
Promoting Teachers' Digital Literacy and Professional Development in Moroccan Secondary Schools after Covid-19

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Abstract. Digital literacy skills and teachers' online ICT competencies have been the main concerns for Moroccan educational stakeholders after school closures and the unprepared shift to online teaching and learning phase. This article tries to shed light on the ministry's strategy for implementing ICT teacher development before and after the pandemic era. The study adopts a mixed method research that combines quantitative and qualitative approaches. The online survey was conducted through a self-filling questionnaire which was constructed through google forms. The 516 respondents from high schools and 244 respondents from private schools are teachers belonging to many schools in Sous Massa Academy. In addition to this questionnaire, semi-directed interviews were conducted through emails with 15 teacher trainers from the training pedagogical center in the same Academy. The outcome of the study analysis shows that there is an urgent need for a training program required for teachers to boost their digital skill level and to initiate them to online interactive approaches, based on the combination of both constructivism and connectivism learning theories to upgrade their online teaching and implementing techniques that promote student learning autonomy and student collaboration strategies. Moreover, the study reveals that the trainees at the regional pedagogical center are initiated to ICT in classroom use only while still adopting the same traditional teaching techniques.

Key words: digital literacy, professional development, teaching, Covid-19

Introduction

Digital literacy and the effective use of technology outside classrooms and school buildings have been the main concerns of educators, teachers and students during the COVID-19 crisis. The governments' restrictions and tough measures to limit the spread of the pandemic compelled educational authorities to continue teaching and learning process online. However, the shift to remote learning was not prepared and led to randomly and arbitrarily use of material and tools available on the internet for teachers as well as for students. In this context, the need for effective professional development for teachers and promoting their digital literacy was raised by many education policy makers in order to overcome the barriers that prevented a successful pedagogical continuity after school closures. In Morocco, the shift from face to face teaching to distance learning was hindered by many obstacles related to the mastery of technology tools and appropriate online teaching techniques. This great challenge has called for a reconsideration of teachers' professional development and the promotion of teacher digital literacy. Since 2006, Moroccan educational system has witnessed many reforms aiming at promoting education quality. In this perspective, teacher professional development and in-service training were attributed great importance in the GENIE program (Generalization of Information and Communication Technology in education). Successful ICT implementation in the teaching and learning process relies on the acquisition and development of skills and the use of computer software and applications. To this end, Agadir Idaoutanae delegation has set up a training schedule for teachers. The main objective of this training is to underline the importance of digital illiteracy and to raise teachers' awareness of self-training.

Literature Review

The considerable evolution in science and technology that continues to grow invites educational stakeholders and school staff to develop skills that can cope with digital society requirements. In this context, digitalization of education has accelerated significantly during the COVID-19 pandemic. The widespread adoption of online learning was driven by the need for emergency remote teaching making thus technology an important tool for education. Due to this pandemic and lockdown restrictions, educational institutions were compelled to switch from in-person classes to online instruction. In this period of crisis, teachers need to develop their use of digital tools as a medium for delivering material (Maimun, 2021). In Moroccan context, the government has provided many applications to support online learning such Microsoft Teams, Google Classrooms in order to guarantee the pedagogical continuity outside school buildings. The shift to emergency remote learning has called for the mastery of digital tools to facilitate the online teaching and learning in order to benefit from their implementation.

ICT Implementation Requirements

The integration of ICT into education has brought about positive changes and innovation in teachers' daily practices. This change requires to think about new pedagogical approaches to take full advantage of this integration. Marcel Lebrun confirms that technology tools are not "just a solution for the quality of education, they are a necessity because society is changing" (Lebrun, 2010). Therefore, the use of technology imposes on teachers to reconsider their teaching practices. There is no doubt that ICT implementation can improve the teaching and learning process and has a positive effect on students' motivation and engagement. ICT is therefore a means of bringing schools into line with the community. In this ever-changing society, ICT integration is a necessity. However, it is not enough to bring about a change in people's attitudes. Young people today use technology for fun and leisure. Studies have shown that they rarely use these technology tools for learning. The concept of 'learning' in the 21st century no longer means acquiring knowledge. On the internet, anyone can access knowledge and new information. Integrating technology tools requires a reconsideration of teaching methods by teachers. Thus, many strategies are considered including:

