Recommendations for Addressing the Deficiency in Computer Skills Among Intermediate Language Learners at the LINC Center

Samir H. Sefain[1,*]

[1]School of Education, Liberty University, Virginia, USA

*Correspondence: School of Education, Liberty University, Virginia, USA. Tel: 647-892-4226

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Abstract

The purpose of this study was to provide recommendations to solve the problem of a lack of computer skills among Canadian Language Benchmark (CLB) 4 and 5 learners at the Language Center for Newcomers to Canada (LINC) Center. The problem was learners did not have basic computer skills, so during the pandemic, teachers struggled to teach and assess learners using technology. Therefore, most learners chose to withdraw from the program, citing a perceived decline in teaching quality compared to traditional methods. This study aimed to explore the potential benefits of technology-based learning on academic achievement and workplace skills. The community would have well-trained immigrants, and employers would consider the graduates of this school. Consequently, the provincial government would notice a decrease in social assistance applications, and schools would get more funds. For this reason, the central research question was, "How can the problem of a lack of computer skills among CLB 4 and 5 learners be solved at the LINC Center?" Data were collected in three forms, namely interviews with teachers and administrators, a focus group with teachers, and a survey administered to all instructors. Recommendations to solve the problem included creating professional learning communities (PLCs) and providing blended professional development.

Keywords: technology integration, technology integration benefit, digital literacy, barriers to integrating technology, teachers' beliefs, technology standard

1. Introduction to the Problem

CLB 4 and 5 learners lack basic computer skills. Schools and TESL Ontario provided solutions, including digital portfolios, assessments, gamification, and free resources for online classes. Professional development workshops and one-on-one training helped learners use Google Classroom and Zoom apps. However, 40% of students had no computers at home or shared computers, so the school purchased 275 laptops to facilitate access. These efforts have not been effective due to students' inability to use technology efficiently.

1.1 Significance of the Research

Technology literacy can benefit students, school administration, the community, local government, and the work environment (Lee & Martin, 2020). It promotes interactivity, collaboration, and workforce skills, improves academic achievement, saves time, and helps students adapt to the Canadian computerized system (Holloway & Gouthro, 2020). It also boosts self-efficacy, attracts more clients, and attracts businesses, leading to increased local revenue (Rohatgi et al., 2016). Additionally, it can reduce the number of Social Assistance or Employment Insurance (EI) applications among new immigrants, benefiting the government and the community (Gu & Lai, 2019).

1.2 Central Research Question

How can the problem of a lack of computer skills among CLB 4 and 5 learners at the LINC Center be solved?

2. Literature Review

2.1 Technology Integration Definitions

De León et al. (2021) cited the definitions of the American Library Association (ALA) (2013), the National Council of Teachers of English [NCTE] (2022), and the International Association for the Evaluation of Educational Achievement (IEA) (2019) that digital literacy is the ability of students to use information communication technology (ICT) to find, evaluate, critically analyze, create, communicate, and share information at home, school, or work. It requires technical and cognitive skills and using digital tools in social engagements and communication. International Computer and Information Literacy Studies (ICILS) (2018) defines two stands: learning how to use computers, access and evaluate resources, and collect information, and focusing on interacting technology to create, exchange, share, and transfer information. The European Commission (2013) emphasized the importance of ICT skills for employability and societal inclusion. Nur Morat et al. (2017) differentiated between ICT literacy (technical use of technology) and ICT competencies (functional use of technology), highlighting the importance of digital literacy and community building within platforms. For instance, using Facebook is a form of digital literacy, but building a community within Facebook is a competency. Uerz et al. (2018) defined competencies as communication, problem-solving, and critical thinking, while Baek and Sung (2021) summarized the three levels of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) definition of technology competencies: knowledge acquisition, knowledge deepening, and knowledge creation, stressing the importance of embedding them into the course content and teaching methods. The Council of Ministers of Education Canada (CMEC) (n.d.) differentiated between "digital native" and "digital immigrants" and classified factors affecting using technology into antecedents and processes. The antecedents, such as socioeconomic status and home resources, are the exogenous conditions that shape and constrain Computer and Information Literacy (CIL) development and influence the learning process indirectly. At a higher level, process factors influence learning directly and include teacher attitudes, learning tasks, and classroom learning environments.

2.2 Benefits of Integrating Technology

Technology's benefits include facilitating social interaction, promoting intercultural awareness, and integrating communication methods Liu et al. (2018). It aligns with Vygotsky's social theory, reducing anxiety, increasing academic achievements, and improving learning outcomes. Consequently, it switches learning from a cognitive to a socio-constructive process because its taxonomy includes language, information, connections, and (re)design. Additionally, it transforms teachers from knowledge dispensers into facilitators and learners from knowledge receivers to knowledge creators (Uzumcu & Bay, 2021). It narrows the gap between native and non-native speakers, fostering engagement, motivation, and creativity. Computer Assisted Language Learning (CALL) helps learners acquire pronunciation and intonation (Regan et al., 2019). Despite the great benefits of integrating technology, there are some barriers.

2.3 Barriers to Integrating Technology

Ekberg and Gao (2018) categorized these barriers into first-order barriers such as lack of reliable internet access and low student-to-device ratios, and second-order barriers are insufficient levels of technological, pedagogical, content, and knowledge (TPACK). Additionally, Honey (2018) differentiated between the external barriers, which include devices, time, training, and support, and the internal barriers, which include teachers' self-efficacy, epistemological beliefs, pedagogical beliefs, and perceived value of technology. Meanwhile, Bernacki et al. (2020) classified the barriers into human constraints such as lack of training, experience, inability to apply pedagogical knowledge, confidence in using technology, and physical barriers to the organizational environments.

