

A Mixed-Method Study on Professional Learning Communities in Enhancing the Digital Competence of Primary Schools English Teachers in Malaysia

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ABSTRACT

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The current study examined the relationships between primary school English language teachers' engagement in Professional Learning Community (PLC) and their digital competence. It also explored the challenges faced by the teachers in participating in PLCs. A mixed-method research design employing an online survey and semi-structured interviews was used to collect data. For the survey, the cluster sampling technique was used to select 150 primary school English teachers, and the data were analysed using descriptive statistics. For the qualitative method, 10 teachers were chosen using purposive sampling to participate in online semi-structured interviews. The interview data were then analysed using thematic analysis. The quantitative findings showed a positive correlation between PLC engagement and teachers' digital competence. It showed that teachers who are actively engaged in PLCs have a higher level of digital competence. The qualitative findings identified five major themes of challenges faced by teachers in PLC participation: workload constraints, insufficient collaboration, inconsistent leadership support, and limited digital training. Findings suggest that improved leadership engagement, adequate resource provision, and targeted digital training within PLCs are key factors for enhancing teachers' digital literacy and enabling meaningful technology integration in teaching English in primary schools.

Introduction

Digital competency of teachers is crucial for navigating the evolving educational landscape (Ng et al., 2023), and it is highly regarded because of its significant impact on students' learning outcomes (Darling-Hammond, 2000; OECD, 2005). Recently, educational practices have undergone major transformations due to the rapid rise of digital technology. It has made digital competence an essential skill for 21st-century teachers. Moreover, the effectiveness of teaching

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is closely linked to teachers' expertise, preparedness, and openness to adopting and applying pedagogical innovations that integrate technology. The Malaysian Ministry of Education (MOE) has acknowledged the relevance of digital transformation for educational advancement, leading to the implementation of various initiatives to strengthen technology-integrated teaching. Professional Learning Communities (PLCs) in Malaysia began gaining momentum after they were identified in the Ministry of Education Malaysia's Interim Strategic Plan 2011–2020 as a key goal for improving the quality of education and teacher professional development. Currently, PLCs in schools have been recognized as a key approach to Continuous Professional Development (CPD), as encouraged by the Malaysian Transformation Education Bulletin, *Buletin Anjakan* (Issue No. 7/2015). In response to these initiatives, several State Education Departments have included PLC participation and teacher contributions as part of the Key Performance Indicator (KPI) for appraising their professional development efforts.

Collaboration in professional development has long been recognised as a critical component of effective teaching practice. However, its significance has been revitalized in the context of contemporary education, particularly in response to the evolving landscape of technology-integrated instruction. According to Lai and Bower (2024), the origins of PLCs can be traced to early 20th-century learning communities, particularly through John Dewey's 1933 emphasis on teacher collaboration and student-centered learning. Similarly, Meiklejohn's Experimental College model in the 1920s gave emphasis to the value of teacher collaboration and reflective practice (Meiklejohn, 2001). The core ideas of these early approaches continue to shape modern PLCs. Early approaches to PLCs offer structured opportunities for professional and formal dialogue and shared reflection. Although schools are encouraged to implement PLCs, Kementerian Pendidikan Malaysia (KPM, 2013) claims that, to secure overall benefits, systematic support and institutional commitment are still needed, as implementation is at an early stage. According to Ala-Mutka (2011), effective technology integration is linked to teachers' digital competence, which includes the ability to use, evaluate, and apply digital tools effectively in the classroom. Barjeshtesh (2024) claims that digital literacy among teachers is crucial for delivering engaging, interactive lessons. Valtonen et al. (2021) claimed that the use of digital tools can improve student engagement in the classroom. To integrate digital tools into teaching, English teachers, especially, must be proficient in using technology to create an immersive learning environment and facilitate student interactions.

Fullan & Hargreaves (2012) highlight that PLCs create a structured environment in which teachers can participate in knowledge-sharing sessions. They can practice problem-solving and reflective skills to improve their classroom teaching and instructional methods. In line with this, DuFour & DuFour (2013) argue that PLCs foster a culture of continuous learning, enabling teachers to continually refine their pedagogical strategies in response to technological advancements. Teachers can build the digital competence required for their teaching and learning activities through working together in PLCs. They become more confident in integrating technology during peer mentoring and shared reflection sessions (Antinluoma, Ilomäki, & Toom, 2021).

Recent studies have reported that teachers face challenges in implementing technology-integrated teaching due to a lack of a teaching framework and limited resource availability. Effective implementation requires capacity building, comprehensive curriculum development, and strengthening support services (Lukas & Yunus, 2021). Alongside this, it is equally important to address issues related to interventions and opportunities for capacity building. According to Nguyen, Vu, & Nguyen (2020), PLCs provide a structured framework for professional development that allows teachers to reflect and iteratively improve their practices until the desired outcomes are achieved.

