

Contribution of ICT to Didactics: A Case Study in Algeria

مساهمة تكنولوجيا المعلومات والاتصالات في التعليمية: دراسة حالة في الجزائر

Baligh BABAALI

University of Mascara, baligh.babaali@univ-mascara.dz

Khaddidja YAHYAOU

University of Mascara, yahyaouikhaddidja@yahoo.fr

Kheireddine BOUHEDDA¹

University of Médéa, bouhedda.kheireddine@univ-medea.dz

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Abstract:

Information communication technologies (ICTs) are becoming very essential and unavoidable in our daily life. Today in Algeria, ICTs exemplified by the internet and interactive multimedia are obviously an important focus for future education. They need effective integration into formal teaching. The problem question of this study is: To what extent is the contribution of ICT to didactics in Algeria? Hence, this study analyzes trends in using ICT by teachers and students in classrooms. Quantitative research was used to collect data from respondents using online Google forms. The principal issues and challenges deemed important in using ICTs in education were: Quality of internet connection, limited time, and lack of effective training.

Keywords: ICT, Didactic, Connectivism, E-learning

ملخص:

لقد أصبحت تكنولوجيا المعلومات والاتصالات أساسية جدا ولا يمكن تجنبها في حياتنا اليومية. أما في الجزائر اليوم، فمن الواضح أن تكنولوجيا المعلومات والاتصالات التي تجسدها شبكة الإنترنت والوسائط المتعددة التفاعلية تشكل محورا هاما للتعليم في المستقبل، وهي تحتاج إلى إدماج فعال في التعليم الرسمي. إن الإشكالية التي تطرحها هذه الدراسة هي: إلى أي مدى تسهم تكنولوجيا المعلومات والاتصالات في العمليات التعليمية في الجزائر؟ من ثم، فإن هذه الدراسة تحلل مختلف الاتجاهات في استخدام تكنولوجيا المعلومات والاتصالات من جانب المدرسين والطلاب في الفصول الدراسية. وقد استخدم بحث كمي لجمع البيانات من المجيبين باستخدام استمارات غوغل على الإنترنت. من القضايا والتحديات الرئيسية التي تعتبر هامة في استخدام تكنولوجيا المعلومات والاتصالات في التعليم هي: نوعية الاتصال بالإنترنت، وضيق الوقت، والافتقار إلى التدريب الفعال.

الكلمات المفتاحية: تكنولوجيا المعلومات والاتصالات، التعليمية، الربط الشبكي، التعلم الإلكتروني.

¹ - Corresponding author: **Kheireddine BOUHEDDA** mail : bouhedda.kheireddine@univ-medea.dz

1. Introduction

According to (UNESCO, 2002) *“ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural matters”*. Information and communication technologies referred to by the abbreviation (ICT) indicate technologies that allow access to information through telecommunication. In general, it is analogous to information technology (IT), but principally focuses on communication technologies. This consists of the internet, wired and wireless networks, cell phones, tablets, and other communication mediums.

The twenty-first century seems to be the era of Information Technology (IT). Hence, it seems obvious that information technology has had exponential growth. The huge flow of information is rising in all fields across the world. Now information and technology are widely used in the educational area for developing the teaching-learning process and making it effective and interesting for students and teachers both.

Usually, the lecture has been the conventional didactic method of teaching, highly dependent on listening and language skills. But, the latest evolutions in ICT have made the creation and use of ICT tools easier. This evolution supplied instructors with new innovative ways to teach and educate students and capture the full range of their abilities and talents. This is important because it gave lecturers and teachers an opportunity to leverage Howard Gardner's theory of multiple intelligences (Gardner & Hatch, 1989).

In Algeria, as in many other countries, ICT tools gain areas in the educational process at different levels. Sometimes they are integrated formally in the process, and in many cases, it's a personal didactic practice. For this purpose, this study attempts to answer the following research question: What is the depth of the contribution of ICT to didactics in Algeria?

1.1. Aims of the study

The principal aims of the study were to analyze trends in using ICTs by respondents (teachers and students), these tools availability, their use by teachers in classrooms, respondents' awareness of ICT, and eventually their views on the use of ICT in learning. Besides this, an attempt was made to investigate the:

- Impact of ICT on their study.
- Purpose of internet use by respondents.
- Level of information retrieval skills in searching activities.
- Time spent by the respondents in searching online information.
- Problems faced by the respondents in online searching and accessing information.
- Respondents' perception of the ICT use in learning.