For learners' performance, Rodriguez-Gomez et al. (2018) found some challenges such as plagiarism, privacy issues, sharing others' homework to copy, cheating during exams, and that technology sometimes distracts students. Moreover, the assessment system does not utilize technology due to the spell and grammar check and the possibility of accessing a dictionary. Students do not have enough space to store their work on the school intranet. As a result of problematic internet usage, students may develop behavioral addictions such as compulsive behaviors when students get an unmanageable and inner urge to use media.

Teachers' performance is also affected by a lack of confidence in technology, teacher-centered approaches, and the high volume of information on the internet (Tomczyk and Solecki 2019). Technology barriers can demotivate teachers and negatively impact their attitudes (Martin et al., 2020). Based on De Leon et al. (2021) research, insufficient digital educational resources (DER) pose a challenge to teachers since they need to go through administrative work to use the computer lab and assessment tools, and they cannot store either their own work or that of their students. Bernacki et al.

(2020) found that some educators prefer a teacher-centered approach, either because they lack the technological skills or because digital tools are unavailable at the school, making technology integration difficult. Additionally, Fadda et al. (2020) reported that the high volume of information on the internet makes browsing for specific information time-consuming, especially when teachers are unsure of which technology tools to use.

For schools' performance, Dorrington (2018) elaborated on the high cost of buying educational digital series for every grade level and updating this software regularly. In addition, building a protection system against hacking, advertisements, and personal use in the school costs the school a big budget that they sometimes cannot afford. Poth (2019) focused on the capacity and reliability of Wi-Fi that can serve a large number of users at the same time.

2.4 Standards to Observe

Standards are a theoretical framework that guides teachers, students, schools, and decision-makers in achieving high-quality education. They help measure performance, narrow the gap between instructional practices, and promote skill inclusion, content consistency, and training diversification (Claxton & Michael, 2020). Fadda et al. (2020) emphasized that standards-based education benefits skill inclusion, content consistency, high-quality activities, and training diversification. Kimm et al. (2020) mentioned the standards set by The Council for Accreditation of Educator Preparation (CAEP) (2015) set standards for teachers, including content knowledge, pedagogical skills, and technology integration. Bolden and Tymms (2020) called for more stringent teacher certification standards, according to the Organization for Economic Cooperation and Development (OECD), so Educator Preparation Providers (EPPs) should demonstrate certain academic knowledge integrated with technology for all graduates. The International Society for Teacher Education (ISTE) (2017) standards for educators emphasize that teachers should be learners, leaders, citizens, collaborators, designers, facilitators, and analysts to identify strengths and deficiencies in their teaching techniques. These standards direct not only the contents of the curriculum but also the contents of professional development programs, digital resources, digital activities, and learning outcomes. Trust (2018) described the ISTE standards for learners as empowered learners, digital citizens, knowledge constructors, innovative designers, computational thinkers, creative communicators, and global collaborators. Moreira et al. (2019) mentioned that the ISTE standards for schools (2019) should have a vision for comprehensive technology integration, develop a culture of digital learning, provide a professional working environment for digital best practices, and inform teachers about their ethical, social, and legal responsibilities when using digital tools.

2.5 Teacher Roles

Teaching is about creating and constructing knowledge, not just memorizing it. St. Thomas Aquinas defined teachers as philosophers and practitioners who introduce new materials and guide students in their quest for knowledge using the repertoire of teaching methods they acquired through their experience (Colton, 2019). Teachers turn students into inquiry-minded researchers by guiding them on what to know, where to find that knowledge, and with which community they share (Gibson & Smith, 2018). They also play a crucial role in integrating technology into the classroom, guiding students in their search for knowledge and community. The TPACK theory suggests that teachers should develop learners' competencies to enhance communication and self-expression skills (Falloon, 2020). Factors such as administrative assistance, technology access, peer coaching, and technology skills can improve teaching practices. Avidov-Ungar et al. (2020) commented on the significant role of teachers in integrating technology since they decide what, how, and to what extent technology should be used in the classroom. Cabero-Almenara et al. (2020) mentioned there are numerous factors that interfere with shaping the role of teachers, such as their beliefs, attitudes toward using technology, credentials, pre-service training, standard awareness, experience, joining professional organizations, self-efficacy, and teaching environment.

2.5.1 Teacher Beliefs

Teachers should be aware of their beliefs, articulate and discuss them, and be open to change to keep up with the new trends (Sadaf and Johnson 2017). Beliefs lead to actions, and successful actions reaffirm the beliefs or change them (Ifinedo, 2017). Xu et al. (2019) demonstrated that teachers change their beliefs when they see the added value of technology on student outcomes and their teaching methods. Teachers' beliefs are unconscious assumptions about technology integration and learning, influenced by personal experiences and factors such as student performance, administration expectations, and colleagues' expectations (Hankins and Nicholas 2018).

Teachers' beliefs can be classified into behavioral, normative, and control categories. According to the Theory of Planned Behavior (TPB), behavioral beliefs come from personal evaluation of the action outcomes and determine performance. Normative beliefs are the social support or social pressure that urges a person to behave in a certain way and are backed by the teachers' motivation, with control beliefs determining the level of technology integration

(Jagirani et al., 2019). Bahcivan et al. (2019) mentioned that beliefs can be categorized into four types: A, B, C, and D. Type C influences the level of technology integration and teaching decisions, as it is related to knowledge and knowing "epistemological beliefs" and can be measured in certain contexts. Types A and B are more centered around the person's "self," so they are impossible to change, and type D relates to ideological beliefs.