- Working in small groups instead of large groups.
- Provide students with resources rather than the lesson or course itself.
- Involvement and commitment of students in the task at hand
- Assessment of progress and projects rather than retention of knowledge
- A more cooperative structure rather than a competitive one
- A personalized teaching that allows each student to learn at his own pace and according to his own needs
- Methods of communication that combine different techniques of expression (visual, pictures, graphics)

These strategies set the basics for a successful integration of digital tools in the classroom and may transform and enrich the student's experience. ICT enables teachers to reconsider their traditional teaching practices by creating new tasks for the learner. This process requires from students to develop a wide range of skills such as creativity, communication and collaboration. For example, students can upload a document to a web page and get feedback from other students. Students can also work in real time via wikis and forums. Thus, learning becomes collaborative and involves more active participation on the part of students.

Teachers' Digital Literacy and Professional Development

Effective professional development plays a key role in enhancing teachers' digital literacy. As noted by Koehler and Mishra (2009), such programs aim at emphasizing technical skills and incorporating pedagogical strategies integrating technology into teaching. The

TPACK (Technological Pedagogical Content Knowledge) framework provides a structure for integrating technology into subject-specific teaching ensuring that digital tools complement rather than detract from the learning process. Research indicates that professional development that involves practical and collaborative learning experiences is more successful in enhancing teachers' digital literacy (Kopcha, 2012). Teachers also benefit from peer collaboration, mentorship and ongoing training, which helps them to keep up to date with fast-changing technologies and teaching tools. Teachers' digital literacy refers to the ability of educators to effectively use digital tools, technologies and platforms to enhance teaching and learning processes. In today's increasingly digital world, it is essential for teachers to be digitally literate, to navigate educational technologies and deliver high-quality education. Teacher's digital literacy includes the following components:

- Basic technical skills deal with the functioning of computers, mobile devices and other digital tools including interactive whiteboards, printers and projectors.
- Internet navigation refers to skills in using the web effectively, deal with online Databases and digital libraries as well as finding reliable educational resources.
- Learning Management Systems (LMS) such as Moodle, Google Classroom through which teachers communicate with students and deliver assignments and feedback.
- Digital Communication Tools such as email, video conferencing software (Zoom, Microsoft Teams) and social media that provide effective communication with students, parents and colleagues.
- Software Proficiency: familiarity with a variety of software such as word processors (e.g., Microsoft Word, Google Docs), presentation software (e.g., PowerPoint), spreadsheets (e.g., Excel), and collaboration tools (e.g., Google Drive, Microsoft Teams).
- Digital Content Creation refers to the ability to create digital teaching materials such as educational videos, infographics, interactive quizzes and other multimedia resources using tools (Canva, Adobe or video editing software)
- Assessment and Feedback: Familiarity with online assessment tools, plagiarism checkers and software that helps in tracking and analyzing students' academic performance such as Google Forms, Kahoot or Quizlet.
- Adaptation to emerging technologies allows teachers and students to be acquainted with new evolving educational technologies such as virtual/augmented reality, artificial intelligence in education and personalized learning platforms.
- Cybersecurity awareness deals with the importance of digital safety, privacy and security.

