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Innovation in Distance Training and Distance Assessment Practices in the Regional Centers for Education and Training in Morocco

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This study is conducted in the post-Covid 19 era and focuses on diagnostic assessment at a distance and online self-training in the Regional Centers for Education and Training, in French "Centres Régionaux des Métiers de l'Education et de la Formation" (CRMEF). At the CRMEF, the diagnostic assessment is conducted at the beginning of the training year to identify the pre-acquired knowledge and skills of the trainees. This study is conducted with 43 trainees, school laboratory preparers, from the class of 2022 who have passed the entrance exam (written and oral) to the CRMEF. In order to diagnose the pre-acquired skills of these trainees in Information and Communication Technologies (ICT), we carried out a distance pre-test. Furthermore, we measured through a post-test conducted online, the impact of self-training via an adaptive remote platform, which we realized with the Padlet tool, on the degree of acquisition and progress of the trainees in ICT. In order to determine the trainees' perceptions of these innovative practices, an online questionnaire was made available to them using the Google forms tool. The results showed a saving of time and effort for the trainer with the help of automated correction of diagnostic assessments carried out remotely, a rate of commitment and involvement of the trainees during the online self-training phase.

Keywords: remote diagnostic evaluation, Remote self-training, self-training platform, pre-acquired, CRMEF trainees

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INTRODUCTION

The situation induced by the Covid-19 crisis has precipitated the pedagogical actors of education, teachers and students, into an emergency distance-learning mode. As a result, distance learning is on the minds of many researchers around the world. University pedagogy is mainly oriented towards the development of autonomy. Distance learning systems are beginning to transform the ways in which knowledge is accessed and the approaches to teaching and learning. This requires a variety of learning modalities, and induces students to take responsibility for organizing their time and planning their other learning in order to complete their training. It is true that through these distance-learning systems, students can self-train and self-manage, they are continuously pushed towards empowerment, but such self-training still requires a very close and precise guidance. The teacher must design training that addresses both the need for self-management and the need for guidance. This distance learning seems to be conducive to exchanges and consultation, but at the same time places the student in a more autonomous pedagogical relationship that may disrupt his or her learning habits and consequently be a source of difficulties related to the management of space and time units (Atmani, 2020). This may influence the students' rate of engagement and involvement in the course and, consequently, the degree and quality of completion of learning activities, which could obviously be a reason for dropping out. The results of Lollia and Issaieva's (2020) survey of 198 teachers about distance learning and assessment revealed that the teachers questioned tried to adapt, develop and/or vary assessment approaches and tools but felt trapped by the reality of the field. The teachers questioned were not able to establish real interactions using all the tools deployed, so regulation and remediation were not feasible at a distance. Putting the student back at the center of his training means asking him to pilot his learning in part, without being really sure of his motivation or his ability to do so. In order to motivate students to self-train and self-evaluate at a distance, a close and precise accompaniment as well as an analysis of the needs of these students at the beginning of the course with the help of a diagnostic evaluation are necessary. In addition to the need for support, a diagnostic evaluation of skills is worthwhile before the self-training phase. It allows for early detection of future difficulties and points to potential medical management of the student (Géry Marcoux & al., 2014). This diagnostic evaluation will in fact allow the teacher to become aware of the choices to be made regarding the tools to be adopted and the modalities to be followed according to the students' needs and the particularities of the context. The results of this diagnostic test will mainly be benchmarks, a statement with no other ambition than to describe the students' pre-learning before the start of self-training (Emin & Levasseur, 2007).

In Morocco, the Regional Centers for Education and Training Professions (CRMEF) are training institutions for senior executives. Their mission, according to the ministerial decree of creation of the CRMEF (2011)[1], is the initial professional training of teachers, the training for the preparation of the competitive examination of aggregation, the

[1] Ministerial Decree creating the CRMEF (2011). Available on: https://www.men.gov.ma/Ar/Documents/D_2.11.672CRMEF.pdf

training of the executives of the pedagogical direction and the executives of the administrative, pedagogical and social support body, the preparation of the sessions of continuous training, the realization of the activities of action research as well as the proposal of projects of reforms and innovation of the methods and programs of the training. These trainings aim essentially to respond to the increased need for a qualified teaching staff, to adapt to the evolution of the society and to adapt while adopting the evolution of the pedagogical and institutional approaches. In general, the evaluation of trainees' learning in the Regional Centers for Education and Training Professions (CRMEF) has two dimensions. The first, formative, is part of the trainee's professional development through a diagnosis of his knowledge, skills and pedagogical practices in order to identify the points that need improvement. The second is summative and aims to evaluate the trainee teacher's performance during initial training in order to make him responsible for his duties and tasks as a future teacher. The diagnostic evaluation in the CRMEFs takes place at the beginning of the training in order to assess the trainees' pre-requisites. Analysis of the results of this type of assessment is necessary to detect trainees' gaps and needs. However, this phase requires time and effort from the trainer. Therefore, the automation of data processing from the evaluations is a necessity. The results of our survey conducted, in July 2020, just after the end of the containment period, on "the impact of the Covid 19 pandemic on the successful delivery of distance training and assessment" were a point of support for the conduct of this study. The survey was conducted within the CRMEFs with 20 trainers and 46 trainee teachers (French and English specialties) from the class of 2020. The results confirmed that the consideration of distance training and evaluation in the field of initial training (for trainee teachers) and in-service training (for trainers and permanent teachers) within the CRMEFs remains a reality (Guennoun and Benjelloun, 2022). The results further revealed that improved distance training and assessment procedures are needed, as well as the construction of valid and reliable digital tools and adaptive e-learning platforms (Guennoun and Benjelloun, 2022). Following the results found during the Covid 19 pandemic, it seems appropriate to introduce an innovative evaluation approach in the Post Covid 19 era by using new information and communication technologies. In this context, the present study will focus more on distance diagnostic evaluation and online self-training in the post-Covid 19 era.