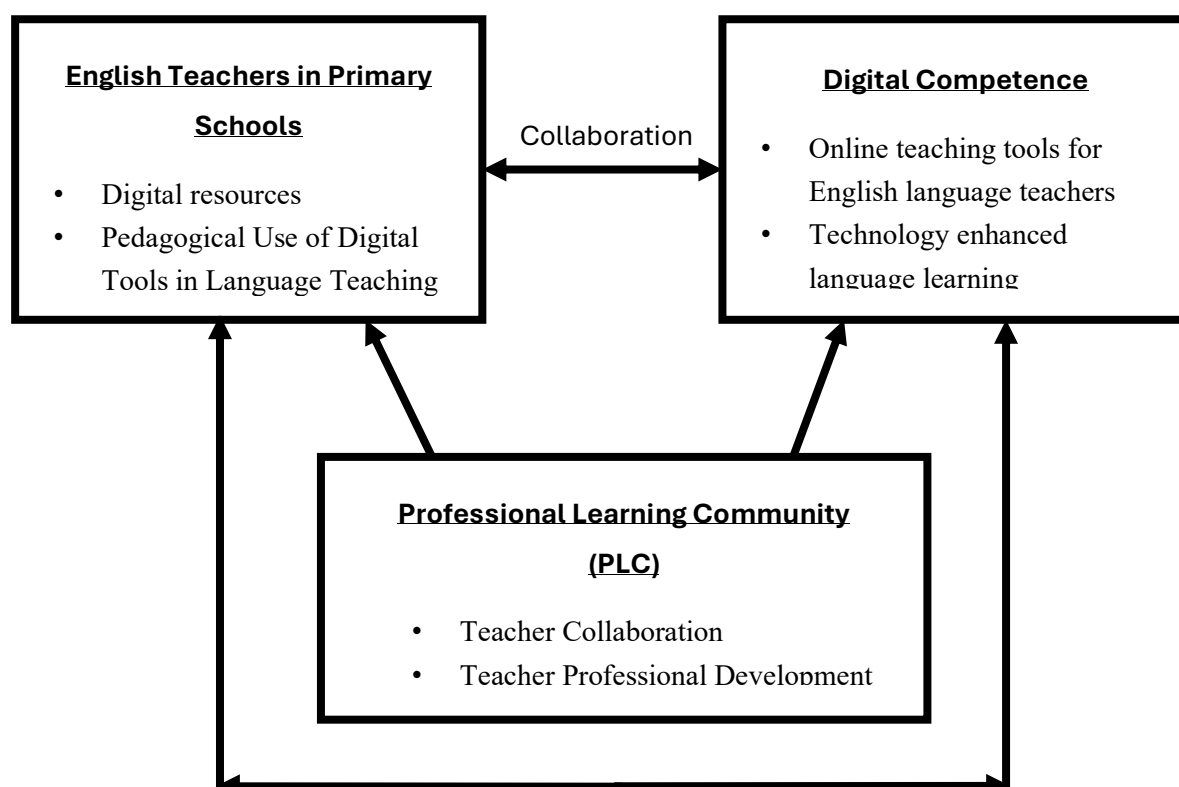
Although PLCs are well known for their contribution to professional development, little is known about how they directly affect teachers' digital competency. Fullan & Hargreaves (2012) argue that while PLCs are important for encouraging continuous professional learning, there is limited practical research on their specific role in developing teachers' digital competencies. For example, a systematic review conducted by Fernández-Batanero et al. (2020) highlighted the need for further practical studies to explore how PLCs can effectively support teachers in acquiring digital competency. Thus, this study intends to address the gap by investigating how PLCs support primary school English teachers' acquisition of digital skills and how these skills improve teaching and learning in the classroom. Understanding how PLCs build digital skills among teachers is important. This will allow school administrators to organise more effective PLC activities to help their fellow teachers navigate technological advancements in education.

Literature review

PLCs promote a supportive community where teachers share their knowledge and participate in ongoing professional development to enhance instruction and student learning outcomes (Ikpuri & Peter, 2024). The following section gives readers a view of how PLCs can serve as a professional development tool in the digital age.

Figure 1

Conceptual Framework for Developing Teachers' Digital Competence Via PLC



Theoretical Foundations of PLCs

There are several factors that determine the success of PLC. According to Wenger, McDermott, and Snyder (2002), the essential elements include creating a community of practice that fosters effective leadership, encouraging teamwork, and creating a community with shared responsibility and identity. The current study is underpinned by two key theories: Community of Practice (Wenger, 1998) and Social Cognitive Theory (Bandura, 1986). Bandura's Social Cognitive theory explores the concept of observational learning. According to this theory, individuals in group settings learn new abilities and information by observing others. Wenger's community of practice theory stresses the value of cooperative learning. This theory explains that when individuals are placed in a community or group setting, they can share practices, solve problems, and exchange information. Wenger's "community of practice" theory states that social interaction and community involvement are key components of learning. Working as a community, participants are able to communicate and identify their weaknesses through shared practices. Wenger emphasises that true learning happens when people work together in a community to develop their knowledge and skills (Buus & Moensted, 2022). Theoretical frameworks provide a foundation for understanding how PLCs enhance digital competence through collaborative learning, peer reflection, observation, and feedback.

The Role of PLCs in Teacher Collaboration and Professional Growth

Research consistently demonstrates that PLCs support teachers' professional development and improve collaboration. For instance, a study by Nguyen, Vu, and Nguyen (2020) found that teachers who participate in PLCs frequently share more digital resources, collaborate to develop lessons, and overcome classroom challenges. This method not only improves teachers' digital competency but also fosters shared accountability and cooperative problem-solving. Collaboration within PLCs allows teachers to improve their practice through reflection, claims Mohd. Zaibidi et al. (2023). Additionally, it benefits them by exchanging knowledge and group learning. The teachers feel more capable and confident in the classroom as a result of this collaboration. They are more comfortable utilising technology and implementing creative teaching methods. According to a study by Trust and Whalen (2020), school administrators are in charge of creating a positive school culture. The results also showed that PLCs are resources that encourage educators to collaborate, be innovative, and exchange ideas about how to teach and learn in the classroom. According to a study by Muthukrishnan et al. (2023), teachers can improve their digital skills when given the opportunity to collaborate and share knowledge.

Digital Competence of Teachers

According to Alla-Mutka (2011), digital competence of teachers is their ability to use, assess, and navigate digital tools in classroom teaching. Designing classrooms suitable for technology-integrated teaching, and crafting engaging and interactive learning spaces show that digital competence of teachers requires more than just knowing the basics of technology (Salim et al., 2022). Google Forms and Kahoot! are examples of digital tools that help improve student involvement and accelerate the evaluation process (Ramadhan & Inayati, 2024). However, through structured PLCs, teachers' digital competency can be developed, which is key to helping them effectively integrate new digital tools into their teaching.

Hoon et al. (2022) emphasise the important role of PLCs, related PLCs, and other professional support systems in equipping teachers to enhance teaching and learning. Based on the study's findings, highly motivated preservice teachers were more likely to use digital tools and teaching methods aligned with 21st-century skills. The value of integrating digital skill development into PLCs was fortified by the results obtained. It reconfirmed that collaborative practices encourage

teachers to implement innovative and technology incorporated teaching strategies.

PLCs as a Mechanism for Enhancing Digital Competence

PLC is a strategic approach to teacher development that allows teachers to test and resolve classroom issues and share their knowledge with colleagues (Baran et al., 2015). According to Fullan and Hargreaves (2012), it also enables teachers to share knowledge and evaluate their own pedagogical approaches. Moreover, it promotes an innovative culture in developing teachers' digital proficiency. Additionally, as noted by DuFour & DuFour (2013), PLCs allow teachers to apply innovative pedagogical practices in the classroom while nurturing a culture of continuous learning.