Digital literacy is also defined as set of skills to access internet, find, manage and edit digital information; join in communication and engage with an online information and communication network. Digital literacy is the ability to properly use and evaluate digital resources, tools and services, and apply it to lifelong learning processes (Gitster, 1997). A more recent definition of digital literacy *"is the ability to evaluate and criticize information that is created and shared in digital media. To be digital literate, people need to develop mental habits to adjust to new digital tools and content"* (Hays & Kammer, 2023). In this context, digital literacy is not limited to students using technology within their areas of interest, but they should learn cognitive and social skills imposed by technology tools such as critical thinking, problem solving, sharing information and knowledge building. Within this context, a digitally literate student *"can choose the correct technology for the task at hand, use that technology and then ethically share, communicate or reuse information created with that technology"* (Hays & Kammer, 2023). Moreover, other definitions are attributed to digital literacy. Some authors view digital literacy as *"technical skills"* while others consider it as focused *"on cognitive and social emotional aspects of working on digital environment"*. To clarify this ambiguity, Martin lists five key elements (Belshaw, 2012, p. 85):

1. Digital literacy consists of being able to carry out successful digital actions related to daily life activities: learning, work, leisure
2. It is an on-going lifelong process depending on the individual's self-development
3. It encompasses many digital tools including ICT literacy
4. Digital literacy includes the individual's personal qualities and attitudes as well as his ability to acquire and use knowledge and techniques
5. It involves the individual's ability to reflect and to be aware of his digital literacy development

The five mentioned items which are linked with “*soft skills and meta-level understanding*” (Belshaw, 2012, p. 85) are clearly embodied in the TPACK modal of ICT implementation. The theoretical models developed can serve as a blueprint for the integration process in all its dimensions. These dimensions include the teacher dimension and the student dimension.

- The teacher dimension deals with the choice of implementing technology tools in the classroom. This pedagogical use includes showing video clips using visual aids demonstrating a website, modelling the use of a digital recorder or e-reader, leading a Skype session and reading podcasts.

- The student dimension involves what they know and can do with technology. Many teachers admit the difficulty of planning the use of technology by students in the classroom and guiding them in this process. However, this role of a guide and a monitor emphasized in the constructivist and socio constructivist approaches seems a tiresome task for teachers in a learner-centered approach that offers the learner the opportunity to control digital tools. Students can create projects, conduct research, carry out investigations and solve problems in all areas. Access to interactive websites encourages interaction with people from all over the world, the creation of a web page and the production of videos. Nevertheless, the success of these two dimensions calls for a third dimension related to the pedagogical content of teachers. Carrying out their teaching function requires knowledge and skills as well as new pedagogical practices linked to content.

One of these areas of knowledge is Pedagogical Content Knowledge (PCK). The notion of PCK was proposed by Shulman in Stanford University in 1986 in an article that highlighted the importance of teacher education and the knowledge required to teach. The birth of this concept was prompted by several debates and the publication of many reports calling for a major overhaul of teacher education programs and questioning their fragmented structure, disciplinary focus and failure to assign fundamental professional knowledge. In this context, it is important to rethink teacher education by improving the quality of training and the professionalization of the teaching profession and the acquisition of specific knowledge in teaching. It is in this context of a national project to develop teachers' content knowledge that Shulman's research confirms the role of this knowledge in planning teacher education. In this sense, Shulman questions teacher education and encourages educational trainers and researchers to reconsider the knowledge that teachers need in their daily practices. Teacher knowledge includes:

- Disciplinary knowledge
- General pedagogical knowledge
- Curricular knowledge
- Pedagogical content knowledge
- Knowledge of students and their characteristics
- Knowledge of educational contexts
- Knowledge of the aims, objectives and values of education

This knowledge includes pedagogical content knowledge which has led to in-depth research and enriched discussions on the nature of PCK and the types of programs needed to adequately prepare and train teachers to develop this knowledge.

Pedagogical Content Knowledge

Teaching is a highly complex activity that calls on many types of knowledge. Teaching is a complex cognitive skill that is exercised in a dynamic and unstructured environment. Like expertise in other complex fields, teaching expertise depends on flexible access to well-organized knowledge systems. There are several knowledge systems fundamental to teaching mainly students' cognitive and mental processes, and knowledge of the subject being taught.