2.5.2 Teacher Self-Efficacy

Bandura's social cognitive theory (1977) defined self-efficacy as people's belief in their abilities to reach a certain level of performance, which determines how they feel, think, and are motivated. Technology Self-efficacy (TSE) is the teacher's ability to decide how, why, and when to use technology to enhance learners' abilities (Gomez et al., 2021). Furthermore, Hicks and Bose (2019), Voithofer et al. (2019), and Nordlof et al. (2019) postulated that teachers' self-efficacy is affected by several factors: their experience, level of education, personal preferences, and preparation. Zhang et al. (2021) divided self-efficacy into outcome expectation and efficacy expectation, which are supported by the social environment and application environment and have more influence on teaching than the outcome expectation.

2.5.3 Joining Professional Organizations or Events

Joining professional organizations helps teachers stay updated, gain best practices, and foster personal and professional growth. Attending conferences, workshops, and seminars can improve teachers' performance by providing experienced speakers and peer discussions (Martin et al., 2022). Acquiring renowned organizations like ISTE helps teachers transfer digital citizenship training and improve students' performance, enhancing their self-efficacy and creativity (Baek & Sung 2021).

2.6 Professional Development

Professional development (PD) enables teachers to stay updated with current education trends and ensure best practices. It can be conducted in-house, in workshops, online, or full-term courses, and should include various methods (Claxton & Michael, 2021). Pischetola (2022) strongly recommended in-service training to renew vocational skills and advise teachers about how to engage with theoretical knowledge and distinguish between know-what and know-how. Teachers benefit from instructional practices, course- and content-specific practices, and intensive and continuous digital tools for enhancing learning and monitoring for success (Yurtseven Avci et al., 2020). Raman and Thannimalai (2019) concluded that professional development helps teachers decide when, how, and why they should incorporate technology into their teaching. Therefore, PD should be tailored to meet teachers' needs and explain the practical application of technology, fostering confidence and relevance (Bergmark, 2020).

The course design should be constructive and include the implementation of new materials under the direction of professional trainers to cultivate a growth mindset within the organization (Shurygin et al., 2022). Contents should be site-based and district-based, consider socio-cultural perspectives, be task-oriented, practice-based, hands-on learning, and address any passive attitudes and beliefs of teachers (Sokel, 2019). To help teachers convert what they have learned into instructional practices, consistent technical and pedagogical support should be part of the application process. PD should support research-based training for teachers to help them apply academic knowledge instead of relying solely on external experts in a single event that is disconnected from teacher practice and follows a top-down perspective. Research-based training is based on teachers' own questions, starts with analyzing the content difficulties, promotes research skills, and discusses the recommendations with the administration and colleagues (Chan, 2017). Organizing a single event will not achieve great success, so Paulus et al. (2020) recommended forming professional learning communities (PLCs) to establish a shared vision of outcomes, initiate collaboration, and support sustained and meaningful class implementation so that technology will be incorporated into daily teaching activities. Morgado et al. (2021) recommended exposing teachers to a variety of digital tools not readily available locally and providing them with at least 80 hours of professional training during the school year. Informal PD community could develop teachers' perspectives on technology integration through asynchronous interactions, so trainers should be approachable and provide practical advice (Fernández-Batanero et al., 2021).

2.7 Schools

Schools play a crucial role in technology integration, determining the budget allocated to students, teacher training, broadband internet, IT support, and infrastructure. The role of digital leaders includes pedagogical, technological, and organizational dimensions (Cohen, 2019). Schools should have a clear plan for integrating technology and share this vision with teachers. Technology creates a student-centered environment, allowing for authentic, real-world situations and content-based instruction. Kartal and Kuzucu (2020) suggested hiring an ICT coordinator "change agent" to instill ICT culture into the school, train teachers on pedagogical innovation that utilizes ICT to build their

professional confidence, and monitor the technology integration in curricula. Avidov-Ungar and Hanin-Itzak (2019) elaborated on the role of the ICT coordinator to be a planner (plans, promotes, monitors, and facilitates using technology), budgeter, educationalist (trains and supports teachers to integrate technology into their daily practices), and technician (maintains and deals with technical problems). Schools can be catalysts for education transformation by developing computational thinking skills and promoting creative thinking, inclusion, and equity (Hansen et al., 2021). Class size impacts learners' instructional experience, as it improves engagement, behavioral challenges support, and enrichment opportunities (Tahir et al., 2021). Small student-to-teacher ratios enable struggling students to have one-on-one instruction and high-achieving students to have rich activities (Christensen et al., 2018).

2.8 Students' Perception

Students' acceptance of technology in education is influenced by factors such as age, background, daily use, and internet access (Vorobel et al., 2021). Younger students are more likely to accept technology due to its prevalence in society (Uiboleht et al., 2019). Factors such as familiarity with technology outside the classroom and access to the internet at home are crucial for acquiring technological competence (Al-Wasy, 2020). Martin et al. (2020) found that learners' beliefs varied more intrapersonally than interpersonally, so their use of technology was related to their levels of self-efficacy, self-determination, mastery orientation, persistence, goal orientation, and failure avoidance. English language learners (ELLs) should be able to do assignments online and engage with teachers and peers digitally (Siefert et al., 2019). However, there are drawbacks to using technology, such as excessive noise and concerns about inadequate devices, slow internet connections, and time wasted training students on digital tools (Cunningham, 2019). Schools should address these concerns to ensure effective and engaging learning experiences for students.

