EFL Teachers' Perceptions of the Challenges of Technology-Based Professional Development

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ABSTRACT: Pre-service teacher professional development could assume an urgent part in raising teaching quality and learning outcomes. Evolving technologies allow for new and different forms of professional development. However, teacher professional development opportunities are limited and outcomes are controversial. In this study, to capture the challenges of a technology-based professional development, the researchers examined teachers' perceptions of the barriers to technology integration and instructional practices. Three hundred participants were recruited through an online survey- Technology-Based Professional Development Questionnaire. Through employing Structural Equation Modeling (SEM), the researchers analysed the data. The results of the study indicated that the gap between information and the use of technology-based apparatuses was viewed as related with the difficulties confronting teachers with technology-based directions. Technology-literate teachers knew how to integrate their insight into their commonsense instructing and had higher students' commitment and inspiration. In any case, technology-illiterate teachers had mechanical troubles that reduced their education. A few ramifications can be drawn from the review, for example, the requirement for teacher instruction projects to further develop teacher consciousness of new educational innovative learning strategies, and the significance of giving chances to get computerized proficiency. Our findings have both theoretical and practical implications for pre-and in-service teacher training programs. Based on these discoveries, suggestions for the plan of online professional development and gaps for future examinations are discussed.
Keywords: teachers' beliefs, teachers' perceptions, teacher professional developments, technology-based instruction, teacher education programs, learners' engagement and motivation

Las percepciones de los profesores de EFL sobre los desafíos del desarrollo profesional basado en la tecnología

RESUMEN: El desarrollo profesional de los profesores de pre-servicio podría asumir un papel urgente en el aumento de la calidad de la enseñanza y los resultados del aprendizaje. La evolución de las tecnologías permite nuevas y diferentes formas de desarrollo profesional. Sin embargo, las oportunidades de desarrollo profesional de los docentes son limitadas y los resultados son polémicos. En este estudio, para capturar los desafíos de un desarrollo profesional basado en la tecnología, los investigadores examinaron las percepciones de los profesores de las barreras a la integración de la tecnología y las prácticas instruccionales.

Trescientos participantes fueron reclutados a través de una encuesta en línea - cuestionario de desarrollo profesional basado en la tecnología. Mediante el empleo de modelos de ecuaciones estructurales (SEM), los investigadores analizaron los datos. Los resultados del estudio indicaron que la brecha entre la información y el uso de aparatos basados en la tecnología estaba relacionada con las dificultades que enfrentan los profesores con las direcciones basadas en la tecnología. Los maestros alfabetizen tecnología sabían cómo integrar su percepción en su sentido común de la instrucción y tenían un mayor compromiso e inspiración de los estudiantes. En cualquier caso, los profesores analfabetos en tecnología tenían problemas mecánicos que reducían su educación. Se pueden extraer algunas ramificaciones de la revisión, por ejemplo, el requisito de los proyectos de instrucción de los maestros para desarrollar aún más la conciencia de los maestros de las nuevas estrategias educativas innovadoras de aprendizaje, y la importancia de dar oportunidades para obtener dominio computarizado. Nuestros hallazgos tienen implicaciones tanto teóricas como prácticas para los programas de capacitación de maestros antes y durante el servicio. Sobre la base de estos descubrimientos, las sugerencias para el plan de desarrollo profesional en línea y las lagunas para los exámenes futuros se eliminan.
Palabras clave: creencias de los profesores, percepciones de los profesores, desarrollo profesional de los profesores, instrucción basada en tecnología, programas de educación de profesores, compromiso y motivación de los estudiantes

1. Background and purpose of the study

Today, almost all those who seek development and reform everywhere in the world start with education (Ansyari *et al.*, 2022). The approaches emerging from the new era of communication and technologies in education and training, including the perspective of how to learn (metacognition), process-oriented and independent learning, have caused a gradual movement in redefining the basic concepts of education and training (Yin *et al.*, 2023). Science, teaching, teacher, student, curriculum, and educational environment are getting new definitions (Berg *et al.*, 2023; Wang, Derakhshan, & Azari Noughabi, 2022). The emergence of technologies disappeared the traditional boundaries of education and technologies. For instance, the vanishing of the boundary between the public culture and its constituent subcultures, among school and neighborhood local area, among home and school, among training and work, between the universe of work and learning foundations, among formal and casual training, between the educational program of pre-organized and individuals decisions, among understudies and teachers, and among guardians and their youngsters have caused significant difficulties in instruction (Chaipidech *et al.*, 2022; Gondwe, 2021; Kong *et al.*, 2023; Sivaci & AltaŞ, 2023; Woodcock *et al.*, 2022; Yin *et al.*, 2023). In order to deal with them and adapt to the changes, educational planners and trainers should take immediate and bold steps to renew the educational organization in all aspects and dimensions. It is obvious that neglecting this task means disclaiming responsibility for the benefit of the technology and the flow of its custodian (Choi, 2023; Wang, Derakhshan, & Rahimpour, 2022).

