

Toward an Effective Model for Evaluating Distance Education

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Abstract—Distance education has become popular due to their ability to provide learning from almost anywhere and anytime. COVID-19 forced educational institutions to urgently introduce distance education to ensure pedagogical continuity, so all stakeholders were invited to adapt to this new paradigm. In order to identify strengths and weaknesses, the research focuses on the need to create an effective mechanism for evaluating distance education. The aims of this research were to explore and evaluate the use of digital media in general and official platforms in particular in distance education practices. To this end, we have developed and validated a questionnaire before administering it to a sample of 431 teachers in Morocco. Teachers reported lower knowledge and skills in the didactic use of ICT in the distance education process. In addition, although age and educative experience of the teachers continue to modulate the level of instrumental skills. Therefore, resources (digital resources and infrastructure) and the teachers' ICT training present serious limitations, which require a training more focused on the distance educational paradigm and educational environments that allow teachers to create educational activities able to promote and facilitate the distance learning process.

Keywords—distance education, learning management systems, evaluation, teachers, digital learning

1 Introduction

Integration of distance education technologies to promote learning quality and improve its performance has become a priority of Moroccan education system. The spread of COVID-19 has accelerated the adoption of technologies that facilitate the teaching-learning process while reducing viral spread. Indeed, in a pandemic context, the use of technologies remains “the only opportunity to continue the learning process and to prevent the termination of the educational process” [1], [2]. These new conditions of teaching invite all stakeholders to engage in a constructive evaluation of their distance teaching practices. Without a regular, valid and systematic reflexive evaluation of distance education, teachers, pedagogical inspectors and education policymakers may find it difficult to understand the impact of this mode of teaching and learning process. It will also be impossible to improve their experience.

Faced with this new educational reality and in order to improve distance educational experience and make it a success, we have tried to study the pedagogical use of digital technologies (e-learning platforms, social networks, communication tools ...). The research problem is formulated under the following main question: To what extent have teachers been successful in using ICT in general and official platforms in particular in their distance educational practices?

To answer this research problem, we decided to divide it into the following four sub-questions: 1) What resources are available for distance education?, 2) What are the ICT skills of teachers in Morocco secondary schools?, 3) Are teachers motivated to use technology in their practices?, and 4) What are the challenges facing learners and teachers in distance education process?

This study is significant for many reasons. First, the mobilization of distance leaning into educational practices has been growing along with both ICT developments and educational paradigm shift [1]. The gap between the existing literature on ICT and issues important to how we evaluate distance education makes this empirical study valuable. Second, this study used a multi-dimension questionnaire to evaluate education distance practices. Third, the findings are expected not only to improve educational experience, but also to help Moroccan teachers who have not yet adopted DE to begin doing so. It is also hoped that the findings can strengthen educational policymakers' awareness of both the various challenges and the feasibility of adopting DE.

This paper is organized as follows: Section 1 introduces the research context, motivation, and questions; Section 2 details the research background, models, and instruments; Section 3 presents the search process; Section 4 provides the data results according to the proposed framework; Section 5 discusses the main findings, conclusions and suggestions of the study.

2 Background

2.1 Distance education approaches

From a theoretical point of view, distance education cannot be equivalent to face-to-face education. Distance education “considered as using non-traditional approaches and delivery methods compared to conventional campus-based education [...] Distance education has taken various forms and different definitions have been adopted depending on the age it has been developed” [2]. Keegan considered distance education to be a different field of education, parallel and complementary to mainstream education [3]. He classified the theories of distance education into three main groups: 1) Theory of Independent Study, 2) The industrialization of teaching and learning, and 3) Theory of Interaction and Communication.

Wedemeyer characterized independent study as one in which: 1) Separation between learner and teacher, 2) Normal teaching and learning processes take place in writing or through some other medium, 3) Teaching is individualized, 4) Learning takes place through the activities of the learner, 5) Learning is adapted to the learner in his or her own environment, 6) The learner takes responsibility for the pace of his or her own progress, with freedom to start and stop at any time [4]. He also highlighted four elements in every teaching/learning situation: the teacher, the learner (s), the communication system

and the content. He suggested rearranging these elements among themselves in order to allow a better understanding of the physical space and to allow greater freedom for the learner. Wedemeyer believes that the key to the success of distance education is the development of the relationship between the learner and the teacher. In the same perspective, Michael G. Moore defined Independent Learning and Teaching as “an educational system in which the learner is autonomous, and separated from his teacher by space and time, so that communication is by print, electronic, or other non-human medium” [5].