In this article, we address the impact of the implementation of an adaptive distance self-training platform on the initiative, motivation and autonomy capacities of trainees. The objective of our work is twofold, on the one hand, it aims to diagnose the pre-acquired skills of 43 trainees through a remote diagnostic evaluation conducted at the beginning of the training year. On the other hand, to measure the degree of acquisition, motivation and autonomy of these trainees after self-training via an adaptive distance platform.

The specificity of our problem lies in the category of the population of our learners. Indeed, these trainees are at least 21 years old, they have a scientific professional license and have successfully passed the entrance exam to the CRMEF and are future laboratory preparers who will be operational in 2022/2023. These 43 trainees, participants in our study, are therefore developed, responsible, autonomous and capable of making the necessary efforts to further develop their skills during their initial training at the

CRMEF. The risk of dropping out in the online diagnostic assessment and distance self-study phases is very low.

Theoretical and Problematic Framework

In the field of education and training, evaluation is an integral part of the teaching-learning process and is closely linked to training intentions. It has become an unavoidable concern in the school world (Jorro, 2007). As a result, it raises many questions, for example concerning its strategies, methods, objectives and added value. It makes it possible to identify and anticipate the various drifts and weaknesses that can prevent the achievement of the expected objectives and jeopardize the performance of the process. Nevertheless, for a successful evaluation of learning over time, three conditions must necessarily be met, validity, reliability and relevance (De Ketele and Gerard, 2005). Internationally, researchers in docimology have been attempting to clarify the processes of evaluation development for decades (Boulet, McKinley, Whelan, & Hambleton, 2003; Downing & Haladyna, 2006; Tillema, Leenknecht & Segers, 2011). Their main objectives are to find out which quality criteria are specifically relevant to learning assessment. These researchers revealed that quality criteria are related in different ways to different stages of an evaluation cycle (the process of constructing, administering, and monitoring an evaluation). Criteria for assessing the quality of assessment devices are also the subject of several discussions and debates about evolving conceptions of validity and fidelity (Phelps, 2005; Osterlind, 2006; Leclercq, 2006; Birenbaum, 2007; Newton, 2007; André, Loye & Laurencelle, 2015). These researchers confirmed that establishing the validity of a test or measurement instrument means in practice that a method, a validation process, has been used. Validity must be tuned to the objectives pursued by the users and the methods for doing so must be chosen accordingly. Furthermore, the Assessment for Learning approach brings a new dynamic to the field of formative assessments (Black & Wiliam, 2006; Laveault & Allal, 2016). The focus is on active learner engagement and devices that support learning and provide informative feedback to foster self-regulation and lifelong learning (McMillan, 2007; Tillema, Leenknecht, & Segers, 2011; Reinholz, 2016).

It is certain that distance-learning assessment can develop, support and self-regulate learning. On the other hand, the majority of pedagogical interventions that rely on the use of digital technology for distance assessment have been found to have no clear effect. Research by Hettiarachchi and Huertas (2013); Blais, Gilles and Tristan-Lopez (2015); Detroz et al., (2020); Charroud Christophe et al., (2020); Noureddine Samlak (2021) have shown that distance assessment involves several challenges, obstacles and barriers. The docimological problems related to the validity, fidelity and reliability of remote evaluation devices still remain. Charroud, C et al., (2020) noted that among the disadvantages of using digital for assessment is the overly vague concept of "personalization", which often remains difficult to resolve with increased risks of misuse of personal data and surveillance. In the same sense Brown, G. T. L. (2020) added that computer bugs, lack of equitable access as well as dehumanization are among the limitations of remote assessment. Detroz et al., (2020) stated that the adaptations

provided in each e-training have most often consisted of replacing the terminal assessment with the continuous assessment. Samlak, N. (2021) added that testing via distance platforms poses several problems in terms of reliability, validity and feasibility. Blais, Gilles and Tristan-Lopez (2015) suggested the implementation of devices that meet quality criteria on the docimological and technical levels. Despite these limitations, barriers and obstacles, there are advantages to remote evaluation that should not be ignored. The work of Ryan et al., (2019) showed that automated assessment, resulting in less "evaluative fatigue" on the teacher's side, while allowing more practice on the student's side, with immediate, multimodal feedback, less ephemeral than in face-to-face situations. Yerly and Issaieva (2021) in turn revealed that distance-learning assessment could support students cognitively, but also socially and affectively. In addition to this, Charroud Christophe et al., (2020) stated that students can access more immediate and lasting feedback, teachers to sometimes richer and objective information. Gilles and Charlier (2020) added that computerized means could save time by automating certain steps, for example the correction of tests for large groups of students.

These previous and subsequent national and international studies have shown that distance assessment has many advantages. However, there are a number of pedagogical, technological, professional, emotional, and social barriers and obstacles to distance assessment. Despite the progress made in the field of distance learning assessment, the docimological problems related to the validity, reliability, security and credibility of distance certification assessments remain.