From the study of the current situation in the education of most countries, it can be seen that during the past years, no successful efforts have been made to identify these challenges and deal with them (Alavi *et al.*, 2022; de Vries *et al.*, 2022; Dunst & Bruder, 2014; Feryok, 2009; George *et al.*, 2018; Yuan, 2020). The challenges of technology in education in the 21st century can be seen as a result of different approaches, the capabil-

ities of these technologies, and new issues in education (Finch *et al.*, 2023; Holzberger & Prestele, 2021). Topics have attracted the attention of researchers and education thinkers at the level of universities and research centers. New topics and approaches originate from scientific developments and new technologies, especially IT and ITC (Menon & Sadler, 2016; Şen & Yildiz Durak, 2022; Wang *et al.*, 2021). In fact, these developments have paved the way for the emergence of new perspectives. Likewise, they raise them beyond the national borders, in a global framework (Symes *et al.*, 2023). In addition, it has taken them out of the scope of society's intellectuals and presented them as a social approach, and they put new responsibilities and challenges beyond the educational systems of different countries (Mellati *et al.*, 2022; Wettstein *et al.*, 2021).

What are the characteristics of good language teachers in such a situation? What skills should they have to perform their duties correctly? What programs do managers and planners have for updating the knowledge and skills of teachers and based on what model do they take steps to develop their skills? The answer to such questions can be found in the concept of professional development. The success of educational departments in educating students is significantly influenced by the accessibility of EFL (English as a Foreign Language) teachers and their participation in quality development activities.

Teachers' professional development has a vital role in school reform activities (Chang *et al.*, 2022). It is also necessary for the success of the efforts made in the field of education improvement, professional development and increasing the knowledge and skills of EFL teachers - technology literacy (Dunst & Bruder, 2014; Gondwe, 2021). The importance and necessity of the development of EFL teachers' professions are due to the intensification of the upcoming challenges in the teaching profession and the increase of students' expectations of the quality of education (Holzberger & Prestele, 2021; Mellati & Khademi, 2018). Especially, despite many efforts, organizations and educational centers still suffer from low quality in many ways and have major problems in improving it (Ansyari *et al.*, 2022; Gondwe, 2021; Kong *et al.*, 2023; Metsala & Harkins, 2020; Senler, 2016). In the way of solving this problem, attention should be focused on the basic and influential elements, and among these elements, the role of teachers is the most important (Kwon *et al.*, 2019). EFL teachers are not only one of the variables that need to be changed in order to improve educational systems, but they are also considered the most important factor that creates change (Michos *et al.*, 2022).

2. Review of the literature

2.1. Technology Literacy

The results of various pieces of research show that many EFL teachers do not have a desirable technology literacy in the fields of professional knowledge, educational, teaching, scientific, behavioral, personality, social, intellectual, managerial, practical, ethical, professional, and lifelong learning and educational technology (Schwarzenthal *et al.*, 2023). Sivaci and AltaŞ (2023) consider content, fields, and process factors to be effective in the development of effective writing. When EFL teachers encounter new knowledge and skills, they realize that the foundation of any effort for their development must be based on content. According

to Wray *et al.* (2022) the content is the literacy, knowledge, and perceptions that teachers need to perform their educational duties. The content of professional development should prepare EFL teachers to create a healthy, orderly and supportive learning environment and maintain high level expectations for students' academic success. On the other hand, with the improvement of learning standards at the global level, societies need to acquire new knowledge and skills in different fields in order to achieve success (Johnson, 2022; Mellati & Khademi, 2020). In such conditions, EFL teachers should be able to improve their technology literacy in line with scientific developments and in accordance with the needs of society and provide diverse learning situations for students to acquire lifelong learning habits and skills. Acquiring this ability is important for the students because what the students gain can affect their life in the community and in the future under the influence of the experiences during their education. It is obvious that the realization of this matter depends to a large extent on how to prepare teachers and develop their literacy (Lazarides *et al.*, 2023; Oppermann & Lazarides, 2021).