Otto Peters proposed a new approach to analyzing distance education, by employing economic and industrial theory. This approach is based on the following principles: 1) The use of methodological measures that ensure the rationalization of energy, time and money needs, 2) Divide the task into simpler items or sub-tasks, 3) The use of technology in the work process, 4) the learning materials should be created by both teacher and learners, 5) The mass production of distance education courses can improve the quality, 6) The preparatory phase is linked to the development of distance learning courses, which allows the inclusion of experts in various fields with higher qualifications than those enjoyed by other teachers, and 7) Planning is important in the development of distance education, where the contents for the learner’s reference have to be specified in detail and modified to adapt to each other.

Holmberg’s distance learning theory falls under the general category of communication theory. Holmberg notes that his theory has explanatory value by linking the effectiveness of teaching to the influence of feelings of belonging and cooperation, as well as the actual exchange of questions, answers and arguments in communication media.

Hilary Perraton synthesizes the existing theories of distance education in the light of education philosophy in the form of 14 hypotheses. We choose to quote here only those which will be useful to us in evaluating distance education practices: 1) Any medium can be used to teach anything, 2) the teacher’s role changes from that of information transmitter to that of learning facilitator, 3) group discussion is an effective way to learn when using distance learning, 4) The systems approach is useful in planning distance education, 5) Feedback is a necessary part of the distance learning system, and 6) they need to ensure that learners engage in frequent and regular activities in addition to reading, watching or listening. One issue important to highlight is that DE theories are multi-dimensional, which is expected given the interdisciplinary nature of the field.

2.2 Distance education towards new definition

The definitions and principles of distance education presented above are consistent with the educational and socio-economic vision in which it was established. Since the 2000s, these definitions and principles have been revised by several researchers to meet the requirements of the 21st century. In this article, we adopt Abdullah Saykili’s definition: “Distance education is a form of education which brings together the physically-distant learner (s) and the facilitator (s) of the learning activity around planned and structured learning experiences via various two- or multi-way mediated media channels that allow interactions between/among learners, facilitators as well as between learners and educational resources” [2]. This definition meets the requirements of Faerber’s educational tetrahedron (see Figure 1), who added a new pole (the group) to the famous didactic triangle of Houssaye (1988).

The Figure 2 shows our conception of the distance education process. it is an adaptation of the Faerber tetrahedron to meet new educational and technological requirements: 1) Technologies have replaced the virtual environment in order to have a more generic model that is easily adaptable to each context, 2) the knowledge pole has replaced by the resource’s node. Knowledge acquisition will be the result of the mobilization of these resources and of communication with the other nodes that make up this didactic and educational network, 3) the frozen structure of tetrahedron is replaced by network in order to facilitate communication between the different nodes. These nodes can be humans (learners, teachers, group, learning community...) or resources (Digital resources, Systems or Interactive Objects) [6], and 4) Group work promotes the learning process and motivates learners. When they belong to a learning group, they motivate themselves more while developing transversal skills (communication, respect, the spirit of sharing and collaboration) and acquiring disciplinary knowledge.