Challenges in Implementing PLCs

Whilst PLCs offer several benefits, there are nevertheless several challenges around their implementation and functions. One of the most common challenges is the lack of time and resources. According to Avalos (2016), teachers often find it difficult to balance their involvement in PLCs with their daily teaching duties, lesson planning, and administrative work. Harris and Jones (2019) claim that PLCs that do not have clear goals will result in ineffective sessions. The authors add that when such ineffectiveness occurs, it creates a gap in which members who are vocal gain control over the discussion. The result of this situation is that some teachers will feel isolated or disconnected.

Another major obstacle to the success of PLC in schools is the support from administrators. There is evidence that school administrators view PLCs as a choice rather than as essential professional growth. According to Liu and Hallinger (2022), research shows that encouraging a collaborative culture of ongoing learning among teachers in PLCs requires active instructional leadership. Teachers are more willing to participate in PLC activities and attempt to implement creative teaching methods in their classrooms in schools with strong leadership. On the other hand, in settings where there is inconsistent leadership, participant engagement often decreases. Consequently, without a standard and supportive leadership, the potential of PLCs to meaningfully improve teaching and learning outcomes remains critically inadequate.

Teachers' Motivation and Digital Readiness

Teachers' willingness to participate in PLCs is largely dependent on their personal motivation and digital readiness, according to Philipsen et al. (2019). Some teachers may be reluctant to participate in debates or share their experiences because they believe they lack the requisite knowledge to make a significant contribution, especially those who are insecure about their digital skills. According to Lai & Widmar (2021), some teachers prefer self-directed learning because they believe that working and learning independently enables them to acquire digital skills at their own pace rather than in a controlled PLC environment. According to Ertmer and Ottenbreit-Leftwich (2020), although PLCs are seen to provide strong peer-learning opportunities, they may not always suit individual learning preferences, especially for teachers who need more individualized or flexible training alternatives.

The Impact of PLCs on Student Outcomes

It is generally known that student results and teachers' digital competency are related. Teachers who are digitally competent are better able to produce lessons that are both effective and engaging. It helps students to develop their self-motivation and achievement. Aydin et al. (2024) claim that teachers who actively participate in PLCs report higher levels of digital competence and greater confidence in using technology to improve students' learning experience. These results highlight the value of collaborating in a digital-based professional development activity

by demonstrating that PLCs not only help teachers but also improve student achievement.

UNESCO's Model of Professional Learning Communities

To help the community understand better about PLC, UNESCO has come up with a model framework for understanding how PLCs can improve digital competence among teachers. According to UNESCO (2017), there are four main elements to be considered while planning PLCs. The four elements proposed are student learning, collaborative learning, shared leadership, and continual professional development. According to König et al. (2020), emphasising teachers working together to share their knowledge, solve problems, and develop innovative teaching approaches is part of the collaborative learning concept. Based on the results of this study, which aligns with the statement above, teachers testified that working together within PLCs has helped increase their knowledge and digital competence. The notion of shared leadership is to foster a creative and cooperative teaching and learning environment through providing training, resources, and initiatives to promote teacher involvement in PLCs. Besides, UNESCO promotes continuous professional development opportunities. PLCs should give teachers chances to reinforce their knowledge and skills in response to changing educational demands and technological upgrades, and provide more structured digital guidance. The most important element highlighted by UNESCO is that PLCs should be able to improve student learning outcomes in the classroom.

Aligning the Study with the Educational Framework Recommended by UNESCO

According to UNESCO (2017), PLCs foster academic innovation, shared leadership, and continuous learning, particularly in digital education. A recent study by Lai and Bower (2024) confirmed that teachers who engage in PLCs collaborate to develop digital competencies and increase their proficiency and self-assurance in incorporating digital technologies into the classroom.

Shared leadership is one of the most important elements of a successful PLC. Ghavifekr and Rosdy (2015) assert that school administration is essential to creating a cooperative atmosphere. They should also support teachers' innovative teaching strategies and provide resources. However, leadership support varies from one school to another. This disparity across schools and other institutions highlights the need for a more systematic strategy for digital integration in PLC.

According to Darling-Hammond et al. (2017), the other essential element is lifelong learning. Good professional development practice includes structured training, a mentorship program, and practical workshops that enable teachers to successfully integrate digital resources into their lessons. Although knowledge sharing is facilitated in PLC discussions, formal training programmes must be incorporated to ensure practical application in learning institutions. It has been identified that the use of digital technologies in PLCs enhances students' performance and engagement. Chuaungo et al. (2022) assert that more digitally competent teachers have a greater capacity to design engaging student-centered learning experiences. The integration of digital learning can be enhanced and the quality of education improved by strengthening institutional support for PLCs and ensuring fair access to professional development opportunities.

Research Questions

To fulfill the purpose of the study, the current study aims to answer the following research questions:

1. How does participation in a Professional Learning Community (PLC) support primary school teachers in developing their digital competence?

1a. What are primary school English teachers' experiences of shared and supportive leadership

In participating in PLCs in their schools to enhance their digital competence?

1b. How do teachers perceive the alignment of school policies and programmes with shared values and vision within their PLCs in enhancing their digital competence?

1c. What is the extent of collective learning and application of PLC practices in primary schools?

1d. What are teachers' experiences of shared personal practice in their schools in enhancing their digital competence?

2. What is the relationship between PLC practices and the digital competence of primary school teachers?

3. What are the challenges faced by teachers in participating in PLCs in enhancing their digital competence?

Methods

The current study employed a concurrent mixed-methods design to investigate the role of PLCs in improving the digital competency of primary school English teachers. A concurrent mixed-methods approach entails gathering and evaluating both quantitative and qualitative data within a single study (Creswell & Clark, 2007). In the current study, a mixed-methods approach was selected because it combines the strengths of qualitative and quantitative methods, offering a comprehensive understanding of PLC implementation in schools to support teachers' digital competence development. Proponents of Mixed-method design argue that it offers a deeper understanding of the research problem, thereby enhancing the overall rigour of educational research (Johnson & Onwuegbuzie, 2004). Additionally, Maxwell (1992) emphasises that using a variety of data sources improves the validity of research by guaranteeing that findings encompass both individual experiences and general trends.

In the current study, the level of PLC practices in acquiring teachers' digital competence was investigated through a survey questionnaire, while semi-structured interviews provided rich, contextual insights into their experiences and challenges in improving their digital competence in teaching English Language. The study was carried out among 30 public primary school English teachers in Perak, Malaysia. This study employs two sampling techniques, which are cluster sampling and purposive sampling.