The knowledge foundations of teacher education have focused on content knowledge. More recently, teacher education has focused primarily on pedagogy, emphasizing general pedagogical practices in the classroom irrespective of the subject being taught. In other words, different approaches to teacher education emphasize content knowledge (C) or pedagogical knowledge (P). Shulman (Renau, 2012) developed thinking about teacher knowledge by introducing the idea of pedagogical content knowledge (PCK). He argued that the emphasis on teachers' content knowledge and pedagogy are treated as mutually exclusive domains. The consequence of such exclusion is the production of teacher education programs in which the emphasis is on one or other of the two approaches. To remedy this dichotomy, he proposed to consider the necessary relationship between the two by introducing the concept of PCK. PCK lies at the intersection of content and pedagogy. Thus, it goes beyond a simple consideration of content and pedagogy in isolation from each other. PCK represents the fusion of content and pedagogy into an understanding of how particular aspects are organized, processed and taught. Shulman emphasizes the importance of both subject knowledge and general pedagogical strategies. According to Lee Shulman, president of the American Educational Research Association, pedagogical content knowledge is *"a combination of content and pedagogy that is unique to teachers, a particular form of professional understanding of content. It is knowledge that distinguishes teachers from other professionals. This amalgam of content and pedagogy involves an understanding of how certain themes, problems and issues can be organized, represented and adapted to different categories of students and then taught"*. This knowledge implies the readjustment of pedagogical approaches according to subject content and knowledge of teaching strategies that incorporate appropriate conceptual representations. It is a combination of content and pedagogy that enables this knowledge to be understood, organized and represented. This concept therefore involves the transformation of disciplinary knowledge into knowledge to be taught. It consists of four stages:

- The preparation phase consists of the teacher analyzing and understanding the teaching material by restructuring the content according to his conceptions and the characteristics of his target.

- The representation phase is a process of appropriating the key concepts of a lesson including demonstrations, simulations and analogies that make it easier for students to understand these concepts.

- The choice of teaching methods phase which dictates the teacher's chosen strategies

- The adaptation phase consists of adapting these strategies to students' characteristics.

In these four stages, Shulman presents modes of action for this knowledge and the appropriate transformations to make disciplinary knowledge taught according to students' characteristics. The PCK concept developed by Shulman has given rise to a great deal of research and several revisions of teacher education programs. Within this area of development in theories and concepts on knowledge and pedagogy, an explosion of technological knowledge has considerably changed the world thanks to the invention of IT tools, the computer and Internet, which have enabled society to enter the digital era. As a result, these technology tools

are becoming increasingly accessible for educational purposes. Although most of the digital tools that appeared in the 1980s were developed for different tasks, some educators are wondering how these technologies could be used as learning tools. The expansion of the Internet and the proliferation of millions of interconnected computer networks began to have an impact on everyday life in the 1990s.

This dynamic shift towards dependence on an increasing number of information and communication technology for everyday life has rapidly challenged the fundamental idea of the knowledge and skills needed for productive citizenship. From this perspective, integrating new digital technologies represents a challenge for teaching and learning. Teacher education at pedagogical centers should help to reshape teachers' thinking and help them to reshape their teaching. Faced with this situation, trainers are questioning teachers' ability to apply these technologies in the teaching-learning process in various content areas. The advent of digital technologies has radically changed practices in most areas of human work. Thus, a new perspective has emerged for acquiring the knowledge needed to teach with these technology tools. Recognizing the need for a broader perspective, many academics and researchers such as Shulman have thought about the integration of technology, pedagogy and content by putting forward TPCK which refers to Technological Pedagogical Content Knowledge as an interconnection and intersection of technology, pedagogy and content.

The issue, according to Mishra, is the tendency to consider only the technology itself and not the way in which it is used. What teachers need to know to effectively integrate technology into their teaching has been the subject of several studies including the International Society for Technology in Education, the National Council for Accreditation of Teacher Education, the U.S. Department of Education, Teacher Education and the U.S. Congress Office of Technology Assessment. The TPCK refers to a dynamic framework that describes the knowledge that teachers need to draw on to design and implement teaching programs while guiding their students' thinking and learning about digital technologies in the various school subjects. The aim is to make the best possible use of technological knowledge in teaching practices and subject content. The TPCK highlights the relationship between the three components shown in Figure 1.