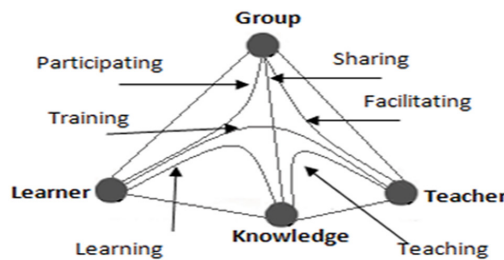


Fig. 1. Faerber educational tetrahedron

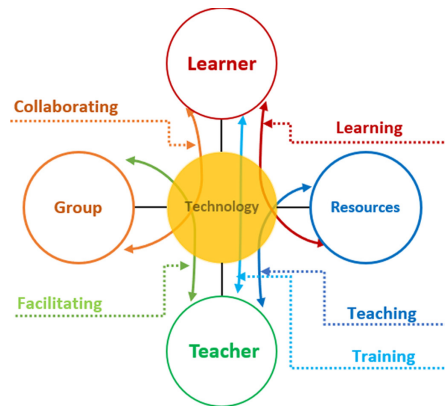


Fig. 2. Distance educational model

2.3 Evaluation of the pedagogical relevance of distance education

Currently, given the teaching-learning experience in the context of COVID 19, most countries are encouraging e-learning including developing countries like Morocco. To assess the pedagogical relevance of distance education, in-depth scientific studies and expert opinions were mobilized. Various instruments and constructions have been suggested [7]–[16]. Although each of the instruments remains relevant and aims to

address the different dimensions of distance education, but they are too focused on the learner and the infrastructure; the teaching is a bit neglected in the process of distance learning assessment. On the other hand, the teacher remains the only actor who has the necessary skills to offer useful and relevant information concerning the quality of the distance teaching-learning process.

In the literature there are several factors and dimensions that must be taken into account to assess distance education like: technology acceptance, motivation, interactivity, instructors, institutional e-learning policy, learners, learner support, presence/community, self-regulatory behavior, design and content factors. Bringing all these dimensions and factors together in the distance teaching-learning assessment process will be a very complex and expensive task, for this reason we have tried to bring them together in four main dimensions: Resources, Technology, Affective dimension and Challenges (see Table 1).

Table 1. Dimensions, criteria and indicators to evaluate DE

Dimensions	Description	Criteria & Indicators
Resources	represents the set of material, digital and human resources that can be mobilized to facilitate the distance teaching-learning process.	School context (Rural, Semi-Urban and Urban); Infrastructure (Computers, Internet, Official platform, e-learning policy learning ...) [17]; Technical support; Teacher age and seniority.
Technology skills and knowledges	Digital skills to use ICT either in the teaching or learning process	Technology experiences and training; Teachers' confidence level to using ICT; mobilized type of distance education (Used media); Digital content creation skills.
Motivation	"Motivation is the reason for people's actions, desires, and needs. Everyone is concerned with motivation to push themselves or others to act. Parents, teachers and coaches are always looking for the right way to motivate those they educate, teach and mentor. Every individual struggles to find the energy to achieve and persist in his daily tasks" [18]	Learners' engagement (Participation, collaboration); Teacher' engagement; Teachers' satisfaction; Presence (social presence, teaching presence, and cognitive presence) [19].
Challenges	The set of difficulties and obstacles that negatively influence the process of either teaching or learning. Studying this dimension would be an important step in developing the quality of distance education.	It will be better to check this dimension through open questions in order to give teachers the opportunity to express their feedback freely.

3 Methodology

The study adopted a mixed approach which combines a theoretical and descriptive method since it suits the current study to evaluate distance education reality in Moroccan secondary schools from teachers' feedback and point of view. The study sample included 431 male and female teachers working in Regional Academy of Education and Training Fez-Meknes.

In order to develop a reliable and robust instrument able to meet the study problem, objectives and questions, the following five steps were followed:

- 1) **Review on the subject**, we first conducted a literature review of how distance education experience has been evaluated. More than 40 indexed articles were analyzed to identify the dimensions to be taken into account in this evaluation process. As explained in the Previous Work section (Section 2.3), the analysis revealed that the evaluation of the experience of using distance education tends to focus on: technology acceptance, motivation, interactivity, instructors, institutional e-learning policy, learners, learner support, presence/community, self-regulatory behavior, design and content factors.
- 2) **Instrument elaboration**, In light of the literature review and related studies, the questionnaire was formulated where its four dimensions included the followings: 1) Resources [20], [21], 2) Technology skills, 3) Motivation, and 4) Challenges.
- 3) **Content's Validity**, the first phase of validation of the instrument (questionnaire) was a content validity where the quality of the questionnaire in terms of its completeness, diversity of content, linguistic clarity and ergonomic quality, was verified by 5 specialists in the field of distance education. The necessary modifications have been made on the basis of the recommendations and suggestions of the arbitration body.
- 4) **Validity of the internal consistency**, after content validity, the second phase of this validation process concerns the internal consistency of the instrument. This internal consistency analysis was carried out on the basis of a user test on a sample composed of 34 teachers, using the Pearson correlation coefficient of the items with the total degree of the dimension it belongs. The results obtained varied from (0.63 to 0.92) in terms of correlation coefficients, are high values which means that the items of the questionnaire have internal consistency validity.
- 5) **Reliability of the study instrument**, in the third phase of the instrument validity process, we used Cronbach Alpha to check its reliability. The same survey data mentioned earlier are used. The Cronbach's alpha coefficients of the scales ranged from 0.72 and 0.84, which means that the study instrument has a high value of reliability [22].
- 6) **Data collection**, the questionnaire was prepared via Google form because of the possibilities it offers with regard to the speed of data collection, as well as its adequacy to the pandemic situation. We adopted the method of non-probability sampling, where we sent the questionnaire through email and WhatsApp to all teachers working in the different directorates of Fez-Meknes, whether in urban, semi-urban or rural areas. Total 452 responses were received; 21 responses were dropped due to incompleteness and 431 were taken as the final sample size. The data collected were analyzed using SPSS 25.

4 Findings

This section provides the findings regarding the perspectives of the teachers towards their distance education experience and practices. The findings are organized based on the four dimensions of the proposal distance education model.

4.1 Resources dimension

Most participating teachers' specializations were in informatics (22.3%), Islamic Education (21.1), mathematics (15.8), History and Geography (8.8), physics and chemistry (7.4), language teaching (French (5.3%), Arabic (4.4), English (3.9%)). Among all teachers, over 62% were aged between 31–50; 67% of them male. It can be noted also that around 43% of participants have teaching experience of more than 15 years, while those less than 5 years do not exceed 21%, and those varying between 5 and 10 years only reach 15% and 20% have teaching experience between 10 and 15 years. This sample of experienced teachers allows us to collect relevant data concerning its process of adaptation to the digital age. This distribution is due to the concentration of the most participants in the urban center, which is an environment of stability, since 70% work in the urban center and 18% in the semi-urban center, while only 12% work in the rural area.

4.2 Technology skills and knowledges

Teachers were asked about their confidence and competency to use ICT (e-learning platforms, social networks, communication tools). More than half said they had weaknesses in their ability to use ICT. Indeed, only less than a third had a very favorable attitude towards distance education. This can be explained by the lack of quality training (official training or self-training), in particular in the educational uses of distance education applications and platforms. Correlation analysis with Spearman correlation (r_s) showed that teachers confidence level in using ICT was significantly correlated with the teachers training variable ($r_s=0.78$, $n=431$, $p\text{-value}<0.01$).

Teachers are aware of the importance and the need to engage in the distance learning process more than two-thirds have participated in the production of courses and digital content on a voluntary basis and without compensation. In addition, 90% mobilize their own resources to ensure a kind of pedagogical continuity between them and their learners.

However, this commitment lacked knowledge on the pedagogical and methodological aspects related to the way of conceiving and producing digital resources and supports. Only 14% of the respondents were involved in the production process in order to meet the needs of the learners. Most of the literature related to the design and production of digital resources confirms the impossibility of engaging in the production process without analyzing and defining the needs, trends and socio-economic background of learners [23].

As can be seen from Table 2, only 4.4% of teachers use the official platforms in their distance education practices; the majority (64.5%) mobilize Facebook and/or WhatsApp. This is explained by the difficulties encountered by teachers and students alike to use the official platform, as well as by the technical problems that these platforms had at the beginning. It can also be explained by the lack of quality training concerning the use of platforms in the teaching-learning process. In fact, 54.1% are engaged spontaneously (without supervision) and with their own means. On the other hand, 28% tried to combine the two solutions in order to benefit from the strengths of each.

Table 2. Teachers’ involvement in online teaching

	Items	*f	**P
Used technology	FaceBook or WhatsApp only	278	64.5%
	both FB or WhA and official platforms	121	28.1%
	Official plateforms (Teams) only	19	4.4%
	Other Media (Zoom, Classroom)	13	3.0%
Creation digital resources	Personal initiative	233	54.1%
	at the request of the Institute	119	27.6%
	According to learners’ needs	79	18.3%

Note: *Frequency; **Percent.