2.2. EFL Teacher's Perceptions

In relation to the development of EFL teachers' perceptions, many studies have been done and different models and factors have been presented; components of knowledge and beliefs and design strategies (Holzberger & Prestele, 2021), cooperative learning and knowledge sharing by teachers (Michos *et al.*, 2022), focus on content (Ryan & Mathews, 2022), collective learning (Symes *et al.*, 2023), active learning (Woodcock *et al.*, 2022), subject teaching method for EFL teachers (Mellati *et al.*, 2018; Xu & Jia, 2022) have been found to be effective in promoting the professional development of teachers. For instance, Vidergor (2023) developed the knowledge and skills of teachers in designing materials and issues related to the curriculum and improved the overall quality of education and the positive attitude of teachers towards the professional development program. In another study, Schwarzenthal *et al.* (2023) focused on content knowledge, the opportunity for active learning and consistency with other learning activities to increase knowledge, skills, and change in the way effective teachers know the classroom. Similarly, Hallinger and Hosseingholizadeh (2020) focused on teaching and learning strategies from the implementation strategies of the professional development model. In contrast, Meesong and Jaroongkhongdach (2016) EFL teachers' learning and their perceptions were found to be effective in the development of classroom skills.

The implementation of the professional development program causes enthusiasm for the subject, especially in terms of content and improving the performance of EFL teachers, increasing the number of argumentative discussions among students and improving the communication behavior of teachers, improving the career path, improving the ways of using information and communication technology as a tool. For example, Cui *et al.* (2022) found that there is a positive relationship between classroom management, creative and innovative skills, communication skills, familiarity with information technology and professional development of teachers. They introduced the EFL teacher's sincere behavior and the manager's supportive behavior as predictors of teachers' professional development. In contrast, Lee and Drajati (2020) sated that improving job security and perceptions is one of the necessary

prerequisites for the creation of professional development. Individual, collaborative and educational professional development strategies, duration and focus on content, reflect the professional development process of teachers (Pérez-Escoda *et al.*, 2019).

Despite the fact that professional development and technology training are vital for all EFL teachers and trainers, published statistics show that teachers do not have the necessary information regarding inclusive education and the use of technology in classrooms during literacy (Choi, 2023; Hooper, 2022; Oppermann & Lazarides, 2021; Pereira & Tay, 2023). Research findings have mentioned lack of motivation, lack of interest and lack of a positive perceptions towards lessons among students due to teachers not being up-to-date and their inattention to the new needs of educational environments and students. The results of the research showed that the low technology literacy level is among the factors affecting the classrooms. Therefore, in this article, an attempt has been made to determine the impact of technology on education. Also, explain the major challenges that teachers and consequently the education system will face for the professional development of teachers. Finally, the necessary educational strategies to deal with these challenges have also been presented.

2.2.1. Research Questions

1. How much variance in the EFL teachers' challenges of technology-based professional development can be predicted by their perceptions of technology integration?
2. How much variance in the EFL teachers' challenges of technology-based professional development can be predicted by their technology literacy.

3. Method

3.1. Participants

Through convenience sampling, the authors distributed a reliable questionnaire among EFL teachers from different provinces. Of 302 received questionnaires, 300 questionnaires were valid. The gender of the participants was as follows: the men 176, accounted for 58.28%; women 126, accounted for 41.72%. The participants' age ranged in 23 to 48 (mean = 32. 41, SD = 5.098). Teachers' education structure: high school teachers were 1.32%, 11.26% undergraduate, master's doctoral 46.69% 40.73%. The data was collected in English. The data collection procedure lasted for a week. Participants were aware of all of their rights, and the researchers in the study had told participants that the information they fill in will be completely confidential and only be used for research purposes. There was no previous contact or conflict of interest between researchers and participants.

3.2. Instruments

The researchers used the following instruments in their work.

3.2.1. Technology-Based Professional Development

This researchers-made survey has 56 items. The purpose of this survey is to determine challenges of integrating technology into their classroom teaching. It has two subscales: perceptions of technology integration (30 items) and technology literacy (20 items). For each statement of the questionnaire, teachers indicate the strength of their agreement on a five-item-Likert scale. The first form of the questionnaire had 75 items. The items were subjected to expert and face validities. Then, the second version was subjected to Principal component analysis (PCA). The third version or the last version of the questionnaire consisting of 56 items was steered by 50 members of a similar populace. Utilizing the Cronbach Alpha coefficient, it showed a reliability file of .91 (r = .91). These items determine teachers' planning, executing, assessing, and practicing in technology-integrated teaching environments, their beliefs about challenges of employing technology-supported materials in language classrooms, and their attitudes towards appropriate classroom activities in technology integrated learning environments.