The TPCK Model

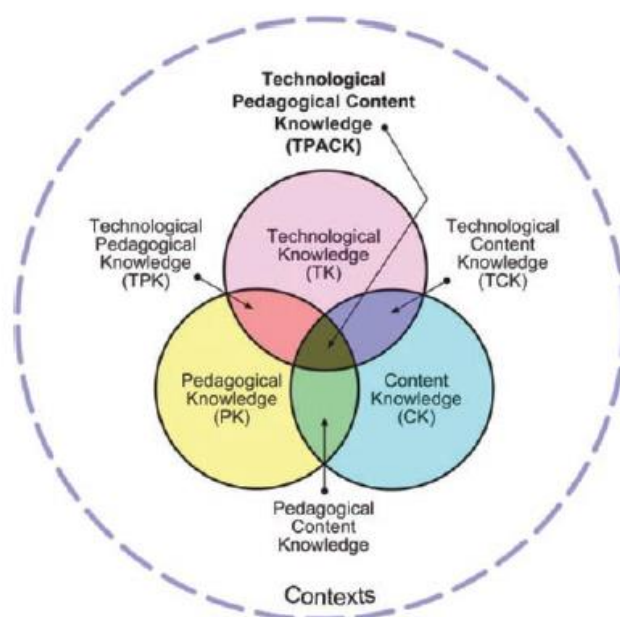


Figure 1: TPCK Model

- Technological knowledge (TK): encompasses the culture and use of new technology tools such as Internet, computers, digital video, smart phones, etc. It consists of knowledge of operating systems and the creation of archives and slides. Rapidly evolving technology means that teachers need to be updated in order to make the best use of them in their teaching.

- Pedagogical knowledge (PK): refers to knowledge of teaching models, methods and techniques, strategies for student learning including classroom management, lesson delivery and assessment models. This knowledge enables teachers to adopt the appropriate teaching methods to achieve their objectives.

- Content knowledge (CK) refers to the teacher's knowledge of the subject being taught. It involves the theories and concepts related to the subject being taught and the study of the relationship between different disciplines.

- Knowledge of content pedagogy (PCK) mentioned above refers to a mixture of pedagogy and subject content.

- Technology pedagogy knowledge (TPK) refers to the link between technology knowledge and pedagogy knowledge. The aim is to study the impact of technology on pedagogy and to analyze the ability of different technology tools to improve teaching situations.

The TPACK framework and its knowledge components offer different perspectives to teachers. Teachers' knowledge is represented as a dynamic balance between multiple knowledge domains (technology, pedagogy, content) that are guided by both the cognitive and socio-constructivist approaches.

The Cognitive Dimension of the TPACK

A teacher needs to develop knowledge in order to teach content adapted to different school levels. This conception of knowledge requires an understanding of knowledge as the amount of information needed to achieve objectives, the ability to draw information from data and transform it into meaningful data, the ability to think, interpret and act creatively. The TPACK helps teachers to organize, implement strategies and study results. This perception of the TPACK based on knowledge, thoughts and beliefs is based on four cognitive components that describe the reasoning and processes of technology integration on the part of teachers.

- An overall conception of the aims of integrating technology into the teaching of different subjects. This conception is what the teacher knows and thinks about the nature of the subject, what the students need to learn, and the contribution of technology to this learning. This initial phase forms the basis for teaching decisions.

- Knowledge of students' understanding, thinking and learning of the subjects taught using technological tools. In this component, teachers draw on their knowledge and beliefs about students' understanding, thinking and learning with technology in specific subjects.

- Knowledge and identification of curricula that require the integration of technology: teachers decide on the appropriate digital tools for teaching different subjects in a technological environment. These tools can be improved, organized, structured and evaluated throughout the curriculum.

- Knowledge of pedagogical strategies for creating a favorable environment for integrating technology into different subjects. This allows teachers to adapt their teaching, encourage and guide students to learn using technologies and develop content-driven learning contexts to achieve pedagogical objectives and meet learners' needs.