4.3 Motivation

Results from the third part of the survey focused on motivation factors. Learners’ motivation (Tables 3 and 4) consisted of motivation and involvement level in distance learning situations. Teachers’ motivation (Table 5) included teachers’ engagement and perceptions.

Table 3. Learners’ motivation for distance learning

Motivation Level	Frequency	Percent
Motivated	119	27.6
Little motivated	240	55.7
Not motivated	72	16.7
Mean (On a scale of 0 to 2) = 0.89; SD= 0.66		

Table 4. Learners’ Involvement in online Learning situation

Learner’s Involvement	Frequency	Percent
Too weak	89	20.6
Weak	117	27.1
Average	133	30.9
Much	73	16.9
Very much	19	4.4
Mean (On a scale of 0 to 4) = 1.57; SD= 1.12		

Table 5. Teachers’ engagement and satisfaction with distance education

	Item	Frequency	Percent
Teachers’ satisfaction	Strong	169	39%
	Fine	159	37%
	Weak	103	24%
Classes number of each section per week	One	114	26.5%
	Two	140	32.5%
	Three	77	17.9%
	More than three	100	23.2%
Classes duration	Less than half an hour	51	11.8%
	Half an hour to one hour	121	28.1%
	One hour to an hour and a half	110	25.5%
	More than an hour and a half	149	34.6%

Information and communication technologies arouse the interest of the learner and satisfy his needs by motivating him and making him spontaneously engage in learning situations [18]. However, the results show clearly the low level of student involvement and motivation for distance learning. Indeed, 72.4% of the sample state that their learners are not motivated or have little motivation for distance learning. In addition, only 21.3% of pupils engage in a good way in the learning situations proposed by the teachers. Researchers have looked at motivational variables as significant indicators of desire to continue with any form of technology assisted-education [24].

The teacher remains the guarantor of the success of the teaching-learning process. The “teachers are key players to effectively implementing distance education” [25]. It is therefore important to find that 76% express their satisfaction with their experience and their involvement in distance education. 39% expressed their complete satisfaction; 37% have an average level of satisfaction while only 24% are not satisfied with this experience. These results show that teachers are aware of the importance of integrating distance education into their teaching practices despite the lack of resources and training.

4.4 Challenges

Results from the last part of the survey focused on challenges dimension. The analysis of teachers’ perceptions concerning their distance learning experiences allows us to detect the difficulties encountered, the weaknesses and the strengths of the mobilized system. According to Gökhan and Beyhan “Perceptions affect behavior, so determining teachers’ perceptions is also important for effective distance education” [25].

We used three questions. The first concerns the learning assessment: Is it possible to adopt the official platform (Teams) to assess your learners? (See Table 6).

Microsoft Teams is adopted as the official platform (OP) for delivery of distance learning courses, “it is a communication platform that is integrated with Microsoft Office 365. This application provides features for meetings, video conferencing, file storage and offers easy access for its users. Users can create virtual classes and manage the class like a real class, where in this virtual class students can interact with fellow students and teachers” [26]. According to Table 6, 72.2% of the teachers expressed that they cannot use the OP in the learning assessment process but only 8.4% of the teachers stated that they can use the OP to create and administrate assessment activities. In an online learning situation, assessment becomes a complex and even complicated task because of the spatial and temporal distances that separate the teaching staff and the learner. Creating and managing assessment activities with Teams platform is a complex issue. The lack of training in using the available tools (Teams offers features to create assessment activities, grade them, and provide feedback) may explain this rejection.

The second question targets teachers’ perceptions about official solutions proposed to facilitate distance education: How do you evaluate the tools available on the official platform, and do they meet your needs related to distance education? (See Table 7).