In addition, to these earlier and later studies on the benefits and limitations of distance learning assessment, other research (Alonso Vilches et al., (2020); Atmani, M. ,(2020); Barras and Dayer (2020); Cerisier (2020); Hodges et al., (2020); Lollia and Issaieva (2020); Peraya and Peltier (2020); Villessèche et al., (2019)) has focused more on distance teaching and training practices. Barras and Dayer (2020) measured the impact of online courses on the teaching-learning process. They promoted student engagement through a formative assessment device. The results showed that the formative assessment implemented was an effective response to support student learning. Alonso Vilches et al, (2020) evaluated the reception of the "Switch to e-Learning" prescription on teachers' professional identity. They stated that it seems wise to encourage development networks in a sustainable path of a reflection process from each of the interactions of the constituent areas of professional development. Villessèche et al., (2019) developed an adaptive online learning platform that enhances learners' skills from elementary school to university. These researchers stated that the development of this platform has provided new opportunities, especially in terms of pedagogical and research scenarios that target the development of individualized cross-curricular skills. Hodges et al., (2020) studied the difference between emergency distance education and online learning, they showed that well-planned online learning experiences are significantly different from online courses offered in response to a crisis or disaster. They stated that effective online learning results from careful instructional design and planning, using a systematic design and development model. Riadi, B., et al. (2022) in turn studied Indonesian students' perceptions of online learning during the Covid-19 pandemic. These researchers stated that Indonesian students perceive their online

learning experience negatively. They are dissatisfied with the poor performance of the Internet and the high cost of Internet access. In the same vein Alarabi Khaleel & al, (2022) examined the attitudes of 58 teachers and 418 students towards online physics education in the United Arab Emirates (UAE). These researchers revealed that lack of training on e-learning teaching is a significant barrier inviting immediate remediation. The study by Bahtilla Marinette et al, (2022) focused on the challenges of online learning during the Covid 19 pandemic. The study found that most international students studying online faced the following major challenges: poor internet connection, limited course participation, and inability to complete research projects on time. In Morocco, the National Evaluation Authority with the Higher Council conducted an evaluative study for Education, Training and Scientific Research (2021)[2], in partnership with UNICEF. This study analyzed the unprecedented experience of distance learning imposed by the Covid-19 pandemic. Its main objective is to identify practices, opportunities and new pedagogical challenges related to the crisis. The results confirmed that getting through the great upheaval caused by the pandemic and successfully returning to normalcy would require exceptional commitment and consistent decision-making by those in charge, accompanied by effective leadership by school principals, committed teachers and involvement of all educational stakeholders. In the same sense Ouajdouni, A., et al. (2022) evaluated the effectiveness of the e-learning solution during the Covid - 19 crisis in Moroccan public higher education institutions. The results showed that the degree of satisfaction of students towards the use of e-learning technology influences their performance, it can increase their knowledge, and their autonomy. In terms of self-study or individualized distance learning practices, Ntsama, Ngoue and Gaëlle (2018) announced that self-training is an educational process that allows for an osmosis between various times or forms of learning. It is above all, an individual process and/or a social fact (Carré Philippe & al., 2010). It can be seen as a process of empowerment and emancipation from knowledge, from the acquisition of it (Eneau, 2016). In short, the student "must recognize himself as a learner, identify his strengths and weaknesses. He or she must, in order to relegate his or her own learning, perform metacognitive work and make his or her learning conscious" (Brugvin, 2005). Garland (1993, cited by Glikman, 2002) has identified four types of interdependent difficulties that can be at the origin of the abandonment of distance learning, difficulties relating to the learning situation, the learners' dispositions, the epistemological nature of the content to be learned and the institutional characteristics of the context. According to Viviane Glikman (2002), a student who is not emancipated from all these constraints will only lose motivation, and thus exclude himself from the training.

[2] National evaluation body of the Higher Council for Education, Training and Scientific Research. "Teaching at the time of Covid in Morocco", Thematic Report, November 2021. https://www.unicef.org/morocco/rapports/enseignement-au-temps-de-covid-au-maroc

These earlier and later Francophone, and Anglophone studies revealed that despite advances in distance learning training and assessment, docimological problems related to the validity, reliability, security, and credibility of distance certification assessments as well as problems of isolation, motivation, and boredom during distance learning remain. Adding to this, the increased need of teachers and students in training on online teaching learning.

Problem Statement

After analyzing educational and evaluative practices implemented nationally and internationally, we found that the most frequent research has examined the experience of distance teaching and evaluation in the field of education, primary, secondary and higher education. While research in the areas of distance learning and assessment in initial and continuing education is almost non-existent. The results of our survey (Guennoun, B., and Benjelloun, N. (2022)) conducted in July 2020 to identify the perceptions of CRMEF trainers and teacher trainees on distance learning training and evaluation during the Covid 19 pandemic were a point of support for the realization of the present study. The results showed that the consideration of distance learning and assessment in the field of pre-service and in-service training within the CRMEF remains a reality. Following the results found during the Covid 19 pandemic, it seems judicious to introduce, in the Post Covid 19 era, an innovative evaluation approach within the CRMEFs by using new information and communication technologies. In Morocco, the Regional Centers for Education and Training Professions (CRMEF) are training institutions for senior executives. According to the ministerial decree creating the CRMEFs (2011), their missions include the initial professional training of teachers and administrative staff. To enter the CRMEF, the trainee must have a minimum of a bachelor's degree in a specific specialty and pass a written and oral exam. A «certificate of educational qualification» sanctions the initial training at the CRMEF. To help the CRMEF trainers innovate in their pedagogical practices, even in difficult and unpredictable situations, it seemed essential to us to introduce an innovative approach to training and learning assessment. To do so, we diagnosed the pre-acquired skills of the CRMEF trainees by means of a diagnostic assessment at a distance before the beginning of the training year. We then measured the degree of acquisition, motivation and autonomy of these trainees after self-training via a distance platform. Given that the theoretical framework of our study has revealed that summative distance assessment presents, largely, major docimological problems at the national and international level, we will limit ourselves in this study to diagnostic distance assessment. Of course, diagnostic assessment takes place at the beginning of learning in order to identify the learners' prior knowledge and skills in order to propose remedial measures adapted to their shortcomings or to position them in a particular learning level (Noureddine SAMLAK, 2021). It takes place before any learning (carried out at the beginning of each year, period and/or sequence) (Merle, P., 2019). Its purpose is to produce information allowing either to direct the learner towards a course adapted to his profile, or to adjust the teaching-learning to his profile (Charles Hadji, 2000). It makes it possible to "determine the pre-acquired knowledge on which teaching can be based, and the gaps that need to be filled" (M-F. Narcy-Combes, 2005). Diagnostic evaluation