According to these components, ICT implementation invites teachers to reconsider content-specific concepts and processes as well as the impact of technology on the development of the taught items. These results call into question previous assumptions that the integration of technology implies only an in-depth knowledge of the content. However, studies show that teachers' adaptation of new pedagogical practices when integrating digital tools is an essential

element of learning that can make learning a process of assimilation and adaptation that leads to changes in learners' cognitive process.

The development of TPACK is therefore presented as a constructive and iterative process that invites teachers to review their methods and approaches in order to be able to teach the content of different subjects using appropriate technologies in line with their knowledge, beliefs and convictions. The TPACK model is recognized as a dynamic and fluid process, rather than a static vision of teachers faced with an innovation that consists of integrating digital tools and new pedagogical strategies into the teaching and learning process, and a revision of their knowledge of the content of the subject being taught.

The Socio Constructivist Dimension of TPACK

Research in the TPACK model emphasizes the constructivist approach where teachers actively engage in transforming and reorganizing their prior knowledge to teach, guide and assess students learning with appropriate technology tools (Olofson & Swallow, 2016). In this context, social constructivists emphasize the importance of social interactions in learning, recognizing that the construction of knowledge develops in a social context.

According to Vygotsky socio-constructivist approach, knowledge is constructed through social interactions with others (Hodson & Hodson, 1998). This represents a conceptual shift drawn from Piaget's approach to knowledge development as a cognitive process in which learners organize and give meaning to their learning. A social constructivist perspective is based on the important assumption that thinking takes place in social and physical contexts, rather than in the mind of the learner. In this sense, assessment in the TPACK model considers the social perspective and the cognitive perspective as necessary tools for the development of knowledge.

Study Context

The pandemic of Covid-19 had caused the closure of educational institutions in order to control the spread of the pandemic. This unexpected new situation had imposed some measures to guarantee the continuity of the teaching and learning process. Within this perspective, Moroccan educational authorities had adopted some measures to provide necessary educational tools and free access to some national channels which had broadcasted lessons related to different educational levels. However, the outcome of these procedures resulted in the limited access of students to those channels. Some parents had reported low quality of the educational programs. In this context, the present study sheds light on the importance of teacher professional development and ICT training.

Problem Statement

This article investigates the ministry's strategy for implementing ICT teacher development before and after the pandemic era. This pandemic in Morocco as well as in other countries has revealed a huge gap in implementing distance learning and appropriate on-line teaching and learning methods and approaches to make remote learning a successful experience. This invites to a reconsideration of the ministry's policy to implement ICT in classrooms.

Scope of Study

The target population of the study includes 516 teachers in public high schools and 244 teachers in private high schools at the Souss Massa Regional Academy for Education and Training. The study also includes semi-structured interviews with 15 teacher trainers at the Regional Pedagogical Center in Inezgane. The participants in the study supply valuable insights on teacher professional development and digital literacy.

Methodology

The study adopts a mixed method research that combines quantitative and qualitative approaches. The online survey was conducted through two self-filling questionnaires which were constructed through google forms. The participants in the study were 516 respondents from public high schools and 244 respondents from private high schools belonging to many schools in Sous Massa Regional Authority. In addition to the quantitative, semi directed interviews were conducted through emails with 15 teacher trainers from the training pedagogical center in Inezgane. Data was collected through a google forms questionnaire which included demographic information, Likert type items and few open-ended questions.

Results and Discussion

Teacher professional development and in-service training are attributed great importance in the GENIE program (Generalization of Information and Communication Technologies in education) which was part of the ministry of education strategy in ICT integration in Moroccan public schools. Successful ICT implementation in the teaching and learning process relies on the acquisition and development of skills and the use of computer software and applications. To implement the GENIE program, Agadir Idaoutanae delegation has set up a training schedule for teachers. The main objective of this training is to underline the importance of digital literacy and to raise teachers' awareness of self-training.