Participants were selected using a cluster sampling method for the quantitative phase of this study. According to Galway et al. (2012), a population distributed into groups or clusters using probability sampling is known as cluster sampling. Each cluster is randomly selected to participate in a study. In the setting of this research, the public primary schools across the state of Perak are defined as the clusters. Between three to five English language teachers from each selected school were invited to participate. In the survey, with a total of 150 teachers from 30 schools. Table 1 presents the demographic profile of the samples involved in the survey.

Purposive sampling was employed in the qualitative phase, with 10 teachers selected from 10 schools. Creswell & Clark (2007) claim that purposive sampling comprises the intended selection of participants based on research objectives. The selection criteria for participants included active participation in PLC activities at their respective schools and English teaching experience of more than 5 years at the primary school level, to support the study's objectives.

Table 1.
Demographic Profile of the Sample

Variables	Categories	Frequency	Percentage
Gender	Male	35	23.3
	Female	115	76.7
Highest level of education	Bachelor's degree	48	32.0
	Doctor of Philosophy or Doctor of Education	5	3.3
	Master's degree	97	64.7
Years of teaching experience	5 - 10 years	50	33.3
	11 - 20 years	20	13.3
	21 - 30 years	36	24.0
	31 years and above	44	29.3
Total		150	100.0

The gender distribution showed that 23.3% ($n=35$) were male teachers, while 76.7% ($n=115$) were female. The findings show that the sample consists of more female teachers, which directly reflects the reality in the gender distribution of teachers in Malaysia. In terms of academic qualifications, 64.7% ($n=97$) of the sample hold a master's degree, while 32.0% ($n=48$) hold a bachelor's degree. A minor percentage, 3.3% ($n=5$), have a PhD or an Ed.D.

The samples were also divided by the years of teaching experience. Those with experience between 5 to 10 years of experience covered 33.3% ($n=50$) and 13.3% ($n=20$) covered between 11 to 20 years of experience. The other 24.0% ($n=36$) were also between 21 and 30 years old, with teaching experience, whereas 29.3% ($n=44$) had taught for over 31 years.

The sample provided good grounds to explore the influence of PLCs on the development of digital competency among teachers at various stages of their careers, given the range of sample demographics. This study examined both developing and established perspectives on teachers' PLC involvement. The development of teachers' digital skills, as well as the role of leadership in advocating professional collaboration, was also monitored, particularly by engaging teachers with varying experience levels and academic backgrounds.

Instruments, Data Collection and Data Analysis

The current study employed a mixed-methods design comprising a survey questionnaire and a semi-structured interview to examine how PLCs can facilitate more proficient use of digital tools by primary school English teachers.

The survey questionnaire was developed to collect quantitative data on teachers' digital competency and participation in PLCs. The draft prepared instrument was adapted from the Professional Learning Community Assessment Revised (PLCA Revised), developed by Olivier, Hipp, and Huffman (2010), and consists of five primary aspects of PLC. Experts revised and finalised the instrument, and then validated it. The instrument provided an extensive survey that is useful in measuring PLC practices in schools. The instrument covered five significant dimensions: shared and supportive leadership, shared values and vision, collective learning and application, shared personal practice, and supportive conditions in the school environment. Such decisions to retain these parts follow research confirming that the PLCA-R is valid across various educational environments (Olivier et al., 2010). It was adapted to the context of Malaysian education, including changes in terminology (e.g., teachers were renamed English teachers) and adaptations to fit the Malaysian hierarchy-based education system and PLC policies (Dogan et al., 2017). The measure of PLC practices in schools consists of 45 items across five dimensions: Shared and Supportive Leadership, Shared Values and Vision, Collective Learning and Application, Shared Personal Practice, and Supportive Conditions

(Structural and Relational). The measuring scale was a 5-point Likert scale with choices between Strongly Agree (5) and Strongly Disagree (1). The Google Forms were used to send the instrument to the teachers, and responses to the survey were collected electronically. The survey took approximately 15 minutes to complete. The survey instrument was reviewed by a panel of experts and piloted with a group of 35 English language teachers to assess content clarity, consistency, and validity. Based on the feedback, the finalised questionnaire demonstrated strong internal consistency across all dimensions. Cronbach's alpha coefficients for each section ranged between 0.87 and 0.92, and the overall reliability score for the complete instrument was 0.94. Table 2 presents the internal consistency values for each dimension.

Table 2.

Cronbach Alpha Values for Instrument Dimensions

Measures	Number of items	Cronbach Alpha
Teacher Participation in PLC to improve Digital Competence	7	0.87
Shared and Supportive Leadership	10	0.89
Shared Values and Vision	11	0.91
Collective Learning and Application	13	0.90
Shared Personal Practice	6	0.87
Total no. of items	47	

To better understand teachers' challenges, experiences, and perceptions, semi-structured interviews were conducted with 10 participants. The interview allowed for an in-depth evaluation of teachers' experiences and challenges with PLCs.

Data analysis was carried out using survey and semi-structured interview data. The survey examined key factors, including digital competency, leadership support in PLCs, and collaboration. A descriptive analysis was performed using the statistical software SPSS 26.0v to interpret survey results. Research Questions 1 to 5 used descriptive statistics, while Research Question 6 employed thematic analysis to interpret responses from interviews. Braun and Clarke (2019) note that thematic analysis is an effective method for uncovering patterns and relationships in qualitative data.

Findings

Descriptive analysis was used to analyse the survey questionnaire to investigate the level of engagement, perceived use, and experiences of PLCs among teachers in primary schools. The descriptive results of the research questions are presented in the following tables.

Research question 1: How does participation in a PLC support primary school teachers in developing their digital competence?

The findings from Table 3 indicate that teachers recognise the role of PLCs in developing their digital competence, as exhibited in the overall mean score of 4.47 ($SD = 0.576$). The highest-rated item, "I am confident that I can use technology for teaching English in the classroom" ($M = 4.50$, $SD = 0.553$), suggests a strong opinion of self-efficacy among teachers in using digital tools for instruction.

Teachers also expressed a high level of agreement with the impact of collaboration within PLCs on improving digital competence ($M = 4.49$, $SD = 0.552$). Similarly, frequent use of digital tools for instructional purposes was observed, with teachers stating that they learned digital tools for creating and sharing instructional materials ($M = 4.49$, $SD = 0.552$) and integrated technology

to enhance student engagement and participation ($M = 4.46$, $SD = 0.575$).