encourages differentiation and the establishment of needs groups. Thus, "the analysis of pre-acquired knowledge (what they know) compared with the pre-requisites (what they need to know), makes it possible to organize groups of needs in order to adapt learning according to what has been learned and what is lacking. Then, this evaluation clarifies the contents of the sequences, taking into account the initial representations of the learners and making the teacher's expectations explicit.

In the regional centers for education and training (CRMEFs), the diagnostic assessment takes place at the beginning of each year of training, and focuses on certain training modules, including the Information and Communication Technologies in Education (ICTE) module, which was the subject of our study. This module aims at the acquisition by the trainees of skills of use and reasoned control of information and communication technologies in their professional practices. The objective is to make an assessment of the trainees' pre-acquisition of Information and Communication Technologies (ICT) before starting the ICTE module. Indeed, the trainer should consider ICT as a prerequisite for the trainees and the training should focus more on ICTE. In our experience, as trainers within the CRMEF, we note, according to the results of the diagnostic assessments carried out beforehand at the beginning of each year of training, that the trainees have strong gaps in ICT. They do not have the required skills and basic competences in the field of information and communication technologies (ICT). We also note and to a large extent a great heterogeneity of levels and rhythms of the groups of trainees of the same specialty, this heterogeneity resides in the field of competences and know-how related to the ICT as well as in the processes of learning of these technological tools, and that hinders the good progress of the training in module ICTE. It is certain that heterogeneity appears to some researchers as a constraint and to others as an asset and a driving force for the development of the learner. In our case, with a heterogeneous class group that does not have the same ICT skills, the trainer is obliged to devote several sessions to ICT instead of focusing more on the use of these tools in the professional practice of future teachers (ICT) and this delays the smooth running of the training. At the end of the training and in order to finish the program on time, the trainer is obliged to eliminate several parts of the ICTE module which is a very interesting module for the development of the professional practice of the trainees, its main purpose is to help the trainees to know how to teach and make them learn through technologies. In addition, the trainer needs to analyze and process the results of the diagnostic assessment, in order to plan the activities of the training modules according to the needs of the trainees and in accordance with the training plan. However, this phase requires time and effort. The automation of the processing of data from the diagnostic assessments remains essential. This requires the introduction of an innovative evaluative pedagogical approach using educational technologies as essential resources for the proper conduct of the diagnostic evaluation phase. These issues prompted us to adopt distance diagnostic assessment prior to the start of the training and to develop a distance adaptive self-training platform to support and reinforce the ICT trainees' learning (class of 2022) prior to the start of the ICTE module. In this study, we address the diagnostic assessment at a distance and the online self-training within the CRMEF Fez-Meknes for the benefit of the trainees of the pedagogical support corps (School Laboratory

Preparers), class of 2022. We are interested in giving some answers to the following questions:

- What is the contribution of introducing distance diagnostic evaluation in the CRMEF?
- What is the impact of distance self-training on the progress of trainees' ICT skills?
- Has distance self-training developed the degree of autonomy of the trainees?
- How do the trainees view the distance diagnostic evaluation and the distance self-training?
- What difficulties did the trainees encounter during the remote diagnostic assessment and the remote self- training via the platform?
- What are the trainer's observations after the diagnostic evaluation and the remote self-training?

METHOD

The methodology we adopted was based on 5 elements:

- An analysis of previous and subsequent research works cited mainly in our bibliography.
- A pre-test online distributed to assess the pre-acquis of trainees in ICT.
- The development of an adaptive self-training platform at a distance, in order to support, consolidate and reinforce the trainees' ICT skills before starting the training. The duration of the self-training was set at 2 weeks.
- The development of an online posttest to measure the impact of the distance self-training on the progress of the trainees' ICT skills.
- The realization and the online distribution of a questionnaire of perceptions for the benefit of the trainees.

As the theoretical framework of our study illustrates, the training and evaluation of distance learning can constitute a real renewal in our pedagogical engineering, but they must be linked and largely to the expectations and needs of the two pedagogical actors (teacher and learner). Taking into account the results of previous studies carried out in this field as well as the results of the study (Guennoun and Benjelloun (2022)) that we had carried out within the CRMEF in the era of the Covid 19 pandemic, we had the idea to carry out the present study in the era of the Post Covid 19. This is to help the CRMEF trainees to progress in their distance learning and to help the trainers to pursue their distance learning practices with much more confidence and conviction.

Our study is conducted with a class of 43 trainees from the CRMEF class of 2022. These trainees are at least 21 years old, have a scientific professional degree and have successfully passed the entrance exam (written and oral) to the CRMEF. They are future laboratory preparers who will be operational in 2022/2023.