This paper is organized as follows: Section 2 presents the theoretical background, followed by section 3 that summarizes the related works. In section 4, we present the applied methodology. Section 5 describes the results and discussions. Finally, section 6 concludes the paper in addition to

some suggestions.

2. Theoretical background

- (a) *ICT*: In this paper, information and communications technologies (ICTs) refer to computers, videos, hardware, software, networks, and Internet connections used to communicate and process information for learning purposes. They are present everywhere in all fields, and they affect every aspect of life.
- (b) *ICT integration*: “*integration (of ICTs) is when the IT tool is put efficiently to the service of learning*” according to (Mangenot, 2000). From a systemic perspective, effectiveness presupposes that there are gains in terms of learning time, reduction in group size, greater activity of each learner, better appropriation, and ultimate motivation. For Karsenti “*Integrating ICT in education brings many benefits*” (Karsenti, Savoie-Zajc & Larose, 2001). He states, also, that “*Indeed, ICTs are flexible and accessible, they also increase the possibilities of communication and interactions and they bring a great variety of teaching and learning modes, resulting in better learning, improved and more adapted teaching to everyday realities for school officials*” (Karsenti, Savoie-Zajc & Larose, 2001).
- (c) *E-learning*: or online learning. It is a learning method that takes advantage, in whole or in part, of the use of an information network such as the Internet, an intranet (LAN), or an extranet (WAN) to deliver courses, synergy, and/or simplification (Ratheeswari, 2018). Web-based learning is a branch of e-learning. It means learning using an internet browser such as Google Chrome and Mozilla Firefox or the Moodle environment (modular object-oriented dynamic learning environment).
- (d) *Blended Learning*: It is a learning model that mix face-to-face classroom practice sessions with e-learning methods. For example, a teacher may practice classical learning in the classroom session and uses Moodle to facilitate out-of-class learning (Ratheeswari, 2018).
- (e) *Didactics*: or Science of Education (Frabboni, 1998). It addresses the processes of teaching and learning. It conceptualizes teaching as refining of interaction between teachers and knowledge by which teachers make successive adaptations to scientific or academic knowledge, so it becomes an object of learning. As an authoritative person, a teacher or educator is a guide and support for his students. Learning is a refining of interaction between students and knowledge in which learners make new meanings from experience (Camilloni et al., 2007).
- (f) *Connectivism*: is a theoretical structure for understanding learning in the digital age. It highlights how Internet technologies such as blogs, search engines, wikis, discussion forums, and social networks contribute to the adoption of new learning approaches. Its introduction was made in 2005 by George Siemens (Siemens, 2005) and Stephen Downes (Downes, 2005) in separate publications. The two works have received significant and special attention. In 2007, Kerr joined the discussion with a series of lectures and talks (Kerr, 2007). In 2008, in the context of digital and e-learning, connectivism and its technological implications were reconsidered.
- (g) *Student-focused-learning*: or learner-centered-learning, is a learning environment that focuses on attitudes, skills, and knowledge that learners possess and bring with them to the learning

process. Its momentum derives from a paradigm of learning called constructivism. The education model in the twenty-first century has changed its focus, moving away from teacher-focused instruction to student-focused-learning. The new challenge for teachers is to make the most of ICT to improve the teaching and learning process. Without sufficient and suitable knowledge of ICT, the teacher cannot achieve, effectively and completely, his mission in the classroom (Bhattacharjee & Deb, 2016).

3. Related works

Many works using web-based technologies to learn foreign languages are obvious in some journal articles and edited volumes. Chun and Plass (Chun & Plass, 2000) described the development of a project named *netLearn*. It was used by students for learning the German language at the University of California, Santa Barbara (UCSB). As they asserted, *netLearn*, which mixes networked applications and multimedia, was found successful in assisting students to improve their second language skills and features of language competencies, based on the second language acquisition principles.

A study conducted by Jang investigated the effect of integrating technology with teaching strategies on observation and writing into a teacher education course in Taiwan (Jang, 2008). This study compared pre-service teachers getting the teaching practice on “application of technology and theories” with those who got “traditional teaching”. The conclusions showed that teachers who use ICT could use the different technologies and instructional theories; whereas traditional teachers showed limited integration of ICT and instructional theories. The study shows that using ICT and integrating teaching approaches in the teacher education courses had a significant impact on the pre-service teachers’ capacity to use technology for their teaching mission.