Table 3.

Teacher Participation in PLC Activities to Enhance Their Digital Competence

No.	Items	Mean	Standard Deviation
1.	Collaborating with other teachers through PLCs enhances my digital competence in teaching English.	4.47	.609
2.	I'm confident that I can use technology for teaching English.	4.50	.553
3.	I see the value of interaction and collaboration that is taking place during the PLC meeting, which improves my digital competence in teaching English.	4.49	.552
4.	I have learnt many digital tools through PLCs for creating and sharing instructional materials.	4.49	.552
5.	I have learnt to integrate technology to enhance students' engagement and participation.	4.46	.575
6.	PLC activities at my school have helped me to use online platforms for collaborative learning and assessments in teaching English.	4.46	.575
7.	I have learnt to provide feedback to my students using digital tools.	4.44	.618
Overall (Average across all the items)		4.47	.576

Additionally, teachers reported using online platforms for collaborative learning and assessment ($M = 4.46$, $SD = 0.575$) and providing feedback and evaluation through digital tools ($M = 4.44$, $SD = 0.618$). These findings suggest consistent engagement with technology-enhanced teaching practices through PLC activities.

Focused Dimensions 1a: Shared and Supportive Leadership

What are primary school English teachers' experiences of shared and supportive leadership in participating in PLCs in their schools to enhance their digital competence?

The above table findings indicate that teachers largely regard their school leadership as supportive in cultivating digital competence through Professional Learning Communities (PLCs), with an overall mean score of 4.25 ($SD = 0.764$). "My school leaders encourage us to use technology to improve teaching and learning" received the highest rating ($M = 4.37$, $SD = 0.870$). It implies extensive institutional support for digital integration. Access to digital tools and resources that support teaching ($M = 4.31$, $SD = 0.695$) and recognition for effectively using technology ($M = 4.27$, $SD = 0.757$) received high ratings. This implies that there are opportunities for professional learning in digital teaching with PLCs, where schools provide training and resources ($M = 4.23$, $SD = 0.899$), and school meetings include discussions of digital teaching strategies ($M = 4.24$, $SD = 0.692$).

Teachers agreed that there is collaboration among teachers and school leaders, with decisions about using digital technology ($M = 4.15$, $SD = 0.772$) included in PLC meetings, which helped teachers explore new digital teaching methods ($M = 4.22$, $SD = 0.703$). Additionally, the role of leadership was reinforced by the teachers, who agreed that collaboration to enhance digital coaching and learning received a mean score of 4.22 ($SD = 0.684$).

Table 4.

Teachers' Experiences of Shared and Supportive Leadership in PLCs for Enhancing Digital Competence

No.	Items	Mean	Standard Deviation
1.	My school leaders encourage us to use technology to improve the teaching of English.	4.37	.870
2.	My school leaders are open to teachers' views on improving digital teaching practices.	4.23	.878
3.	The PLC of my school provides training and resources to help teachers use digital tools effectively.	4.23	.899
4.	Teachers in my schools are recognised for the creative use of technology in teaching.	4.27	.757
5.	I have access to digital tools and information that support English language teaching.	4.31	.695
6.	Teachers are included in decisions related to implementing technology-integrated teaching at my school.	4.15	.772
7.	Teachers and administrators work together to enhance digital teaching and student learning.	4.22	.684
8.	My PLC school head/representative creates opportunities for teachers to try new digital teaching methods.	4.22	.703
9.	Our school meetings include discussions on how to use technology in teaching.	4.24	.692
10.	School leaders value and support our efforts to improve digital teaching skills.	4.23	.687
Overall (Average across all the items)		4.25	0.764

Focused Dimensions 1b: Shared Values and Vision

How do teachers perceive the alignment of school policies and programmes with shared values and vision to enhance their digital competence?

The Table 5 findings indicate a moderate alignment between school policies, programmes, and shared vision in enhancing digital competence, with an overall mean score of 4.26 ($SD = 0.82$). The highest-rated item, "Policies and programmes in my school align with its vision and digital learning objectives" ($M = 4.49$, $SD = 0.730$), suggests a strong institutional commitment to digital learning. Similarly, teachers agreed that school policies support shared goals for digital competence ($M = 4.48$, $SD = 0.712$) and that student data is used to enhance digital teaching and learning ($M = 4.47$, $SD = 0.711$).

Teachers also acknowledged a shared vision for incorporating technology in the classroom ($M = 4.34$, $SD = 0.703$) and recognized the role of shared values in guiding digital teaching ($M = 4.33$, $SD = 0.700$). However, collaboration among stakeholders in improving student success through digital skills ($M = 4.19$, $SD = 0.847$) showed some inconsistencies across schools. Lower-rated items, such as "Stakeholders have a limited role in setting high standards" ($M = 4.08$, $SD = 0.952$) and "Teachers lack opportunities to share ideas on improving digital and academic teaching" ($M = 4.13$, $SD = 1.121$), suggest limited teacher involvement in decision-making.

Overall, while schools demonstrate a commitment to digital competence, improvements are needed to strengthen collaboration, increase teacher participation, and implement digital teaching strategies more consistently.

Table 5.

Teachers' Perceptions of School Policies and Programmes Aligning with Shared Values and Vision for Enhancing Digital Competence

No.	Items	Mean	Standard Deviation
1	English teachers in my school utilise students' data to improve their digital skills to improve teaching and learning practices.	4.47	.711
2	The policies and regulations in my school support and promote shared goals for improving the digital skills of teachers.	4.48	.712
3	Policies and programmes in my school align with its vision and digital learning objectives.	4.49	.730
4	Teachers share a common vision to improve student learning outcomes using technology-integrated teaching.	4.34	.703
5	Shared values in my school help me guide digital teaching and learning decisions.	4.33	.700
6	Stakeholders (teachers, leaders, parents) work together to raise student achievement in both academic and digital skills.	4.19	.847
7	Teachers collaborate to develop shared values on teaching, learning, and digital education.	4.23	.845
8	There is no structured process for teachers to work together on a shared vision, including digital teaching strategies.	4.18	.812
9	The primary focus of my school is to improve student learning, not just assessment scores, but also digital literacy.	4.17	.823
1	Stakeholders have a limited role in setting high standards for digital and academic learning.	4.08	.952
1	Teachers in my school lack opportunities to share ideas on improving digital and academic teaching.	4.13	1.121
Overall (Average across all the items)		4.26	.820

Focused Dimension 1c: Collective Learning and Application

What is the extent of collective learning and application in primary school?