3.2.2. Technology Integration Questionnaire

The Technology Integration Questionnaire was employed to identify the patterns of language learners' present worries about an innovation that refers to the integration of instructional technologies in language teaching classrooms. The items of this 27-item questionnaire were written in the form of statements about personal feelings or attitudes in a Likert-scale format that starts from *Strongly Agree* (*SA*) and ends to *Strongly Disagree* (*SD*) (Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD)). It focuses on five factors: planning, excute, assessment, profesional use, and knowledge (language teachers' technology literacy). The participants show their attitudes towards each item and the concept of under question as well. To verify the reliability index of the preliminary form of the questionnaire, the researcher piloted its first edition with 50 language teachers of a similar context. The researcher used the Cronbach Alpha coefficient, the results of this analysis showed the reliability index of .81 (r = .81).

3.3. Instruments

At first, the researchers distributed the questionnaires in an online format among 400 EFL teachers from several universities in China. The questionnaire contained a consent form. Those who accept to participate in the study received the questionnaire link. Among them, only 300 valid filled questionnaires were received. They were educated about the purpose of the study and they were permitted to leave the study at any phase of the study. The questionnaires were attributed in the online format.

3.4. Data Analysis

To answer the research questions, the researchers used SPSS software (version 27) and AMOS (version 24). Through employing Structural Equation Modeling (SEM) and functions such as reliability, correlation, and Multiple Linear Regression, the researchers analyzed the obtained data.

4. Results and Discussion

The results of SEM analyses are presented in the following figures and tables.

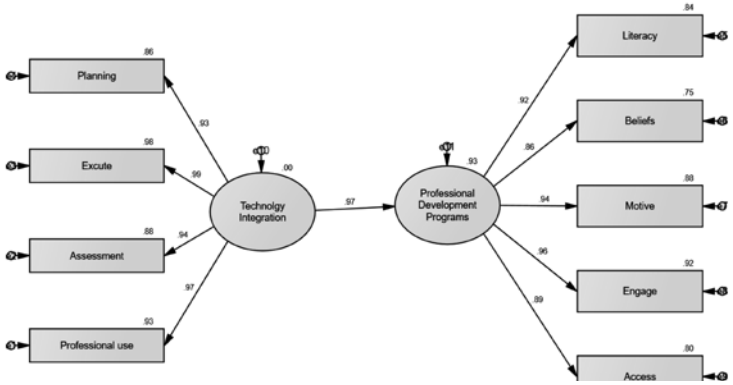

Figure 1. *The Research Models in the Standardized Estimation Mode for the First Research Question*

The values in the research model show that the hypothesis is rejected and there was a significant difference among technology integration and their teacher development in technology-integrated environments (Chi-square = 125.091, Degrees of freedom = 26, Probability level = .000).

Table 1. *CMIN*

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	28	125.091	26	.000	4.811
Saturated model	54	.000	0		
Independence model	18	4457.674	36	.000	123.824

The results of Table 1 reveal that the CMIN value is near 3, so the model is fitted, and there are significant associations between the variables.

Table 2. *Baseline Comparisons*

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.972	.961	.978	.969	.978
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 3. *RMSEA*

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.094	.093	.133	.000
Independence model	.641	.625	.657	.000

Employing a SEM approach, technology integration was all altogether connected with teacher development (0.50 to 0.90, $p < 0.001$). The model sufficiently fits the information, *RMSEA* = 0.094; *CFI* = 0.978; *CMIN* = 4.811. The results of Tables 2 and 3 show that the CFI value is more than .9 and RMSEA is between .05 and .09 that demonstrate that strong association between the variables.

Table 4. *Standardized Regression Weights: (Group number 1 - Default model)*

			Estimate
Professional developmental programs	←	Techno Integ	.966
Professional use	←	Techno Integ	.967
Assessment	←	Techno Integ	.937
Executing	←	Techno Integ	.988
Planning	←	Techno Integ	.925

The results of Table 4 present the standardized regression weights for the variables of the study. The results reveal that there is a strong association between technology integration and teachers' professional developmental programs. In other words, more than 96 percent of modifications in teachers' professional developmental programs can be predicted by technology integration. Likewise, the outcomes showed a strong association between subcategories of technology integration and their professional developmental programs. It means that teachers' professional development is different based on their technology integration procedures. The values indicate that 96 percent of changes in teachers' professional development can be predicted by their professional use and 93 percent of changes can be predicted by their assessment activities. Moreover, among the four subfactors of the teachers' technology integration executing with more than 98 percent attribution had a strong prediction power. This value emphasized the importance of practical aspect of technology in teachers' professional development. These results highlighted the role of teachers' technology use in the process of their professional development.