2.9 Theoretical Framework

A theoretical framework enables researchers to understand concepts, connect studies with existing knowledge, develop research questions, and select methods, while also enabling critical evaluation.

2.10 Social Cognitive Theory

The social cognitive theory, developed by Bandura (1986-1997-2001), suggests that learning occurs in social contexts, where students observe and test the consequences of others' behavior. It focuses on reciprocal determinism and behavioral capacity, with intrinsic and extrinsic components. The theory explains how learners' thoughts, feelings, and social interactions influence the integration of technology into their learning (Martin et al., 2020). It defines variables like performance expectancy, social influence, and facilitating conditions like infrastructure and technical support (Siefert et al., 2019). The theory also emphasizes the importance of collaborative support, perceived ease-of-use, and usefulness in creating a technology-inclusion environment (Scherer et al., 2019).

3. Procedures

3.1 Interview Procedures

The research uses semi-structured interviews to collect qualitative data on computer skills among CLB 4 and 5 learners at the LINC Center. The interviews combine structured and unstructured methods, allowing for more detailed responses and reliable data (Zhang et al., 2021). Purposeful sampling was used, with eight teachers selected based on their familiarity with the LINC curriculum and problem of practice. Born et al. (2022) posited that purposeful sampling has behavioral consistency and yields accurate data.

The interviews were conducted virtually via Zoom, with transcripts reviewed and coded to identify themes. Data analysis methods aligned participant responses with literature and provided a table of codes to determine compliance with specific themes. After all participants voluntarily consented to participate in the study, the following 16 questions were utilized for the interviews (see Appendix B).

3.2 Focus Group Procedures

This study used a single-focus group approach to collect data on the lack of computer skills ESL learners. Eight teachers, experienced in teaching, were chosen to inform the problem of practice. Zoom meetings were used for the focus group, which lasted for one hour and a half. The transcripts were reviewed and coded to determine themes. Kalu (2019) argued that choosing informative samples who articulate, reflect, and are interested in sharing knowledge leads to generalizable results. The data was collected through 11 semi-structured questions to answer the central research question. After participants consented to participate in the study, the following 11 questions were utilized (see Appendix C).

3.3 Survey Procedures

This study used a quantitative survey to investigate the issue of computer skills among CLB 4 and 5 learners. To collect data, a closed-ended Likert scale, and true/false survey were administrated electronically using Google Forms, an Internet-based program.Participants included 18 teachers, a coordinator, and a manager. Purposeful sampling was used to ensure data trustworthiness. Participants were given two weeks to complete the survey, with the possibility of extension. The survey included demographic questions and 17 prompts from scholarly literature, with participants to which survey participants responded using a five-point Likert scale (see Appendix D).

4. Findings

4.1 Interview Findings

Interviews with coordinator, manager, and six instructors were conducted to identify themes related to the issue. Notes and quotes were analyzed, and themes were identified through similarity. Numerous themes emerged from the qualitative data as reported in Table 1.

Table 1. Codes and Themes from Interview Data

Themes	Codes	Participants' Quotes
Collaboration	Learning Community	"I prefer peer discussion before applying any new techniques."
	Teamwork	"I changed my attitude towards using technology when I observed my colleagues' performance."
		"My colleagues' opinions are useful as they are more aware of my teaching environment."
		"I learn more from my colleagues' best practices."
	Sharing experience	"Since we don't have technical support, we share experience to solve any problem."
Professional Development	Length	"PD is not enough as it is only for one or two days, so I get too much information without practicing."
		"I need more follow-up after the training in order not to forget the tools I learned."
		"I need more time to browse and practice all the features of the websites I learned at the PD."
	Teacher training	"Teachers need more ongoing support for better results."
		"Training should have more time to practice the features of the new technology tools."
		"Training should consider our current situations."
		"Our discussions about the best practices are a good source of training."
Effectiveness of integrating technology	Teaching learning	"It is important to teach teachers more about technology tools."
		"Presenters should be accessible whenever we face any difficulties."
		"Learners' computer skills need much improvement."
		"Materials should be clear and suitable for our teaching environment and available devices in the school."
	Learning resources	"Tools should be clear and suitable for the grade level I teach and fulfill the objectives of the lesson."
		"It is really hard to catch up with the fast development in technology."
		"In some cases, I want to know the best way to utilize the materials I have learned, and some materials do not suit my teaching style and my teaching environment."
Standands	Awareness	"I have no idea about technology standards. I did not learn it in the teacher preparation program."
		"Neither my students nor I know what standards we should follow as the school administration and PBLA do not require teaching against certain standards."

Themes were identified, and a word search was conducted. The word search results can be found in the Frequency Codes Across Interview Data as reported in Table 2.

Table 2. Themes and Frequency Codes from Interview Data

Themes	Codes	Occurrences Across Data
Collaboration	Learning Community	10
	Teamwork	10
	Sharing experience	8
Professional Development	Length	7
	Teacher training	9
Effectiveness of integrating technology	Learners' skills	8
	Learning resources	6
Standards	Awareness	10

4.2 Survey Findings

A survey was conducted using Google Forms, with four demographic questions and 17 Likert-scale items. Participants were 15 teachers, a project manager, and two coordinators, each given a week to complete the survey. All surveys were completed within the assigned timeframe.

4.3 Survey Results

Surveys were conducted with 18 participants and were accessed on Google Forms for data analysis purposes. Then, a frequency and mean table was created to display the frequency and mean of the Likert-scale responses.