In-service Training and Professional Development for Teachers

Findings from questionnaires

In-service training and professional development for teachers are attributed great importance in the national program strategy for the integration of information and communication technology. The introduction of these technologies presupposes the acquisition and development of skills and the use of computer software and applications. As part of the GENIE program, the delegation's education department has set a training schedule for teachers. The primary objective of these training courses is to enhance digital literacy and to raise teachers' awareness of self-training. Inspectors are also involved in the training program and are responsible for leading and delivering ICT integration training. The training sessions are interactive sharing sessions. Teachers share and exchange pedagogical projects incorporating ICT. Participants can also collaborate by learning from each other and through registering on websites and blogs dedicated to classroom ICT implementation.

Training is not limited to a specific program but is tailored to teachers' needs. Initial training constitutes a major phase of digital literacy among young teachers in teacher training pedagogical centers. Since 2011, ICT training has been included as a cross-curricular module. Similarly, the oral interview for selecting candidates includes a grid that includes computer literacy. In this context, initial training plays a crucial role in professional integration for novice teachers. In this regard, Karsenti (Karsenti 2017) confirms that when teachers are introduced to digital tools a change takes place in their future practices when they are confronted with ICT in their initial training, which affects positively their motivation to learn with ICT and their attitude towards ICT implementation in their teaching practices in the classroom. In Moroccan context, this study reveals a lack of ICT training. Data collected from teachers in public schools in Figure 2 shows that 57.4% have not received any training in ICT, compared to 42.5% who confirmed that they had developed ICT skills. In this context, 76.7% of respondents admitted that they had acquired these skills thanks to their own initiatives, 26.7% through their academic studies and 25.9% through professional training.

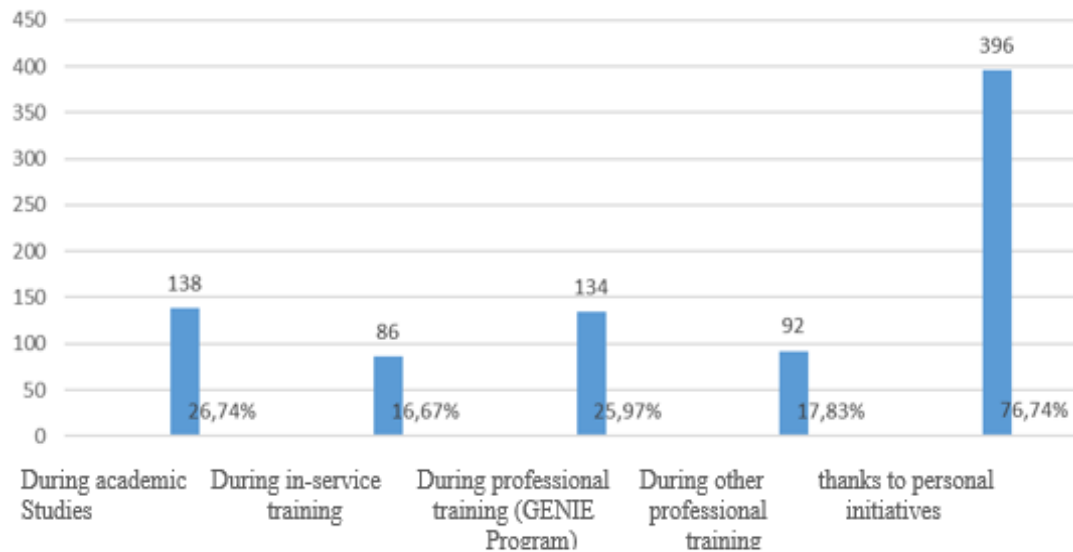


Figure 2: ICT professional training in public high schools

As for teachers in private schools, Figure 3 shows that 72.5% developed their ICT skills thanks to their own initiatives while 16.8% admitted to having acquired them during in-service training.