Regarding the ability of Teams platform to meet the needs of the teacher, 44% consider it low or very low. While 57% say that Teams platform meets their needs in terms of services and features, only 7% have very high satisfaction. In addition, the majority

of respondents rejected the idea of the possibility of adopting Teams platform in the evaluation process. Official solutions offered such as the Teams platform require significant resources ((adequate internet network, internet quota), and teachers must be trained how to use this platform pedagogically and didactically, especially for those who never integrate ICT in their teaching practices. This situation has prompted teachers to resort to alternative means such as WhatsApp and Facebook. These technologies remain inappropriate to ensure effective educational communication and to track students' interactions. Indeed, 57% of teachers said that the process of communicating via WhatsApp is very difficult.

Table 6. The ability to use official platforms (OP) in the assessment process

The ability to use OP in the Assessment Process	F	P
Yes, I can use OP to create and administrate assessment activities	36	8.4%
I don't know	84	19.5%
No, I can't	311	72.2%
Mean (On a scale of 0 to 2) = 0.36; SD= 0.63		

Table 7. Teachers' perceptions about Official platforms quality

Official Platforms Quality	Frequency	Percent
Too weak	88	20.4
Weak	102	23.7
Average	127	29.5
Much	85	19.7
Very much	29	6.7
Mean (On a scale of 0 to 4) =1.69; SD = 1.19		

The third question was open-ended, soliciting additional feedback, Challenges and suggestions: Would you like to make any comments to clarify your responses above or express any other thoughts about the challenges facing you or learners in distance education? And how can this experience be improved? Table 8 shows the results obtained.

Table 8. Challenges of Distance Education for Teachers

Challenges	P	F
Students are not interested and do not communicate in distance learning-teaching situations.	53.36%	230
Some students do not have computers, phones or internet connections.	85.85%	370
Official platforms require important resources for communication, making distance learning a complicated task	70.07%	302
Online communication is troubling (lack of respect for work time and privacy)	56.61%	244
No difficulty. Distance learning allowed me to improve my professional skills	3.71%	16
Lack of teachers' training to use distance education	52.20%	225
Difficulty in assessing student learning electronically	91.65%	395

The most frequently referenced challenge was learning assessment (n=395, 91.65%). This may be due to that assessment is a complex process even in the case of face-to-face teaching. In distance situation it becomes more complex; teachers will be encouraged to use authoring systems to create assessment activities. They will also be invited to think about how to avoid cheating. Some students use books, search engines and/or WhatsApp groups to leak test answers. Other opinions are as below respectively, lack

of equipment and infrastructure (85%), Official platforms require important resources (70%), Online communication is troubling (57%), Students are not interested (53%), Lack of teachers' training to use DE (52%), and Only (4%) who did not find any problems to adopt distance learning, for them it was an opportunity to improve their professional skills.

5 Discussion, conclusion and suggestions

The aim of this study was to explore and evaluate the use of digital media in general and official platforms in particular in distance education practices. In order to achieve these goals, a mixed-method approach was used in this study in which a literature review of how distance education experience has been evaluated was conducted. Following this, a quantitative analysis concerning the four dimensions (Resources, Technology skills and knowledges, Motivation, Challenges) of the proposed model was conducted.

According to teachers' technology skills and knowledge, results confirmed that more than half of teachers feel less competent to use ICT, as had been indicated in previous studies [27]. Teachers' technology skills and knowledge is among the most dominant obstacles to distance teaching. Obviously, teachers need both technical and pedagogical ICT skills and knowledges. Research has shown that for a successful integration of ICT in education, there should be a combination of content knowledge, pedagogical knowledge and ICT technical knowledge [28].

Looking at teachers and students' motivation and engagement with distance teaching and learning process shows that we are in a complex situation. On the one hand teachers are very committed to distance learning. 76% express their satisfaction with their experience and their involvement in distance education. Teachers are aware of the importance and role of distance education. This awareness and conviction were manifested in their great involvement in the production of digital resources and courses and in their mobilization of all the official and personal resources to make distance learning effective for pupils. On the other hand, only 21% of pupils engage in a good way in the distance learning situations proposed by the teachers.