Table 3. Frequency and Average of Survey Responses

	Questions	Frequency					Mean
		5	4	3	1	1	
1.	Teachers should be professional users of technology.	2	6	6	4	0	3.3
2.	Teachers give students useful tips on using technology during their group activities.	3	10	5	0	0	3.8
3.	Students' age plays a role in teaching with technology.	3	9	2	3	1	2.8
4.	The number of professional development training offered is effective.	6	10	2	0	0	4.2
5.	Teachers choose the topics of the PD workshops according to their interests.	0	14	2	2	0	3.6
6.	Learners perceive the importance of learning with technology in their learning process.	2	11	3	2	0	3.5
7.	Teachers' experience in teaching with technology is important.	4	9	3	2	0	3.8
8.	Teachers' preparation programs should focus more on teaching with technology.	8	4	3	3	0	4.1
9.	Class size may affect teaching with technology negatively	3	8	2	3	2	3.3
10.	It is useful to use the bring-your-own-device (BYOD) technique.	1	10	7	0	0	3.6
11.	Students' educational background affects their learning with technology.	5	9	2	2	0	3.9
12.	Students should have access to the internet at home.	10	4	2	0	0	4.0
13.	Teachers vary their teaching strategies by using various educational websites.	6	8	2	0	0	3.7
14.	The enthusiasm of the management to switch to technology fully is required.	5	9	3	1	0	4.0
15.	Teachers have time during contract hours to discuss the best practice of using technology.	3	2	5	6	2	2.8
16.	Teachers engage in conversations that help them analyze data.	2	2	6	8	0	3.0
17.	Ongoing support is provided to new teachers.	8	3	3	2	2	3.7

Note. By multiplying each response value by the relevant Likert-scale value, adding the results, and then dividing the total number of participants' replies to the question, averages for each question were determined.

Teachers' engagement in data analysis, the frequency of their meetings to discuss their best practices, and their opinions about the effectiveness of the number of professional developments are indicated in the following Figures.

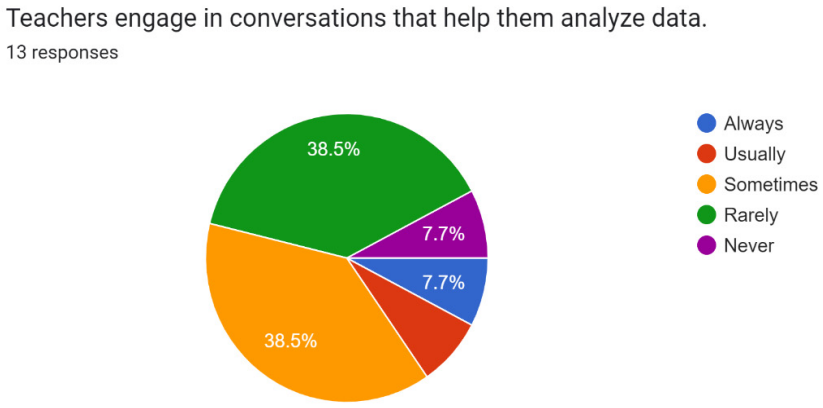

Figure 1. Teachers' Engagement in Data Analysis

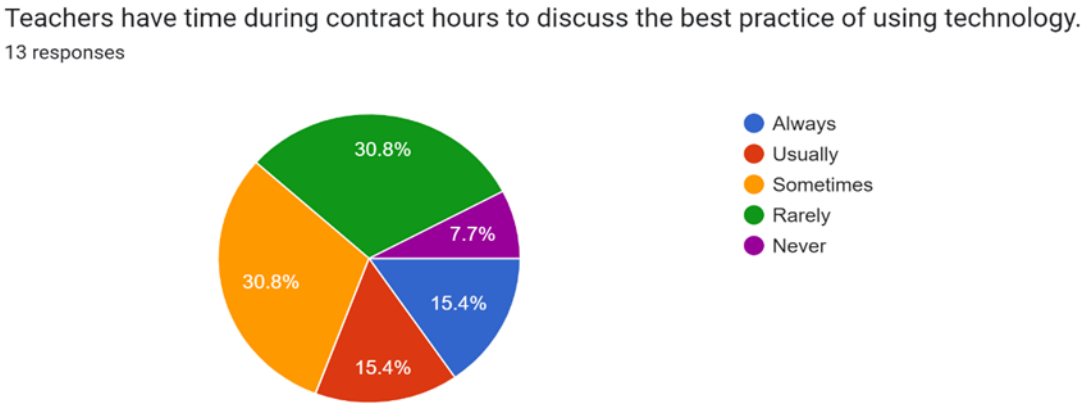

Figure 2. Frequency of Teachers' Meetings to Discuss Best Practices

Figure 3. Percentage of Teachers' Opinions about the Effectiveness of Professional Development

4.3 Focus Group Findings

A focus group with eight instructors identified themes related to the issue by noting phrases, identifying validated quotes, and coding each transcript into themes based on similarity. The qualitative data revealed several themes, which are listed in Table 4.