The pre-test (See link below) lasted one hour and was carried out remotely with the Google forms tool. It aims to establish an assessment of the trainees' pre-acquired knowledge in Information and Communication Technologies (ICT), to make a collection of their initial representations, to analyze their needs and to discover the gaps of each one. To overcome the difficulties identified by the trainer after this diagnostic

assessment at a distance, we have created an adaptive self-training platform using the Padlet tool (see Appendix). The main purpose of this self-training platform in Information and Communication Technologies (ICT) is to support, reinforce and consolidate the trainees' skills. After the remote self-training phase, which lasted 2 weeks, the trainees were asked to take a post-test evaluation (See link below) at a distance of one hour.

Link from the first diagnostic assessment (pre-test):

https://drive.google.com/file/d/1ERoiX0ctbB6g1VPcLRnEuNdDVgnkKaif/view?usp=sharing

Link to the second diagnostic assessment (posttest):

https://drive.google.com/file/d/1ckFdtkcc_NCqZDDSHJcHerJV1N3gBr_/view?usp=sharing

The objective of the trainer is to know the progress of the trainees in ICT and this to proceed to the planning of the activities of the ICTE module before the beginning of the training year. The remote self-training platform includes digital educational resources that promote independent work. The platform includes tutorials, course materials and practical workshops. The trainees had the opportunity to self-train online for free at any time during the self-training period. The objective of the platform is to stimulate learning and to push the trainee to build his knowledge and know-how. The trainee is therefore forced to take charge of his learning. He is forced to find answers to his questions, to look for information and to explore several avenues of work. Access to the self-training platform is free of charge and requires a simple internet connection. An invitation link is sent by e-mail to the trainees in order to access the platform and follow the self-training with much more confidence and conviction. In order to determine the trainees' perceptions of the online diagnostic assessment and the distance self-training, we administered an online satisfaction questionnaire to the 43 trainees that we conducted with the Google Forms tool. The distribution of our questionnaire took place just after the Posttest evaluation phase. We collected 31 responses to this online questionnaire. The contribution of the trainees to answer the satisfaction questionnaire was not obligatory.

Our questionnaire (link below) includes 14 items, mainly concerning:

- The degree of satisfaction of the trainees on the mode of self-training at a distance via the Padlet platform as well as on the mode of the diagnostic evaluation at a distance via the Google Forms tool.
- The advantages of this self-learning method for the trainees questioned.
- Obstacles and difficulties encountered by the trainees during the online self-study and remote diagnostic assessment phases.
- Trainees' suggestions for improving the online self-study and remote diagnostic assessment in the future.

Link to the satisfaction questionnaire:

https://drive.google.com/file/d/1QGAAQwAQk3BFBSP-NhoGUsqiFGePXF5W/view?usp=sharing

Data Analysis Methods:

The trainees' responses during the pretest and posttest were analyzed in terms of frequency of successes and errors. The results helped the trainer identify underlying difficulties. To test the normality of the pre- and posttest data, we used the Shapiro Wilk test. To study the impact of distance self-study on trainees' ICT skills, we used the paired student test. Quantitative statistical analyses of the data collected on trainees' perceptions of the online diagnostic assessment and online self-training were conducted using IBM SPSS Statistics version 28 software. The open-ended questions, which sought further clarification of trainees' recommendations for improving the online diagnostic assessment mode as well as the online self-training mode, were analyzed qualitatively. A Likert-type scale composed of 3 modalities ranging from 1 to 3: [1 = Disagree, 2 = Neither agree - Nor disagree, 3 = Agree] was used with two clear extremes and room in the middle for a neutral midpoint. We chose the Likert scale because it is among the most reliable tools for measuring opinions, perceptions and behaviors. Through this scale, we will identify the perceptions of trainees, school lab preparers, about online diagnostic assessment and distance self-training. We used the Likert scale with only three steps (Disagree, Neither Agree nor Disagree, Agree) to make the questions easy to understand, as the more steps, the more complex the question is for the respondent. To ensure the validity of the data collection instruments. We tested whether our Likert scale is sufficiently faithful to be used in our questionnaire. Cronbach's alpha, equal to or greater than 0.7, was the threshold for internal consistency. The data collection instruments in our study passed the validity test with a significant degree of internal consistency (a Cronbach's α) that exceeds 0.70.

These statistical analyses aim essentially:

- To measure, on the one hand, the variation of the class average (pre-test and post-test) as well as the influence of distance self-training on the homogeneity of the group of trainees in the field of ICT-related skills and know-how
- To study the impact of self-training on the progress of the trainees in their learning in ICT.
- To know on the other hand, the perceptions of these trainees on the online diagnostic evaluation as well as on the distance self-training.

FINDINGS AND DISCUSSION

Our study is divided into two sections:

The first section presents the results of the pre-test and post-test conducted remotely before the start of the training year. The pre-test examines the trainees' pre-learning in ICT and the post-test measures the impact of the distance self-training platform on the development of the trainees' learning in ICT. The second section will present the trainees' perceptions of the online diagnostic assessment as well as the distance self-study. Our study will highlight the notions acquired and those where there are gaps in order to better prepare the CRMEF trainers for the trainees' future needs.

Study of the impact of distance self-training on the progress of trainees' ICT skills

In this section, we present the results of the pretest and posttest conducted remotely with 43 executive trainees of the pedagogical support corps. We used the paired student test to compare the means of two dependent samples. To do this we first checked the normality of the data.

1. Normality test

To test the normality of the pretest and posttest data, we used the Shapiro Wilk test. The Shapiro-Wilk test is a test of whether a set of data follows a normal distribution. The data follow a normal distribution only if the significance level (p-value) of the Shapiro Wilk test is greater than $\alpha = 0.05$. The confidence interval is 95%. To test the normality of the pretest and posttest data, we made the following normality assumption:

Null hypothesis (H0): "The sample follows a normal distribution".