In 2010, (Li & Walsh, 2010) conducted a study that examined how EFL teachers in China used *CALL* (Computer Assisted Language Learning) and factors influencing the use of *CALL*. The study noticed that most of the teachers with a satisfying learning background provided with computers had adequate technical computer skills. But mainly computer use was for PowerPoint presentations. The conclusions proposed that they needed supplementary practices through professional development activities to encourage teachers for a better knowledge of *CALL* pedagogy and to integrate more ICTs in their teaching classes.

An experiment led by (Hocine, 2011) with two groups of 20 school children and which comprises using the Web-blog in activities of writing by following well-determined instructions, revealed that pupils were enabled to use their linguistic skills to achieve a significant written production (Even among students who are not very keen on writing). The possibility of using different media seems to have triggered a desire to write. In this study, the blog proved to be a facilitating instrument for the creative expression of ordinary students who are not particularly keen on writing.

Another study conducted by Cuberos de Quintero and Vivas García in 2015 (Cuberos de Quintero & Vivas García, 2017) whose main goal was to determine the correlation between didactic, management, and educational use of ICT in basic secondary education institutions in the municipality of San José de Cucuta-Norte de Santander in Colombia. The investigation showed a

synergistic relationship arising between didactic, management, and educational use of ICT resulting from poor training of both teachers and managers in didactic technical and managerial skills, leading to a delay in the institutional change in favor of educational quality.

Malek analyzed educational activities (Malek, 2018) and focused her study on comprehension and oral production and interpretation, and analysis of a questionnaire for teachers of secondary level, to observe the problem on the ground. At the end of this experience, she confirmed the importance of the audiovisual media in teaching and learning the French language as a foreign language. She noticed improvements in the educational value of information technology and communication in strengthening learning. The study concluded that by using ICT tools; the learner becomes academically integrated to create, develop, and design his own content.

Some studies are focused on looking at teachers' attitudes towards the use of ICT tools in their classrooms. In 2018, Forhad conducted a study (Forhad, 2018) in an international school in Bangkok, Thailand, and showed that the majority of the in-service teachers are cherishing a positive attitude toward ICT tools. However, an important number of in-service teachers are not using ICT tools adequately in their professional practice.

4. Methodology

After comprehensively reviewing the related literature (Zare-ee, 2011; Hismanoglu, 2012; Cahyani & Cahyono, 2012), we designed the questionnaire Contribution of ICT to the didactics. However, because of COVID-19 pandemic lockdown and the social distancing, we created a survey in Arabic language using Google Forms², and then we shared a web link in many Algerian Facebook groups (dedicated to education) varying from primary school to university level. They returned 328 forms in a CSV³ file format. We analyzed data using Microsoft Excel version 2010. We represented results with the help of tables and distinct figures.

Besides the collected social data and information, we divided the set of questions into 4 categories:

- (1) Attitudes toward ICT.
- (2) Attitudes toward the use of technology in teaching.
- (3) The use of ICT in higher education.
- (4) Perception of ICT use in teaching.

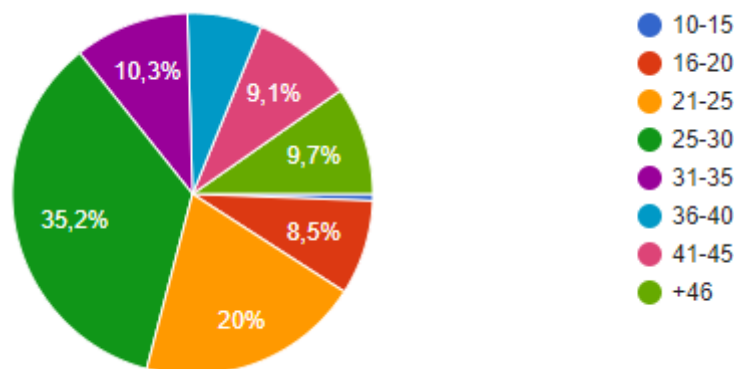
5. Results and discussions

The research sample in the survey thus consists of (63%) males and (37%) females and their age range is shown in Fig.1.