Table 4. Codes and Themes from Focus Group

Themes	Codes	Participants' Quotes
Collaboration	Learning Community	"Learning together inside the school is much better as we have the same teaching environment."
	Teamwork	"I learn more from my colleagues in the group as we share experiences and evaluate the effectiveness of each other's strategies."
		"Our informal discussions enable me to change my attitudes."
	Sharing experience	"Since technology is so broad, I find my colleagues' advice more specific."
Professional Development	Length	"A one-day PD is not enough as I get more questions while practicing the digital tools I learned at the PD." "Follow-up is more effective as I sometimes forget the tools I learned."
	Teacher training	"Teachers need more ongoing support for better results."
		"Training should have more time to practice the features of the new technology tools."
		"Training should consider our current situations."
		"Students' computer skills are not the best."
	Teaching learning	"Teaching teachers how to integrate technology in teaching is important."
		"Digital materials should be accessible, suitable for our teaching environment, and easy to use for both teachers and students."
	Learning resources	"Tools should be suitable for the grade level I teach and meet the lesson objectives."
		"Owing to the great variety of tools, it is hard to choose the most suitable platform that suits my needs."
		"School should subscribe to digital learning series that suit various levels of my students."
Standards	Awareness	"No one explained the standards required to us."
		"I do not teach to meet certain standards as even PBLA does not require standards."

Themes were identified, and a word search was conducted. The word search results can be found in the Frequency Codes Across Focus Group Data as reported in Table 5.

Table 5. Themes and Frequency Codes from Focus Group

Themes	Codes	Occurrences Across Data
Collaboration	Learning Community	12
	Teamwork	14
	Sharing experience	11
Professional Development	Length	7
	Teacher training	7
	Teacher learning	7
	Learning resources	8
Standards	Awareness	7

5. Discussion of the Findings

The data collected from various data collection methods revealed that teachers value working together and learning from their peers' experiences, which can significantly impact their attitudes and views on incorporating technology into the classroom. Porto et al. (2021) emphasized the value of teacher cooperation in shaping educators' attitudes and views about incorporating technology into the classroom. Informal discussions can change teachers' attitudes and beliefs, as they can evaluate the outcomes of their colleagues' classrooms. Professional development is important, but it doesn't provide enough time for teachers to put their knowledge into practice. According to Cabero-Almenara et al. (2020), the follow-up procedure is crucial because all teachers have questions regarding the digital resource once they have tried it out. A learning community with similar interests and backgrounds can provide evidence-based solutions suitable for their teaching environment and learning styles. Park and Byun (2021) noted that learning occurs more deeply when a group of people with similar interests and backgrounds are part of a learning community. This leads to a profound understanding of the problem and provides evidence-based solutions suitable for their teaching environment, available resources, and the learning styles of their learners.

Teachers, administrators, and learners should follow certain standards set nationally and/or internationally, but many of them are unaware of these standards. Kimm et al. (2020) posited that adhering to certain standards ensures equitable access to high-quality education and enables learners to monitor their progress, teachers to set lesson objectives, and administrators to evaluate teachers' performance and students' progress. Teachers suggested promoting membership in technology-specialized organizations, providing more devices, and subscribing to useful learning websites.

6. Recommendations

6.1 Recommendations

Two possible solutions are recommended to answer the central research question based on a review of the scholarly literature and the data collection and analysis. They are as follows:

1. Establish PLCs at LINC Mississauga.
2. Provide professional development in a blended learning model.

6.2 Recommendation for Establishing PLCs

A professional learning community (PLC) is a solution to address the needs of teachers who focus more on fostering teamwork, knowledge exchange, and learning from each other's experiences. PLC is defined as a group of teachers critically interrogating their teaching strategies on a specific situated-based topic through constructive feedback or solving a learning problem in an ongoing growth-promoting and learning-oriented way. Small groups of four teachers, each with a coordinator, should create plans, exchange suggestions, reflect on their practice, apply solutions, and evaluate results. In the general weekly meeting, coordinators summarize the inputs of the group so that the whole group can reflect on the ideas mentioned and choose the most suitable ones. Teachers should adopt technology standards and translate them into teaching practice, ensuring they are well aware of the necessary standards. Teachers should provide computer training for students lacking basic skills. This model enhances students' perceptions of technology integration, creates a dynamic learning environment, and fosters engagement, creativity, learning autonomy, and personalized learning.

To tackle the issue of not-enough follow-up from the PD presenters, one teacher prepares and delivers a lesson. After a peer discussion, the same teacher is requested to redesign and redeliver the same lesson, including the peer feedback. This reconstruction lesson enables teachers to adopt various approaches and de-privatize teaching practices (Price & Reichert, 2017). Alternatively, two teachers prepare and deliver the same lesson while other teachers observe the pros and cons of each lesson plan to provide constructive feedback. This process enhances professional development's effectiveness and sustainability, allowing teachers to focus on the know-how and effective lesson plans and achieving immediate results in computer classes (Price & Reichert, 2017). It is a viable alternative to the less effective PD that delivers know-what content to passive teachers (Alemdag et al., 2020).

This model is based on Vygotsky's sociocultural theories (1978) that state that learning occurs in collaborative work as learners use the Zone of Proximal Development to scaffold their knowledge through assimilation and accommodation. This model aligns with the Community of Practice (CoP) model illustrated by Bergmark (2020), which enables teachers to interact and share opinions. This meaning-making model evolves cognitive, behavioral, and relational aspects and is transformative in nature. By fostering a collaborative learning environment, teachers can enhance communication skills and knowledge development, following the TPACK theory. The PLC model, which focuses on

collaboration, is aligned with Bandura's self-efficacy theory and social constructivist learning theory (1986). These theories emphasize collaboration to create sense-making learning processes, internalize learning, alter teachers' daily practices, increase self-efficacy, and foster long-term retention of new knowledge through self-reflection and group reflection (Yurtseven Avci et al., 2020). This model also helps teachers modify their beliefs and attitudes and ensures they are well aware of how to use technology tools with the required standards. According to Avidov-Ungar et al. (2020), teachers should be well-trained on deciding what, how, and where to incorporate technology to change any negative attitudes of learners. Nevertheless, since teachers' schedules are busy, training time in this model is the main constraint (Dewi Wahyu Mustikasari & Norwanto, 2018).