The following tables show the results of SEM analyses for the second research question.

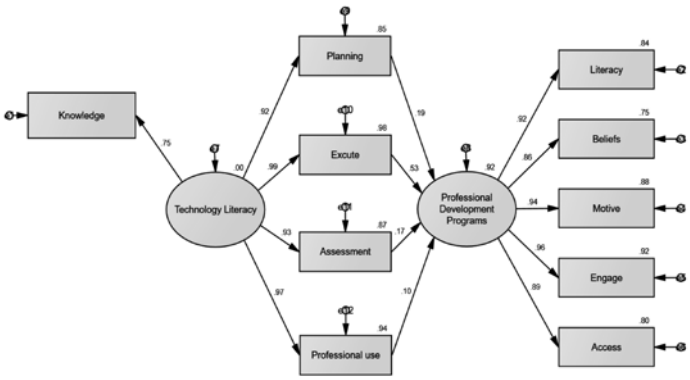

Figure 2. *The Research Models in the Standardized Estimation Mode for the Second Research Question*

The values in the research model show that the hypothesis is rejected and there was a significant difference between technology-literate and illiterate EFL teachers and their teacher development in technology-integrated environments (Chi-square = 123.597, Degrees of freedom = 31, Probability level = .000).

Table 5. *CMIN*

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	34	123.597	31	.000	3.987
Saturated model	65	.000	0		
Independence model	20	4470.753	45	.000	99.350

The results of Table 5 reveal that the CMIN value is near 3, so the model is fitted, and there are significant associations between the variables.

Table 6. *Baseline Comparisons*

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.972	.960	.979	.970	.979
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 7. *RMSEA*

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.090	.082	.119	.000
Independence model	.574	.559	.588	.000

Employing a SEM approach, teachers' technology literacy was all altogether connected with teacher development (0.50 to 0.90, $p < 0.001$). The model sufficiently fits the information, RMSEA = 0.090; CFI = 0.979; CMIN=3.987. The results of Tables 6 and 7 show that the CFI value is more than .9 and RMSEA is between .05 and .09 that demonstrate that strong association between the variables.

Table 8. *Standardized Regression Weights: (Group number 1 - Default model)*

			Estimate
Planning	←	Techno litera	.921
Executing	←	Techno litera	.989
Assessment	←	Techno litera	.934
Professional use	←	Techno litera	.968
Professional development programs (PDPs)	←	Planning	.190
PDPs	←	Executing	.530
PDPs	←	Assessment	.170
PDPs	←	Professional use	.099
Literacy	←	Technology literacy	.753
Literacy	←	PDPs	.917
Beliefs	←	PDPs	.864
Learners' motivation	←	PDPs	.936
Learners' engagement	←	PDPs	.961
Access to technology	←	PDPs	.894

The results of Table 8 present the standardized regression weights for the variables of the study. The results reveal that there is a strong association between teachers' technology literacy and teachers' professional developmental programs. In other words, more than 75 percent of modifications in teachers' professional developmental programs can be predicted by teachers' technology literacy. It means that teachers' professional development is different based on teachers' knowledge how to use different technologies in their classrooms. This value emphasized the importance of technology literacy in teachers' professional development.

According to the above content, the use of technology in classrooms is highly dependent on technological knowledge and access to technology. Therefore, acquiring knowledge alone is not enough. Therefore, the role of the educational system is to prepare learners to receive knowledge from the cultural contexts and different fields of knowledge (Chang *et al.*, 2022). In other words, the speed of new technologies is such that educational environments are no longer sufficient to prepare students. The applicability of new technologies, its instability and its specific context, emphasize that every educational environment must prepare itself for lifelong learning in order to participate in this new space (Finch *et al.*, 2023).

Therefore, the speed of new technologies dictates that every educational environment becomes a learning environment. In a learning climate, every student ought to be self-propelled and make a pattern of self-learning and self-assessment. Students, teachers, and guardians are an organization that frames the classroom for learning. Therefore, the role of teachers is to expand the attitudes and individual abilities of learners. Similarly, Gröschner (2023) believes that technology will bring closer educational environments in terms of cultural exchanges, and as a result, it will cause cooperation and competition in scientific and cultural fields.