The results of this test are summarized in table 1:

Table 1
Results of the Shapiro-Wilk normality test

	Statistics	ddl	Sig. (p-value)
Pre-test results	,963	43	0,182
Posttest results	,958	43	0,112

These results clearly show that the degree of significance (p-value) is greater than $\alpha = 0.05$ for both the pretest (0.182) and posttest (0.112). These results support the maintenance of the H_0 hypothesis. These results help us to infer that the data follow a normal distribution.

2. Impact study

To study the impact of distance self-training on trainees' ICT skills, we used the paired student test. We made the following working hypotheses:

- Null Hypothesis $\mathbf{H_0}$: The pre-test and post-test grade averages are identical. That is, self-training through the platform has no effect on trainees' scores.
- Alternative hypothesis $\mathbf{H_1}$: The mean scores of the pretest and posttest are significantly different.

The results of the table 2, show well, that the average of the marks of the trainees relative to the posttest (15,9961) is higher compared to that of the pretest (13,6589). The difference is about 2.3372 in favor of the posttest.

Table 2
The mean score and standard deviation for the pretest and posttest

	Average	N	Standard deviation	Average standard error
Pre-test results	13,6589	43	2,33891	,35668
Posttest results	15,9931	43	1,37653	,20992

The results of the comparison of the score averages (pre-test and post-test) relative to the paired Student test are shown in Table 3.

Table 3
Results of the paired student test

	Differences Confidence interval	t	ddl	Sig. (p-value)
Pre-test results - Post-test results	-1,74878	-8,016	42	,000

The degree of significance (p-value) is significantly less than $\alpha = 0.05$, which confirms the rejection of the null hypothesis H_0 and the maintenance of the hypothesis H_1. That is, the means are significantly different in favor of the posttest. These results help us to deduce that distance self-training has a favorable impact on the trainees' ICT skills. Indeed, it has caused a progression in their learning. On the other hand, the results of the pre-test (Table 2), shows that the trainees' scores were more scattered than the class average with a Standard Deviation of 2.34. Nevertheless, the posttest results show a standard deviation of 1.38. This decrease in Standard Deviation (from 2.34 to 1.38) indicates that after the self-training phase, trainees' scores are closer to the class average. This confirms a positive influence on the homogeneity rate of the class in the field of ICT-related skills and know-how. Moreover, with a homogeneous class in the area of ICT skills and know-how, the trainer will save more time from the beginning of the training year, and instead of providing ICT training beforehand, he or she will focus more on the ICT module that helps the trainee master how to integrate these technological tools in education. In summary, distance self-training through our adaptive platform had a positive influence on the level of the trainees in ICT as well as on the homogeneity rate of the class.

Perceptions of Preparers of School Laboratories Trainees toward online diagnostic assessment as well as distance self-training.

In this section, we present trainees' perceptions of online diagnostic assessment and distance self-training. Before presenting the results of this section based on a questionnaire survey, we will first check whether our scale is faithful enough to be used in our questionnaire.

1. Validation of the scale

In our study, it appears essential to ensure the validity and reliability of the data collection instruments. Cronbach's alpha, equal to or greater than 0.7, was the threshold for internal consistency. As illustrated in Table 4 the data collection instruments in our study passed the validity test with a significant degree of internal consistency (a Cronbach's α rate) that exceeds 0.70.

Table 4
Validity of the measurement model on trainees' perceptions of online diagnostic assessment and distance self-training

Construction of the research	Code	Number of items	Observations		Scale used	Average	Standard deviation	Variance	Cronbach's Alpha
			Valid	Excluded					
Contributions of online self- training via the Padlet platform.	Q8_P1	4	31	0	[1 = Disagree, 2 = Neither agree - Nor disagree, 3 = Strongly agree]	1.97	1.016	1.032	0.728
	Q8_P2					1.39	0.803	0.654	
	Q8_P3					2.03	1.016	1.032	
	Q8_P4					1.84	1.003	1.006	
Difficulties encountered by trainee during online self-training via the Padlet platform.	Q9_P1	5	31	0	[1 = Disagree, 2 = Neither agree - Nor disagree, 3 = Strongly agree]	1.32	0.748	0.559	0.709
	Q9_P2					1.13	0.499	0.249	
	Q9_P3					1.06	0.359	0.129	
	Q9_P4					1.19	0.601	0.361	
	Q9_P5					1.39	0.803	0.645	
Difficulties encountered by trainees during the online diagnostic assessment.	Q13_P1	3	31	0	[1 = Disagree, 2 = Neither agree - Nor disagree, 3 = Strongly agree]	1.58	0.923	0.852	0.745
	Q13_P2					1.58	0.923	0.852	
	Q13_P3					1.13	0.499	0.249	

The results in Table 4 confirm that our Likert scale is sufficiently accurate to be used in our satisfaction questionnaire. This test of the questionnaire's validity will help us reveal, with certainty, the advantages and limitations of distance self-study and online diagnostic assessment.

2. Trainees' views on distance self-training

Our study attempts to explore trainees' perceptions of online diagnostic assessment and distance self-training and to focus on their level of satisfaction. The questionnaire was administered to 43 trainees, we collected 31 responses with a response rate of 70.5%. The data that were collected reveal (see Table 5) that almost all the trainees (93.5%) who responded to our questionnaire are satisfied with the self-training via the Padlet platform. This confirms that distance self-training can lead trainees to effective learning and can increase their performance in Information and Communication Technologies (ICT).