6.3 Recommendation for Blended Professional Development

Training teachers can transform them from knowledge dispensers to facilitators, fostering asynchronous and synchronous interaction between learners (Liu et al., 2018). This positively impacts learners' perceptions of technology's effectiveness in improving learning outcomes and employment prospects (Vorobel et al., 2021).

In a flipped learning approach, teachers are exposed to a variety of technology tools by experts through online training (a two-hour session biweekly), practice, and reflection on the effectiveness of the materials, and then meet with colleagues and the lead teacher weekly to discuss the issues they encountered. Administrators set goals and objectives and highlight the technology standards set nationally and internationally. Along with teachers, they collect materials and the topics that serve those goals and then determine the online and in-person sections. They can also consult the expert during the online session about the problems they faced in the application or while browsing the features of the tool.

During the online portion, a technology expert introduces teachers to many new technology tools and explains their benefits, the theories behind their application, and the standards of technology knowledge required of both teachers and learners. For more illustration of how to apply these tools, teachers observe exemplary lessons grounded with these tools and follow the required standards. Sessions should be recorded and organized based on the standards followed and the linguistic levels of learners and uploaded on the platform created by the school for this reason. Teachers can access these sessions at any time to review, share opinions, and provide useful inputs for the best practice. Teachers take time to reflect, discuss the effectiveness of the tools they learned, and discuss how to customize these tools to suit their teaching environment. After the online session, teachers prepare a lesson to apply what they learned, collect students' feedback through online surveys and questionnaires, and analyze the data collected. The lesson they prepare should be aligned with school goals and the standards required for the grade level. They upload the materials, student assignments, and learners' feedback on the virtual platform for discussion. These results help to shape instructional design development, and the peer discussions maximize the benefits. The purpose of this component is to provide a supportive environment to reduce discomfort and promote self-efficacy (Kalu, 2019).

During face-to-face sessions, teachers focus on instructions for applications, evaluate results, and suggest modifications to the teaching process. They receive pedagogical advice, and a qualified teacher can mentor less experienced peers. Key strategies to change teachers' negative beliefs and attitudes include observation, application, practice, reflection, and social-cultural support. This model fulfills teachers' demands of self-learning, overcomes PD deficits, and provides sustainable learning resources. It also enables teachers to apply academic knowledge in authentic contexts to solve real problems. Following this step-by-step model, accompanied by self-reflection and interaction, may transform teaching practice and attitudes, leading to improved student performance (Farjon et al., 2019). Nonetheless, Yurtseven Avci et al. (2020) raised some concerns, such as the absence of appropriate, read-to-use exemplar videos and the fact that technology applications are not appropriate for every type of content and every teaching situation.

6.4 Roles and Responsibilities of Stakeholders

6.4.1 Administrators

To ensure the effectiveness of the PLC and customize the content of blended PD, administrators should provide ample time and space for weekly teacher collaborative learning, upgrade the computer lab, and introduce the program to other schools. Administrators should set clear objectives and procedures to promote transitional strategies, enhance teachers' confidence, and encourage them to apply what they have learned. Administrators should change the school culture to include technology as a meaningful learning tool. Kartal and Kuzucu (2020) pointed out that technology should be deeply ingrained in all subjects and school culture because it offers content-based instruction (CBI) that is authentic, real-world, and reflects the students' new community. They should monitor progress, identify inconsistencies, and report on the training's effectiveness on exam results. According to Haiyan and Allan (2021), the administrator's role

has three trajectories: structural, cultural, and relational. At the structural level, administrators define goals and policies and overcome barriers like low student-device ratios, large class sizes, and inadequate technology training. They should create a digital platform for teachers to create evidence-informed instructional strategies and assign roles based on their strengths. At the cultural level, administrators share the school's vision and goals with teachers, fostering a sense of ownership and professional competency. The school administration should facilitate achieving normative and behavioral domains, promoting collaboration and shared values.

6.4.2 Teachers

Teachers should participate constructively in online and in-person training, reflect on their performance, and align their teaching practice with school goals and standards (Sun & Gao, 2019). They should engage in pedagogical inquiry, continuously investigate effective teaching practices and the role of technology, and apply their knowledge to achieve desired outcomes. Regularly re-examining their professional roles and contributions to teaching and learning processes is essential (Christensen et al., 2018).

Teachers should choose topics and direct training materials to help students perceive the effectiveness of integrating technology. Fathali and Okada (2018) found that introducing practical practices enhances learners' intrinsic motivation and improves their positive engagement. Teachers should learn together, construct meaning and knowledge, and test the applicability of digital tools to learners' learning styles. Brodie (2021) categorized teacher leadership practices in PLCs into seven groups: teachers should coordinate and manage the learning process, develop the curriculum, participate actively in professional development, implement the abstract school's new vision into practice, become involved in the community, support preservice teachers, and contribute to the profession. Similarly, Chen and Zhang (2022) framed the four functional roles of the teachers in PLCs and blended PD as translating the school vision and the national standards into actual practice and operationalizable projects, working together toward the goals, becoming a source of knowledge, and fostering a rich peer-coaching learning environment.

7. Resources Needed

7.1 PLCs

Teachers' professional development requires time and funds. *Solution Tree* offers a comprehensive training package for PLCs. Administrators should provide suitable venues, introduce TPACK concepts, and provide books, audio, digital platforms, and educational software. The school should decide on necessary changes and upload relevant learning materials for contextualized discussions. Posters can be displayed in the training room to remind teachers about meeting timing and completion timeframes.