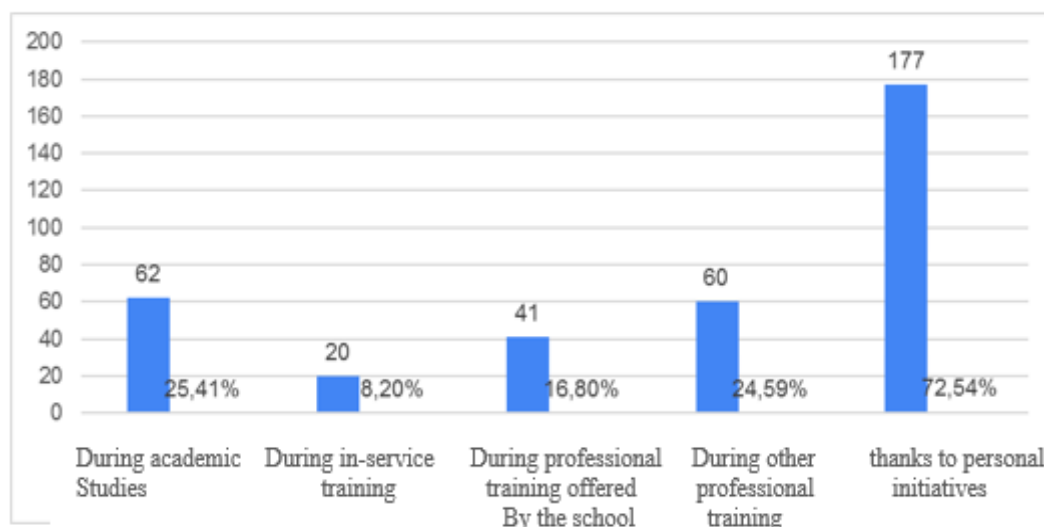


Figure 3: ICT Professional training in private high schools

The Role of Teacher Education

In the process of integrating educational technology, teacher education is a major factor in implementing ICT and changing teaching practices. In our survey which adopts a mixed-method approach in data collection, the quantitative component is enriched by the qualitative component through interviews conducted during the pandemic period through emails. We have sent emails to ten teachers at the Regional Pedagogical Center (Centre Régional des Métiers de l'Education et de la Formation (CRMEF)). The interview guide consists of three questions related to the following points:

- The implementation of ICT in the modules taught at the training center
- The development of ICT skills among future teachers
- The integration of ICT into formative and summative assessment process.

The interviewed trainers expressed different points of view about the items included in the semi-structured interview.

The following observations can be drawn from the comments made by the participants in this qualitative study:

- Trainers perception of ICT integration into teaching is limited to the teaching of computer science as a module independent of other subjects. This very limited view corresponds to the initial phase of the integration of ICT in which teachers associate the use of ICT solely with the teaching of computer science.

- According to some trainers, the integration of ICT cannot be applied to all the taught modules, given the characteristics of each module. In this context, the approach adopted in our study, TPCK (Technological Pedagogical Content Knowledge) emphasizes that the teacher's responsibility is to adapt the tools to the modules taking into consideration the teaching requirements of the module and the appropriate learning methods that correspond to the needs of each learner (Mishra & Koehler, 2006).

Conclusion

ICT integration in the teaching and learning process has gone through many reform phases that have required huge funds to ensure a successful integration of educational technology. Within this context, GENIE program that was implemented through many phases aims to improve infrastructure, teacher education and digital resources. This program has also focused in the acquisition of ICT skills among teachers as well as trainees at the regional pedagogical center (CRMEF). Nevertheless, the results reveal that the use of ICT in teaching practices corresponds to the initial phases of Moersch's model (Moersch, 1995). The efforts made by the ministry of education are insufficient. Strategies for implementing ICT are often ambiguous and lack visibility and clarity for teachers. Moreover, initial teacher education and professional development have not achieved the desired objectives. Analysis of the comments made by the interviewed teachers reveals major constraints. Most of them said that they had developed ICT thanks to their own initiative. According to the semi-directed interviews, initial teacher training shows a considerable lack of training for the trainers themselves, who have unclear and poorly formulated perceptions of the integration of ICT into teaching. These perceptions still adopt very traditional approaches to teaching and learning and reject any form of evolution and innovation offered by digital tools.

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