Fig.1. Respondents' age range

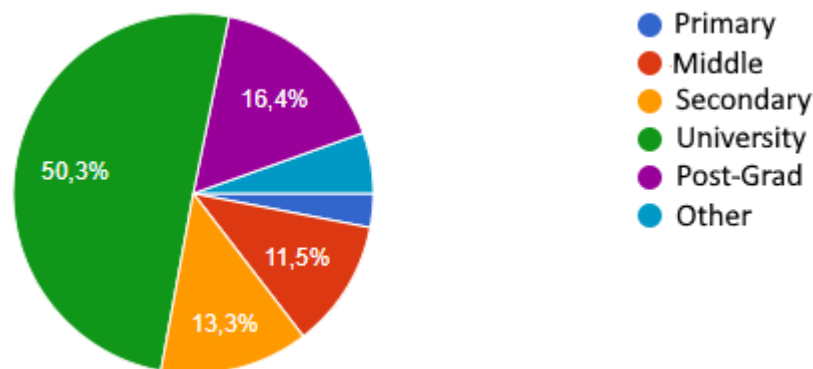
² <https://www.google.com/forms/about/> created 04/05/2020

³ CSV: Comma Separated Values



(23.6%) of the respondents are teachers, (30.3%) are pupils or students and (46.1%) did not specify their position. At the same time, (51.5%) of them followed a scientific course, (22.4%) are literary and the rest (26.1%) did not specify their category of education. More than a half of them (50.3%) are academics. Fig.2 shows the respondents' education level.

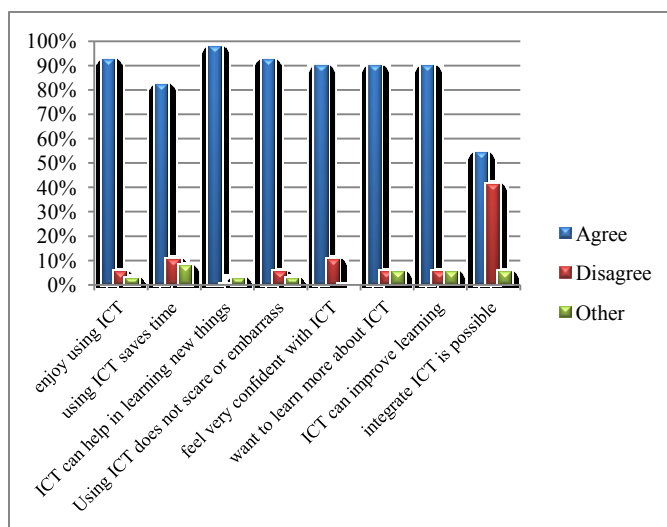
Fig.2. Respondents' education level



The first question of the research was aimed at **impact of ICT on learning and teaching**. In this era, technology influenced everyone involved in the education process especially teachers and learners. We started from evaluating the attitudes toward ICT.

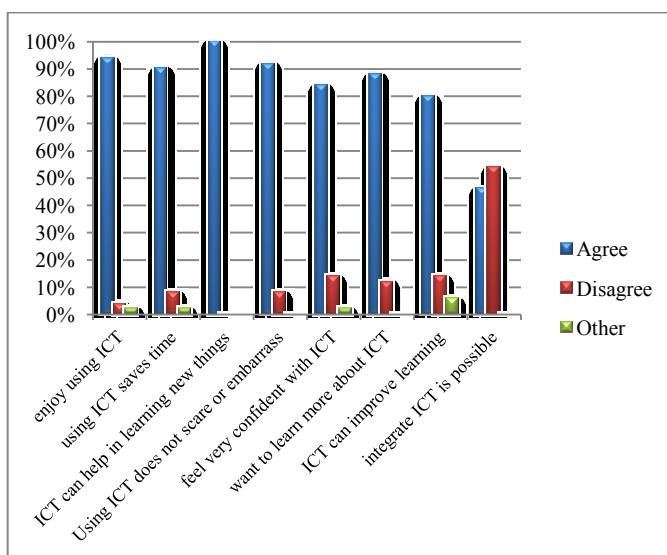
The next two figures show clearly that most respondents' attitude toward ICTs is **very positive** (both teachers and students share this opinion, see Fig.3 and Fig.4). They find it very useful in learning and finding information and answers to their questions. However, while (53.8%) of students believe that it is possible to modify the curriculum to incorporate ICT, only (46%) of teachers agree.