7.2 Blended Professional Development

Teachers often resist technology due to its rapid pace and overwhelming number of educational websites. To help them choose suitable tools, researchers recommend using platforms like Canvas and Hopin. Canvas hosts PD materials and tasks, while Hopin offers synchronous virtual venues. Model Teaching (2020) offers affordable online professional growth courses, such as Let Teachers Control Their Own Learning Path. Schools can also join ISTE for an annual group membership, which provides practical guidance, best practices, and evidence-based professional training. Education World (2019) offers online PD courses. These options can help teachers adapt to the rapidly changing educational landscape.

7.3 Strategies for Enhancing Learner Engagement Beyond Digital Tools

During blended PDs and PLCs, teachers should give extra classes on the basic technology bases and apply all the new technology tools they learned on students to ensure their effectiveness. Meanwhile, learners should build a digital community like discussion forums, and the teacher should be one of these forums to direct their learning outside the classroom. Learners should utilize these tools in all school subjects and their research, and the administrators should monitor their progress.

8. Summary

The purpose of this study was to provide recommendations to solve the problem of a lack of computer skills among CLB 4 and 5 learners at the LINC Center. The problem was that CLB 4 and 5 learners do not have basic computer skills. This part of the report presented the Recommendations, the Roles and Responsibilities of Stakeholders, Resources Needed, and Timelines. Two recommendations were made, including PLCs and blended professional

development.

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Appendices

Appendix A

Interview Questions

1. How much did your teacher program diploma focus on teaching with technology?
2. How do you evaluate your technology skills?
3. What is your opinion about the importance of integrating technology into teaching?
4. How do you help learners perceive the importance of learning with technology?
5. To what extent did technology help you achieve students' engagement?

6. To what extent does the educational background of the learners play a role in their learning with technology?
7. How do you integrate the technology standards in your teaching?
8. How do you measure the students' awareness of the standards they need to acquire?
9. What do you do when the students do not meet the minimum standards of using technology?
10. How does participating in Professional Development focused on technology help improve your teaching?
11. How often is the PD trainer available for following up?
12. What resources do you use to stay current with the ever-increasing technology?
13. How much does the class size affect learning with technology?
14. How do you ensure that students get the proper out-of-the-class technological assistance?
15. How often is technology integrated into the curriculum?
16. Is there anything you would like to add today that we have not discussed about the improvement of learning with technology among intermediate students at the LINC Center in Mississauga, Ontario?

Appendix B

Focus Group Questions

1. What strategies do you use to motivate students to learn with technology?
2. What factors cause some students to think that online learning lessens the quality of education?
3. How often do you integrate technology into your teaching?
4. What day-to-day instructional strategies do you use to improve student's skills in using technology?
5. How often do you change your technology tools?
6. What are the features you are looking for while choosing the technological tools?
7. How are technology skills incorporated into the curriculum map?
8. To what extent is the school's infrastructure of technology satisfied?
9. What standards do you observe while teaching with technology?
10. How can you evaluate the level of students in using technology?
11. How can we solve the problem of a lack of computer skills among CLB 4 and 5 learners?

Appendix C

Survey

Instructions: Choose the best response for each prompt below.

1. What is your educational background?
   - Teacher Education Diploma
   - Bachelor of Education
   - Master of Education.
   - Bachelor of Arts
   - Bachelor of Science.
   - Other (please specify)
2. What is your job title?
   - LINC instructor
   - Lead teacher
   - Coordinator
   - Administrator
   - Manager
3. How many years have you worked for LINC Mississauga?

2-3

4-6

7-9

10-13

14-15

16- more

4. What level are you teaching?

Literacy level

CLB 1-2

CLB 3-4

CLB 5-6

CLB 7-8

Survey Prompts

Instructions: Choose one response for each prompt below.

5. Teachers should be professional users of technology.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

6. Teachers give students useful tips on using technology during their group activities.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

7. Students' age plays a role in teaching with technology.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

8. The number of professional development training offered is effective.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

9. Teachers choose the topics of the PD workshops according to their interests.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

10. Learners perceive the importance of learning with technology in their learning process.

5	4	3	2	1

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

11. Teachers' experience in teaching with technology is important.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

12. Teachers' preparation programs should focus more on teaching with technology.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

13. Class size may affect teaching with technology negatively.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

14. It is useful to use the bring your own device (BYOD) technique.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

15. Students' educational background affects their learning with technology.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

16. Students should have access to the internet at home.

5	4	3	2	1
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

17. Teachers vary their teaching strategies by using various educational websites.

5	4	3	2	1
Always	Often	Sometimes	Rarely	Never

18. The enthusiasm of the management to switch to technology fully is required.

5	4	3	2	1
Always	Often	Sometimes	Rarely	Never

19. Teachers have time during contract hours to discuss the best practice of using technology.

5	4	3	2	1

	Always	Often	Sometimes	Rarely	Never

20. Teachers engage in conversations that help them analyze data.

5	4	3	2	1
Always	Often	Sometimes	Rarely	Never

21. Ongoing support is provided to new teachers.

5	4	3	2	1
Always	Often	Sometimes	Rarely	Never

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Authors contributions

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Competing interests

I declare that I have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

I ensured minimal risks for participants, using pseudonyms, confidentiality, and electronic storage. Personal contact, confidentiality, and password-protected materials were used in the study. Institutional Review Board (IRB) approval was not required as the data was intended to solve a specific practice problem and not be shared with a broader audience.

The Publication Ethics Committee of the Sciedu Press.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.