The above Table 6 findings showed that teachers generally perceive a strong culture of application and collective learning, with 4.18 ($SD = 0.610$) as the overall mean score. "My school focuses on professional development on teaching and learning" ($M = 4.52$, $SD = 0.610$), highlighting a strong institutional commitment to continuous learning. Likewise, teachers also conceded their dedication to enhancing learning through structured programmes ($M = 4.50$, $SD = 0.610$).

Teachers indicated that they engage collaboratively to investigate and apply skills, strategies and new knowledge ($M = 4.41$, $SD = 0.610$). They also use multiple data sources to assess instructional effectiveness ($M = 4.36$, $SD = 0.610$). In addition, they stated that there is a collaboration among teachers and students to enhance teaching and learning ($M = 4.29$, $SD = 0.610$).

Lower-rated items, such as "Teachers do not collaborate in acquiring and applying new knowledge" ($M = 3.76$, $SD = 0.610$) and "Teachers do not engage in conversations that show they value different viewpoints" ($M = 3.82$, $SD = 0.610$), indicate that while many teachers actively participate in professional discussions, some may feel excluded or less engaged.

Table 6.

Teachers' Perceptions of Collective Learning and Application in Primary Schools

No.	Items	Mean	Standard Deviation
1	English teachers in my school demonstrate a strong commitment to implementing programmes that improve learning outcomes.	4.50	.610
2	My school actively promotes professional development to improve teaching and learning.	4.52	.610
3	English teachers in my schoolwork collectively to acquire knowledge, skills, and strategies and apply this new learning to their work.	4.41	.610
4	English teachers in my schoolwork together to examine various source of data to reflect and improve their teaching strategies.	4.36	.610
5	English teachers in my schoolwork together to analyse student work to promote better teaching and learning environment.	4.29	.610
6	Mutual relationships exist among English teachers in my school that reinforce the commitment to school improvement efforts.	4.37	.610
7	English teachers in my school do not collaborate in acquiring knowledge, skills, and strategies, and implementing their newly acquired knowledge in their work.	3.76	.610
8	Stakeholders, including teachers in my school, work together and employ new knowledge to resolve problems.	4.28	.610
9	English teachers in my schoolwork together to develop strategies to address student needs.	4.35	.610
1	English teachers in my school engage in dialogue that replicates a respect for diverse ideas that lead to continued inquiry.	4.25	.610
1	In my school, English teachers and stakeholders are not collaborating to learn together in utilising their new knowledge to address problems.	3.61	.610
1	The English teachers in my school do not engage in conversations that show they value different viewpoints and encourage ongoing questions and discussions.	3.82	.610
1	English teachers in my school lack collaborative relationships that demonstrate a dedication to enhancing the school's educational activities.	3.83	.610
Overall (Average across all the items)		4.18	.610

Focused Dimension 1d: Shared Personal Practice

What are the teachers' experiences of shared personal practice in their schools in enhancing digital competence?

Table 7.

Teachers' Experiences of Shared Personal Practice in Enhancing Digital Competence

No.	Items	Mean	Standard Deviation
1.	English teachers in my school share suggestions and ideas informally for refining student learning and integrating digital tools in teaching.	4.09	.897
2.	Opportunities exist for English teachers in my school to engage in peer observation and offer constructive support in using technology for instructional purposes.	4.23	.699
3.	English teachers in my school offer constructive feedback to colleagues in their instructional practices, including digital teaching strategies.	4.24	.702
4.	Individuals and teams in my school are offered with opportunities to integrate digital learning strategies and discuss the outcome of the strategies they applied.	4.23	.699
5.	English teachers in my schoolwork together to examine student work, incorporating digital tools to enhance classroom practices.	3.95	.541
6.	Opportunities are provided for teachers in my school to engage in coaching and mentoring, including guidance on integrating technology into teaching.	4.11	.719
Overall (Average across all the items)		4.14	.709

It can be seen that shared personal practice is the most prevalent factor in teachers' perceptions of professional collaboration and the development of digital competence, with an average coefficient of 4.14 ($SD = 0.709$). Teachers also indicated that they are highly engaged in peer feedback and collegial support, especially in giving feedback on instructional practices, such as using digital instructions ($M = 4.24$, $SD = 0.702$) and observing and encouraging other teachers to use technology to teach ($M = 4.23$, $SD = 0.699$).

The teachers also have the possibility to implement digital learning strategies in teams and report on outcomes ($M = 4.23$, $SD = 0.699$). This indicates that professional learning is actively practiced and spread among colleagues. The ratings of informal collaboration were rated positive ($M = 4.09$, $SD = 0.897$).

There was less agreement for collaborative review of student work incorporating digital tools ($M = 3.95$, $SD = 0.541$). This indicates that structured opportunities for collaboration may be less frequent or less formalized. Likewise, opportunities for coaching and mentoring to integrate technology in the classroom received a positive rating ($M = 4.11$, $SD = 0.719$).

Research Question 2

What is the relationship between Professional Learning Community (PLC) practices and teacher participation in PLC for acquiring digital competence?

The correlation coefficient (Table 7) shows the relationship between Professional Learning Communities (PLCs) and teachers' digital competence. These findings showed a significant positive relationship, confirming that when teachers are actively involved in PLCs, they feel more confident and competent in their use of digital tools in classroom activities.

The study found a strong, positive, and statistically significant relationship between digital competence and teacher participation ($r = .85$, $p < .001$), indicating active teacher participation in professional learning activities. The interaction among teachers, the creation of lesson

activities, and the sharing of strategies during PLCs contribute to improved practical knowledge in using digital tools. Zhang, Wang, and Wang (2022) support the notion that the use of PLCs has an effect on the development of digital skills among teachers due to the social interaction and mutual reflection of peers. Leadership support developed a strong alliance with digital competence ($r = .82, p < .001$). This study is also similar to a study conducted by Karakose and Tülübas (2023). It emphasises that digital leadership plays a vital role in shaping sustainable school improvement through the integration of technology. School administrators who place a high priority on digital learning, offer relevant training, and support educators in experimenting with digital strategies, foster cultures conducive to professional development.

Table 8.