Fig.3. Teachers' Attitudes toward ICT



Respondent (R9) linked the ICT integration future with the government's will to invest in this field. He stated that *"ICT integration is possible, but it will require investing a lot of money and the government will not do that"*. Some respondents believe that ICT saves time but it will not replace books (R7, R61) and sometimes it leads to a move away from the subject (R89). Concerning the question about the possibility of developing personal learning skills using ICTs, some respondents doubt this possibility and relate it to poor internet flow speed (R97, R262). There is a link between it and the quality of the subject of education (R184). Some opinions link it to the response by answering questions with the professor (R8, R173).

Fig.4. Students' Attitudes toward ICT

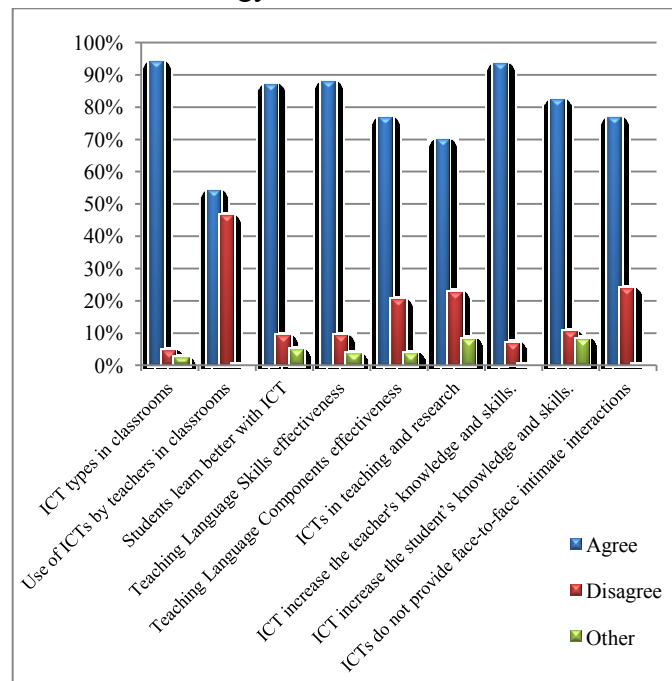


A further aim of the research was to describe **the attitudes toward the use of technology in classrooms**. The data show (see Fig.5) that both teachers and students are in favor of diversifying the types of technologies in classrooms (93.7%). They agree that students learn better when they use ICTs. Their language skills (Listening, Speaking, Reading, and Writing) and language components (Grammar, Vocabulary, and Pronunciation) are assimilated better. Comparing to the traditional tools of teaching and research (70%) of the respondents believe that ICTs are better. At the same

time, the use of ICT (referring, generally, to computers, videos, hardware, software, and networks) increases the knowledge and skills of both teachers (93.2%) and students (82%). However, the respondent (R31) raised the problem of technology addiction, which is a real issue nowadays.

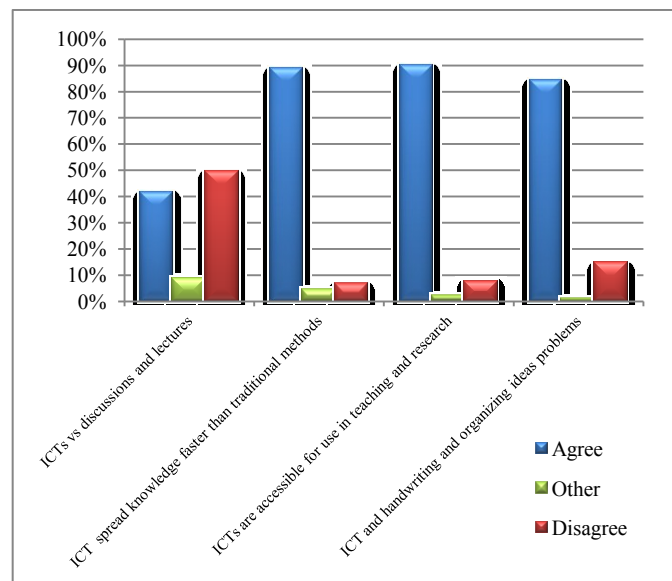
Regarding the requirement of teachers to use ICTs in the classrooms, only (53.9%) of respondents were in favor. For this question, respondent (R43), who is a teacher, stated: *“As required by the objectives of the lesson, but we must not forget the time limit”*, raising the issue of diverging from the objectives of the lesson and exceeding the time limit of this lesson.