Table 5
Trainees' satisfaction on the remote self-training through the Padlet platform

Trainee satisfaction with distance self-training	Number of citations	Frequency
Yes	29	93,5%
No	2	6,5%
Total.Obs	31	100,0%

In addition, as shown in Figure 1, it is clear that the self-study platform has a positive impact on the degree of autonomy of trainees. 90.3% of the trainees surveyed believe that the self-learning platform has enabled them to learn independently. Our results are

in line with the work of Hodges & al., (2020) who stated that distance self-training allows freedom in learning. Indeed, it can provide an opportunity for students to receive enriching training. It can be seen as a process of empowerment and emancipation from knowledge, from acquiring it (Eneau, 2016).

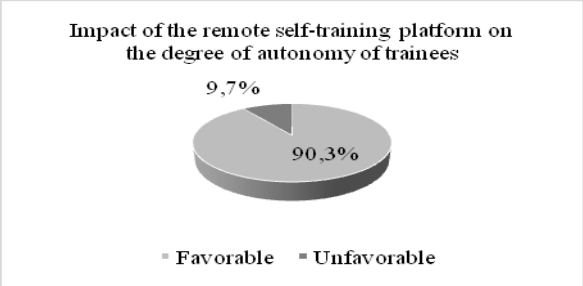

Figure 1
The self-training platform and trainee autonomy

As Tables 6 and 7 show, this new way of learning independently had advantages and limitations for the trainees questioned.

Table 6
Contributions of distance self-training

Contributions of online self-training via the Padlet platform.	Code	1.Disagree	2. Neither agree - Nor disagree	3. Agree
An increase in your interest in the ICTE module.	Q8_P1	16(51.6%)	0 (0%)	15(48.4%)
A development of your concentration level.	Q8_P2	25(80.6%)	0 (0%)	6(19.4%)
An improvement in your learning.	Q8_P3	15(48.4%)	0 (0%)	16(51.6%)
An identification of your strengths and weaknesses in ICT.	Q8_P4	18(58.1%)	0 (0%)	13(41.9%)

Table 7
Limitations of distance self- training

Difficulties encountered by trainees during online self-training via the Padlet platform.	Code	1.Disagree	2. Neither agree - Nor disagree	3. Agree
Lack of motivation and encouragement.	Q9_P1	26(83.9%)	0 (0%)	5(16.1%)
Lack of self-discipline.	Q9_P2	29(93.5%)	0 (0%)	2(6.5%)
Lack of interaction with the trainer.	Q9_P3	30(96.8%)	0 (0%)	1(3.2%)
Lack of coaching.	Q9_P4	28(90.3%)	0 (0%)	3(9.7%)
Lack of financial resources for online self-study.	Q9_P5	25(80.6%)	0(0%)	6(19.4%)

The results in Table 6 show that the self-training platform increased the interest of 48.4% of the trainees to learn the ICTE module, besides it improved the learning of 51.6% of the respondents and this was confirmed by the results of the pre-test and post-test. Table 2 showed earlier that the average of the trainees' scores on the posttest (15.9961) is higher than that of the pretest (13.6589). The difference is about 2.34 in favor of the posttest.

It is true from the results in Table 6 that online self-training via the Padlet platform did not increase the interest of 51.6% of the trainees in learning the ICTE module. These

trainees stated that despite the variety, clarity and relevance of the resources available on the self-training platform, consulting the tutorials available on the platform and then applying them on the computer proved a tedious task for them.

The results in Table 7 show that slightly more than 80% of the trainees did not encounter any difficulties during the online self-training via the Padlet platform, and that the self-training via this platform positively influenced their degree of motivation and self-discipline. Nevertheless, a minority of 19.4% of the trainees felt that the lack of financial resources was a handicap that influenced the success of their self-training.

It is clear from the results in Tables 6 and 7 that respondents were very definite in their views about the benefits and limitations of distance self-training. They either strongly agreed or strongly disagreed, there were no neutral respondents on this topic. This confirms that our sample consists of responsible, developed and autonomous people, they expressed their favorable or unfavorable attitude with much more confidence and assurance.

Based on the results of Tables 6 and 7, we can deduce that distance self-training has advantages for the CRMEF trainees, namely an increase in their level of interest in learning the ICT module, an improvement in their learning, an increase in their level of motivation and self-discipline. However, accessing the platform and downloading the tutorials and explanatory videos available on the platform requires an internet connection, and this has resulted in additional costs for the trainees. In addition, some trainees need more motivating digital resources, as well as support and guidance from the trainer during the self-training phase. In the same sense, the work of Atmani (2020) has shown that distance learning seems to be conducive to exchanges and dialogue, but at the same time places the learner in a more autonomous pedagogical relationship likely to disrupt his or her learning habits and consequently be a source of difficulties related to the management of space and time units. Riadi, B., et al. (2022) in turn stated that Indonesian students perceive their online learning experience negatively. They are dissatisfied with the poor performance of the Internet and the high cost of Internet access. In addition to this, the study by Bahtilla Marinette et al, (2022) found that most international students who study online face the following major challenges: poor internet connection, limited course participation, and inability to complete research projects on time. For an improvement of this mode of distance self-training in terms of the tools chosen and the content, the trainees questioned suggest:

- To make available offline digital educational resources as an alternative to a platform that requires an internet connection.
- A reduction in the size of the explanatory videos available on the platform as well as the introduction of quizzes to assess themselves before the Posttest.

3. *Perceptions of trainees «school laboratory preparers" on the remote diagnostic assessment.*

The results of our study show that the majority of trainees (93.5%) expressed satisfaction with the distance diagnostic evaluation method. Only a minority of 6.5% did not approve of this mode of diagnostic evaluation (Table 8).