Correlation Matrix for PLC Dimensions and Teacher participation in Acquiring Digital Competence

Measures	1	2	3	4	5
Teacher Participation in PLC for digital competence	1.00				
Shared & Supportive Leadership	.81**	1.00			
Shared Values and Vision	.79**	.84**	1.00		
Collective Learning & Application	.83**	.80**	.78**	1.00	
Shared Personal Practice	.80**	.77**	.74**	.76**	1.00

In the same way, the correlation between shared values and visions and digital competence ($r = .78, p = .001$) indicates that the more schools introduce digital learning objectives into their educational plans, the greater the likelihood that teachers will adopt the same approach in their teaching practices. Raptis, Koutsourai, and Konstantinidi (2024) claim that school leadership is significant for fostering a shared digital vision among stakeholders to promote meaningful technology adoption in schools.

Collective learning and application ($r = .80, p < .001$) and shared personal practice ($r = .79, p < .001$) also showed positive correlations with digital competence, indicating that teachers who engage in PLCs are more likely to develop and apply digital skills effectively in their teaching. These results demonstrate that structured collaboration, co-teaching, and peer feedback enhance teachers' confidence in using digital tools and facilitate the practical integration of technology into instruction.

Research Question 3

What are the challenges faced by teachers in participating in Professional Learning Communities (PLCs) in enhancing their digital competence?

The teachers were asked the following questions during the interview: 1. What are the challenges you face in engaging in PLCs? and 2. What needs to be improved to optimise the functions of PLC in your school?

The interview responses from 10 teachers were transcribed and coded, and the themes were extracted. The thematic analysis revealed five themes: workload and time constraints, lack of leadership support, ineffective collaboration, personal motivation and digital readiness, and limited professional development and resources. The themes with their descriptions and evidence sourced from the transcripts are presented in Table 9. The numbers given beside each theme represent the frequency of responses received for the respective theme.

Table 9.

Themes Extracted on Challenges Faced by Teachers in Participating in PLC Activities at Their Schools

Themes	Description of the theme	Evidence from interview excerpts
Workload and time constraints	Teachers struggle to balance PLC activities with their existing workload, limiting their participation in collaborative learning.	<i>"I have so many responsibilities: planning, marking, and administrative tasks. It's difficult to find time for PLC meetings."</i> <i>"Even when I want to join PLC activities, scheduling is always a problem because everyone is busy."</i> <i>"Sometimes PLC sessions feel more like an added task rather than a support system."</i>
Lack of leadership support	Insufficient administrative support and the underprioritization of PLCs hinder teacher engagement and digital learning initiatives.	<i>"Our school leaders talk about PLCs, but they don't really provide much direction or support for them."</i> <i>"If leadership prioritizes digital learning, we will have better access to training and resources."</i> <i>"Without strong encouragement from the administration, PLC meetings don't always feel meaningful."</i>
Ineffective collaboration	Collaboration within PLCs is often unstructured or inconsistent, making it difficult for teachers to benefit from shared experiences.	<i>"Some PLC sessions feel unproductive because there's no clear focus or structure."</i> <i>"Not all teachers actively contribute; some just listen without engaging in discussions."</i> <i>"I wish there were more structured ways to share and apply what we learn in PLCs."</i>
Personal motivation and digital readiness	Differences in teachers' willingness to embrace digital tools affect their engagement and learning outcomes in PLCs.	<i>"Some teachers are hesitant to explore digital tools, which makes it harder to have meaningful discussions in PLCs."</i> <i>"I'm eager to learn new technology, but not everyone feels the same way."</i> <i>"Teachers who face difficulties with digital skills often avoid PLCs that focus on technology."</i>
Limited professional development and resources	Teachers face challenges due to inadequate access to training, digital tools, and relevant professional development opportunities.	<i>"We don't have enough guidance on using the digital tools. Most of us have to learn on our own."</i> <i>"Workshops are helpful, there are not enough held to keep up with the technological changes."</i> <i>"Even the access to digital resources is not the same for all of us. Some teachers have more opportunities than the others."</i>

This study identifies five major challenges that teachers face when participating in PLCs to improve their digital abilities. These challenges are workload and time constraints, lack of leadership support, ineffective collaboration, personal motivation and digital readiness, and limited professional development and resources.

Balancing between PLC involvement with lesson planning, marking, and administrative responsibilities is a challenge for teachers due to workload and time constraints. As one teacher stated, *"I have so many responsibilities like lesson planning, marking, and administrative tasks. It's hard to find time for PLC meetings."* While the others stated that the organisation of the

PLCs arrangement makes it difficult for teachers to participate.

The absence of leadership support in schools also wedges teachers' participation in PLCs. School administrators do not actively support PLC activities, which is perceived by some teachers. One of the teachers described the disappointment by saying, *"Our school leaders talk about PLCs, they do not provide many directions or support about them"*.

Another common issue identified was that teachers are dissatisfied with the cooperation among PLC members. A few of them were concerned that PLC discussions are disorganized and lack a clear purpose. One of the teachers said, *"There are times when the PLC sessions are not productive since no obvious focus or organization exists"*. Others said there is normally a passive conversation rather than participation.

Individual motivation and digital readiness influence teachers' involvement, as some are not keen on sharing their experiences or using digital tools. One teacher confessed, *"Some teachers are not that eager to go digital, and it is more difficult to have a good conversation in PLCs."*

Lastly, digital learning is discouraged in PLCs due to the lack of professional development and resources. Teachers reported a lack of sufficient training opportunities and an uneven availability of digital tools. *"We do not train enough on digital tools as one of the teachers stated"*. *"The majority of us are to learn independently."*

Although PLCs have the potential to enhance digital competency, the following problems require strong leadership support, structured collaboration, flexible learning opportunities, and more convenient access to resources and opportunities for teacher professional growth.

Discussion

The study aimed to determine how PLCs operate and how they support primary school English language teachers in Malaysia in developing their digital competency. Another objective of the study was to explore the challenges that these teachers encountered in attaining digital competence training within the PLCs framework. The research found that teachers who attend PLCs are more confident and do not hesitate to use technology to support effective teaching. The research results demonstrated that PLCs have a significant positive effect on the digital competence of English language primary school teachers. The positive correlation between PLC involvement and digital competence supports the argument presented by Darling-Hammond et al. (2017) that organised expert collaboration helps share best practices, provides opportunities to learn through experience, and encourages the adoption of new teaching methods and approaches. The study findings support those of Liu et al. (2024) and Philipsen et al. (2020), who found that PLC has a significant contribution to technology adoption.

