvement in decreasing *Intercultural Competence*.

In conclusion, integration finds convergence when considering how descriptive analysis indicates how the intervention benefits and hinders performance through a mixture of *high engagement* with the intervention and *disengagement* with *distress* brought on by occurrences of *technical difficulties*. However, when considering *t*-values, the data diverges due to the intervention's minimal role in the scores.

Discussions

As technology advances and global interconnectivity increases, integrating social, emotional, and intercultural learning into online environments becomes more crucial. This study continues this discourse by using creative educational drama techniques online to foster SEI development. It was driven by research questions aimed at analyzing the role of online educational drama on SEI competencies, observing the challenges and opportunities revealed during practice, and evaluating the strategies students employ.

A literature review was conducted to build a solid understanding of the current trends and theories in SEI learning, ICT, and educational drama. This review explored how these elements interplay and pinpointed existing research gaps informing the theoretical and conceptual frameworks that guided this study. Employing the mixed-methods convergent intervention design approach, the research delved into the intricate relationship between online educational drama techniques and SEI learning. The findings of this research offer valuable insights into the field of SEI learning applications. They lay the groundwork for future

research, highlighting the potential and challenges that must be addressed as investigations evolve.

The assessment reveals mixed impacts on SEI competencies, with Group A showing stabilization and some improvements, while Group B exhibits declines in several areas. Technical difficulties and engagement levels significantly influence outcomes, with Group A experiencing distress due to technical issues and Group B showing disengagement when such issues were absent.

The study suggests that while online educational drama can enhance certain SEI competencies, challenges like technical difficulties and engagement levels must be addressed. Practical implications include leveraging drama as engaging activities, early technology education for teachers and students, and explicit ICC learning integration. Theoretical implications highlight the need for more research on the relationship between SEI and ICC competencies and the development of cohesive curriculum models.

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