Fig.5. Attitudes toward the use of technology in classrooms



In the third set of questions, we tried to figure out **the use of ICT in higher education**. Most of the respondents agree that many forms of ICT tools and techniques for higher education are accessible for use in teaching and research (89.8%), and ICT can spread knowledge and information faster than traditional methods (88.7%). But (49.04%) of them prefer discussions and lectures in higher education than ICT (see Fig.6).

Fig.6. Use of ICT in higher education



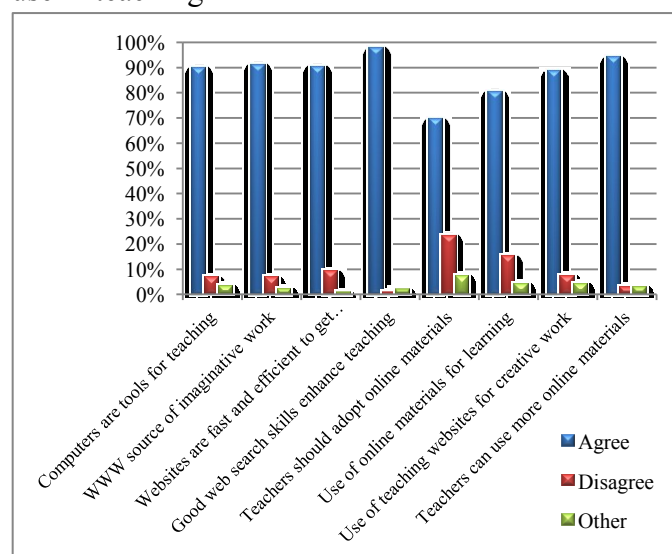
The remarkable thing is that (70.1%) of the teachers have developed ICT-based materials for use in their teaching and research, as shown in Table 1. This participation is a good sign from the teachers who are trying to innovate and integrate ICT in the didactics.

Table 1. Respondents' participation in ICT-based materials development

Developed lot of ICT materials	Developed some of ICT materials	Never	Other
27.4%	42.7%	28.7%	1.2%
70.1%			

Language is another notable point in this study. (48.5%) of respondents declared having problems with ICT because of the English language. (26.1%) found it difficult, but the language was not the cause. While only (23.6%) have a good command of the English language and ICT. Therefore, for successful ICT integration into didactics, improving the level of the English language is imperative among teachers and students.

Fig.7. Perception of ICT use in teaching



The last aim of the research was to describe **the perspectives of ICT use in teaching**. Most of the respondents shared the same opinion (see Fig.7). They agreed computers can serve as a good means for teaching plans (89.9%). But the respondent (R184) related it to the course nature or its content. (91%) agreed that the World Wide Web allows them to do more interesting and imaginative work.

(90.2%) of the respondents admitted good teaching websites are fast and efficient means of getting updated information and/or material. Respondent (R99) stated, *"The teacher must verify the integrity and the rightness of such information"*. This is true given the large number of data sources that may contain false or outdated information.

At the same time, (97.6%) confirmed that good Web search skills enhance teaching. However, only (69.5%) insisted that teachers should change the classical teaching method and adopt online materials as the principal teaching tool. (R26) recommended combining old and new teaching methods. (R37) suggested the use of online materials as helping tools and supplement to interpretation. (R74) restricted their use to specific activities and lessons only, and (R133) concluded that ICTs are useless in primary school.

(80.5%) of the respondents wanted to use more online materials for teaching/learning, but (R41) expressed that books stay irreplaceable. (88.4%) expected to use teaching websites to do more interesting and productive work. But the respondent (R92) did not admit. He said, *"Teachers can do such works with students' questions"*.

6. Conclusion and suggestions

Our research survey aimed to investigate the contribution of ICT to didactics. We tried to find answers to the questions already cited, such as the impact of ICT on the educational practice. We collected different information to identify the purpose of internet use by respondents, their level of information retrieval skills in search activities, and the time spent by them in searching for online information. We tried to analyze the respondents' perceptions of ICT use in learning.

It turns out that there is no problem with the perception and attitudes of learners concerning the use of ICT and its influence on learning practice; however, the most use of ICT is as a supplement to interpretation and as visual communication support for teachers. We perceive that most of the respondents are holding a positive attitude toward ICT tools in professional practice not only as a motivational tool but as a new method of passing information, which is nowadays a required piece of educational practice.

Teachers should take up the challenge of personalizing their teaching activities by considering recent developments in learning theories, current directions in teaching, and the various technologies available in modern contexts. In addition, we should assist the teacher in providing teacher training in implementing ICT in the classroom.

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