Another form of technology can be in the form of joining an international education system in which universities of different countries of the world can have a coordinated educational program. These findings confirm what Oppermann and Lazarides (2021) found

in their studies. In order to better explain the issue, first some challenges of educational environments are examined and then the performance of educational systems is examined in order to face these challenges. Technological knowledge is one of the subjects that has increased the need for education. Advanced countries have tried to bring these educations to families, schools and classrooms with timely planning. These topics should be introduced in a new way in educational programs and even family education and these learning opportunities should be provided to students. Learning opportunities that make students objectively familiar with these issues. So that a mother can pass these teachings on to her children.

Another debate that is raised in this field is the discussion of the participation of teachers and students in technological environments. Participation in these environments requires necessary knowledge, special skills, and constructive attitudes. Participation is learned and we must learn and practice it from the same classroom and family. Educational systems have a special role in teaching and practicing this participation among students. The utilization of correspondence technology in training implies that we ought to carry this technology to the classroom and use it in the growing experience so the two teachers and students have a productive disposition toward this technology.

On the other hand, the dangers that the introduction of computers to education may have include: isolating students from society, damaging the relationship between teacher and student, endangering the education of human values, and becoming overly stereotyped. The development of communication technologies, the variety of products and methods and educational texts have led to the fact that many educational environments have faced the problem and the phenomenon of heterogeneous education, as a result of which some of the students, while they are studying in a single formal education system, due to access to new facilities (especially the Internet), they benefit from other trainings informally. Since these trainings are not the same as formal training, they can cause irreparable damage to educational systems.

The lack of 'association of mentalities' with 'objectives' as well as the lack of contact between theoretical teachings, experiences, and realities have no results other than alienating students from the diverse and active world outside (Finch *et al.*, 2023). In other words, educational systems do not engage students with social processes, so students born from this type of educational system will suffer intellectual deviations when facing the wave of global culture. The world today is made up of many different countries, each of which has a different culture and language due to its own history, and this diversity sometimes makes it difficult for people to live together. Because language also expresses the method of knowledge transfer (Kong *et al.*, 2023). In addition, the transfer of a concept from one culture to another always requires the challenge of changing from one intellectual system to another, and these incomparable intellectual systems can be a mutual source of lack of understanding, misunderstanding, and even contempt and disregard for each other (Kwon *et al.*, 2019).

5. Conclusions

The current study investigated the challenges of technology-based professional developments and found that teachers' technology literacy and access to the new technologies play a key role in determining different aspects of any educational system. In this review, to

catch the challenges of technology-based professional development, the scientists analyzed teachers' impression of the hindrances to technology coordination and educational practices. The gap among information and use of technology-based apparatuses was viewed as related with the challenges confronting teachers with technology-based guidelines. Technology-literate teachers knew how to integrate their insight into their down to earth instructing and had higher students' commitment and inspiration. Nonetheless, technology-illiterate teachers had innovative challenges that decreased their educating.

As mentioned earlier, the development of technology as a main paradigm in the current era has changed all aspects of human life. What is certain is that the introduction of these technologies into educational environments has affected the performance of teachers and students. One of the most important challenges that teachers face is technological knowledge and access to new technologies. These deficiencies can affect all aspects of educational environments. These two factors can have a direct impact on the planning, use, and participation of teachers in technology-based classes. These factors can also have tremendous effects on students' motivation, their academic engagement, teachers' and students' beliefs, and finally, students' academic performance.

5.1. Implications and Further Studies

Therefore, according to the findings of the research and according to the extent of the effects of technological growth, approaches and suggestions are presented for policy makers and educational planners. In determining the strategy of the movement of educational systems, one should look for ways to create participation-oriented executive structures so that everyone can use all the capabilities and facilities of educational environments. As long as the policies and plans are not based on systematic evaluation and evaluation, and the plans are not revised quickly and the quality of the plans is not controlled, it will not only lead to progress, but it will resist scientific and technical innovations and new beliefs. Considering the effective role of teachers in education, it should be said that the lack of correct criteria in choosing useful technologies and the existence of outdated methods have played a significant role in creating unfavorable conditions in the structure of education. Teachers should be familiar with the development stages of students, that is, the necessary training should be formed at the right time. In addition, access to technology should be easy everywhere, whether at home, through the Internet, mass media, and classrooms. Future studies can investigate the effects of technology literacy on students' motivation, their academic engagement, teachers' and students' beliefs, and finally, students' academic performance.

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