The low motivation of learners and their low involvement can be explained by several reasons: 1) socio-economic factors linked to the lack of the necessary means for distance learning, "socio-economic background had an impact in terms of limited access to ICT tools including computers, either at home or in schools" [29], 2) pedagogical and didactic factors due to the fact that the educational situations and environments offered to them are not stimulating and do not offer enough opportunities for each learner to work according to his abilities and to enhance his own abilities, and 3) psychological reasons related to the quarantine environment, among which we mention, for example, but not limited to, students are accustomed to the face-to-face mode in which the teacher plays the role of accompanist, facilitator, motivator and observer of their work. It can be seen that there is no system for monitoring and controlling attendance.

"The sudden change from a brick-and-mortar model to only a click model of education and learning has posed serious challenges in front of teachers and students" [30]. In

this study, the most widely expressed challenges regarding DE are learning assessment (91%), equipment and infrastructure (85%), Official platforms quality (70%), Online communication (57%), Student's motivation (53%), and teachers' training to use DE (52%).

Learning assessment is a main component of any pedagogical act that teacher must carry out in his/her daily work [31]. Assessment remains the only way to verify the achievement of goals and also the only way to verify competencies development and knowledge acquirement. This is all the truer in the case of distance education. Distance Learning assessment becomes a complex or even complicated task because of the spatial and temporal distances that separate teacher and learner [32]. This is confirmed by the results obtained in our study, creating and managing assessment activities with the Microsoft Teams platform is a difficult task. The lack of training in the use of the available tools (Teams offers functionalities to create assessment activities, grade them and provide feedback) may explain this rejection. As a complex process, assessment must take into account the individual differences of learners at intellectual, emotional and socio-economic levels. Taking all these aspects into account requires careful training of teachers on how to design and produce assessment activities, on the basis of a regular scientific methodology in harmony with active pedagogical approaches [32], [33].

Almost half of teachers reported having the skills and knowledge to teach at a distance. The reason may be that new hires have high computer skills and can adapt and use digital technologies quickly and comfortably (platforms, computers, cellphones, social media) since most of them are Gen Y and Gen Z (digital natives). In addition, ICT integration is part of the initial training of new teachers. On the other hand, the older ones find it difficult to adapt to the digital age. In fact, the results show a strong correlation between the age of teachers and their ICT mastery degree. The complexity of distance teaching has increased the workload of teachers many folds [30], [34].

Lack of teachers' training to use distance education also explains the low-level teachers' satisfaction regarding the quality of communication with their learners. Indeed, correlation analysis with Pearson correlation coefficient (r_s) showed that teachers ICT training was significantly correlated with their satisfaction level to distance communication ($r_s=0.82$, $n=431$, $p\text{-value}< 0.01$). The reason may be due to that the teachers who possess high skills to use ICT succeed in choosing the most suitable technological tool for their pedagogical and didactic practices. Although the results obtained show that teachers were aware of the need to use distance education, they were not well equipped pedagogically and psychologically for such a brutal change to use ICT in their teaching practices. This result agreed with the study of Mohd. Imran & al. "The education system was obligated to reinvent itself to handle this unparalleled challenge" [30].

Additionally, the effectiveness of educational e-learning platforms with video conferencing tools including Zoom, Microsoft Teams, Moodle, and Google Classroom was evident during the lockdown period offered an appropriate solution to the difficulties with emergency distance teaching [35]. However, equipment and infrastructure affect negatively the possibility of adopting the official platform in the distance teaching and learning process. More than two-thirds of the sample said the official platform requires significant resources to run on electronic devices such as computers and smartphones. This result agreed with the study of Kristiana Nathalia Wea and Agustina Dua Kuki [26] and was assured by many literatures such as the study of Abu Elnasr E. Sobaih et al. [36]

which pointed to that among the obstacles facing this kind of education are digital resources and equipment.

Distance education can have a wider reach and a wider impact provided the infrastructure is in place. At the same time having technological literacy is a must which is yet a challenge in a country like Morocco. Indeed, distance education requires that teachers are provided with the necessary knowledge and skills for technical use, pedagogical use, didactical use and resources (digital resources, infrastructure) that allow them to create educational activities able to promote and facilitate the learning process. This is consistent with the results of Orhan and Beyhan [25] who “In order to be successful in distance education, the instructors should be adequately prepared with the teaching strategies and techniques required to teach and conduct effective distance education courses/programs and the students should need to take their own responsibility for distance learning”.

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