Additionally, the research concluded that teachers mostly consider PLCs an effective learning platform for developing their knowledge and skills, particularly in digital competencies and in instructional strategies that involve technology. The results of the study coincided with those of Harris and Jones (2019), who noted that persistent engagement in PLCs enhances teachers' confidence and competence in digital instruction. This finding is also supported by this study, which found that teachers strongly agreed that collaborating on instructional materials, participating in online assessments, and implementing digital tools in lessons were associated with frequent PLC participation.

Although the descriptive results reported in the study suggested that teachers were highly involved in PLCs and had high levels of digital competence, the qualitative findings provided a better understanding of the challenges that impacted the effectiveness of PLCs in building

digital competence. From the qualitative findings, five challenges were identified and categorised into the following themes: workload and time constraints; lack of leadership support; ineffective collaboration; personal motivation and digital readiness; and limited professional development opportunities and resources. These challenges need to be addressed. As Fullan (2021) stated, the success of PLCs depended largely on school commitment, engaged leadership and adequate resources. As this study found, these factors varied across schools.

As such school leadership plays a vital role in promoting PLC participation towards the growth of digital competency. Results from the Liu et al. (2024) study revealed that principals who encourage digital learning foster a culture in which teachers use new technology. This aligns with the study's findings that teachers in institutions with strong leadership support for digital integration were more confident in using digital technology. However, the inconsistent support from school leadership revealed problems, showing that leadership-driven incentives, clear policy, and organized facilitation greatly support the PLCs ability to grow in digital competency. Although PLCs are designed to promote collaborative learning, some educators expressed concern about unproductive conversations during sessions, the lack of organized follow-up, and the dominance of a particular voice. Stoll et al. (2006) further noted that PLCs risk becoming pointless conversations rather than life-changing professional learning if there are no defined goals and no organized professional discourse. This trend aligns with the study's findings, as some teachers preferred self-directed learning over PLC sessions.

Given their potential, several challenges prevent PLCs from effectively promoting the development of digital competency. The structure and support of PLCs need to be improved, specifically to maximize their benefits. Since teachers are likely to lack time, Liu and Hallinger (2022) suggested that PLC activities could be incorporated into schooltime to make them more participatory. Similarly, Fullan and Hargreaves (2012) also stated that administrative support plays an important role in maintaining the professional development initiative and called for increased leadership involvement in PLCs. This study found that teachers in schools with leaders who engage in digital training, mentor them, and ensure coordinated follow-through of PLC practices are more engaged in technology-based professional learning.

The paper highlights that effective institutional support for PLCs, enhanced access to professional learning, and the construction of an inclusive professional learning climate will play a vital role in ensuring that every teacher, regardless of their level of digital skills, feels empowered to collaborate, learn, and develop. By addressing the issues mentioned above, PLCs will play a significant role in the digitalization of the education system, enabling teachers to possess the necessary skills and confidence to use technology in their 21st-century classrooms.

Conclusion and Implications

This study has revealed that one effective method to increase the digital competence of English teachers in Malaysian primary schools is through Professional Learning Communities (PLCs). The use of PLCs enables English teachers to better incorporate technology into their teaching by providing a structured platform for collaboration, professional learning, and information exchange. However, for PLCs to be effective, challenges such as inconsistent digital integration, leadership support for schools, and limited access to resources need to be strategically addressed. According to Almunasher & Gillies (2024), the policymakers must acknowledge the importance of well-reinforced and structured PLC programmes towards sustaining digital skill development of teachers.

School leaders are instrumental in promoting a culture of collaboration and lifelong learning.

Therefore, it is recommended that leadership training be provided that is focused on the target for effective implementation of PLCs. Such training will enable school leaders to acquire the competencies required to support and sustain teacher engagement with digital technologies for meaningful, transformative use. Three recommendations to strengthen effective leadership practices in improving PLCs within the schools we outlined in this study. Firstly, according to Hallinger (2003) and Hassan, Ahmed, and Boon (2018), instructional and transformational leadership are the most effective forms of leadership in promoting effective PLCs. Secondly, school leaders need to strengthen social capital within the school, ensuring that trust-building is a key objective of PLCs. Finally, school administrators must be change agents who can inspire and lead their staff towards significant educational reform. They should encourage staff to lead reform in the school and provide leadership to help teachers be creative, support teachers' professional learning, and create a culture of sustainable methods and continuous improvement.

Investment in digital infrastructure is also important to ensure that teachers in all schools have reliable access to technology. Most teachers face poor internet connectivity, outdated hardware, and limited technical support. It will only be necessary to bridge these gaps by making sure that teachers possess the competence and self-assurance to use digital tools in teaching. Moreover, professional development programmes are not to be reduced to mere digital literacy training; they must incorporate strategies such as blended learning, digital assessment tools, and adaptive teaching, alongside basic digital literacy training. There should be PLCs adopted to help students learn digital skills and use them in ways that are meaningful to education. A systematic approach that offers practical skills-building, peer feedback, and collaborative problem-solving prepares teachers to realize the objectives of digital teaching practices. Repeated attempts to incorporate professional learning into teacher training outside the classroom are also worthwhile. This will allow teachers to keep up with new technologies and teaching techniques. It should also be investigated how PLCs affect teaching and learning in the long run with regard to student learning outcomes. These studies will continue to enhance professional learning programmes and empirically inform policy.

This paper confirms that PLCs are instrumental in improving English language teachers' digital competency. PLCs foster an environment where teachers feel free to interact, share ideas, be supported, and learn from each other's experiences when organized with a clear purpose. It is through these shared experiences that teaching practices evolve, digital skills are acquired, and self-efficacy develops. Without such support, PLCs will barely serve as a platform for stimulating digital training and exploring new teaching approaches. Therefore, for PLC to be a game changer, we need to ensure that schools provide meaningful leadership, time, resources, and relevant training.

Hence, in moving forward, we need to ensure all teachers are engaged in professional learning communities. School leaders need to be guided on how to support their teachers. More importantly, equity in access to digital resources is crucial to ensuring equal opportunities for teachers to engage in PLC activities. As Malaysia's education system shifts towards embracing digital teaching, the collective effort of the government, policymakers, school leaders, and individual teachers plays a key role in strengthening PLCs and preparing teachers for the future.

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