Table 8
Trainees' satisfaction with the remote diagnostic assessment

Trainee satisfaction with the remote diagnostic assessment	Number of citations	Frequency
Yes	29	93.5%
No	2	6.5%
Total.Obs	31	100.0%

Our results still indicate that some trainees found connection problems, technical problems as well as financial problems in conducting the diagnostic assessments at a distance (Table 9). Our results are in agreement with the work of Brown, G. T. L. (2020) who showed that computer bugs, lack of equitable access as well as dehumanization are among the limitations of remote assessment.

Table 9
Difficulties encountered during the remote diagnostic evaluations

Difficulties encountered by trainees during the online diagnostic assessment	Code	1.Disagree	2. Neither agree - Nor disagree	3. Agree
Connection problems	Q12_P1	22(71%)	0 (0%)	9(29%)
Technical problems	Q12_P2	22(71%)	0 (0%)	9(29%)
Financial problems	Q12_P3	29(93.5%)	0 (0%)	2(6.5%)

Despite this, 81% of trainees surveyed prefer to take diagnostic assessments remotely in the future (see Figure 2).

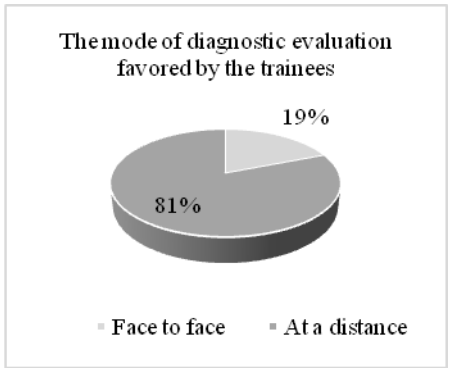

Figure 2
The most favored mode of diagnostic evaluation among trainees

These results help us to deduce that the remote diagnostic assessment was a good experience for the majority of trainees. These trainees were able to self-assess and self-regulate remotely, they were able to discover automatically and instantly their correct answers, their incorrect answers as well as their final scores and this as soon as the evaluation was sent to the trainer. In the same sense, the work of Yerly and Issaieva (2021) has shown that the evaluation of remote learning can support students on a cognitive level. Charroud Christophe & al, (2020) added that students can access more immediate and lasting feedback, teachers can access richer and more objective information.

Difficulties and final observations of the trainer after the self-study and distance diagnostic evaluation phases.

The findings after the remote diagnostic assessment phase are the following. First of all, a saving of time and effort thanks to the automation of the processing of the data from the remote diagnostic evaluation. We received an immediate and automatic summary of the results of the remote diagnostic assessment. In addition, we noticed a general adherence to this mode of diagnostic assessment on the part of the trainees; each trainee had the possibility to find out his or her correct answers, incorrect answers as well as his or her final score as soon as the answers were submitted. Our results are similar to the work of Ryan et al, (2019) who showed that automated assessment, resulting in less "evaluative fatigue" on the teacher's side, while allowing more practice on the student's side, with immediate, multimodal feedback, less ephemeral than in face-to-face situations. Similarly, the work of Charroud Christophe et al, (2020) agrees with our results, they announced that among the advantages of using digital technology for evaluation, the evaluated can access more immediate and lasting feedback, and the teachers can access richer and more objective information. Beyond these results, the automated diagnostic assessment that we conducted remotely allowed us to know the level of each trainee, to establish reinforcement and remediation sessions and to plan training activities and strategies according to the needs of the trainees and in accordance with the training device. As for the distance self-training phase, we found it quite challenging, as we carefully recorded the explanatory videos on ICT beforehand, prepared the digital course materials and the practical workshops, and chose the most appropriate tutorials and digital resources. Thus, the design phase of the platform required a considerable effort. Despite these difficulties, this distance self-training reduced to a large extent the rate of heterogeneity of the class observed during the pre-test.

CONCLUSION

In the era of the Covid 19 pandemic, several difficulties, brakes and obstacles have been encountered, on an international scale, in terms of training and evaluation of distance learning. To remedy these difficulties, and taking into account the results of our study (Guennoun and Benjelloun (2022)) conducted in 2020, in this regard, within the CRMEFs during the period of confinement due to the health crisis. It seems appropriate to us to introduce in the era of Post Covid 19 an innovative approach to training and evaluation at a distance by using new information and communication technologies (ICT).

The present study makes it possible to identify, on the one hand, the impact of self-training via an adaptive distance platform, on the development of the pre-acquired knowledge of the trainees of the regional center of education and training professions (CRMEF) Fez - Meknes. It also aims to measure the effect of the introduction of an innovative evaluative approach on the development of the teaching-learning process. To help the class of 2022 school lab preparatory trainees learn independently and develop their ICT skills before the start of the Information and Communication Technologies in Education (ICTE) module, we have set up an adaptive distance-learning platform using

the Padlet tool. To determine the impact of distance self-study on the development of the skills of 43 trainee, school laboratory preparers, we carried out a diagnostic distance assessment, namely a pre-test and a post-test, on the same sample. The results of the remote diagnostic assessment did show an increase in the class average from 13.65 in the pre-test to 15.99 in the post-test and a decrease in the standard deviation from 2.43 in the pre-test to 1.38 in the post-test. These results confirm that the self-training via the platform has positively influenced the level of the trainees in ICT and has made the class more homogeneous with regard to the skills and know-how related to ICT. Moreover, this will help the trainer to plan the activities of the ICT module before the beginning of the training year. To determine the perceptions of 43 trainees on distance self-training as well as on the online diagnostic assessment, we conducted a survey based on an online questionnaire. The questionnaire was administered to 43 trainees; we collected 31 responses with a response rate of 70.5%.

The data that was collected reveals that 93.5% of the trainees are satisfied with the remote self-training via the Padlet platform. In addition, 90.3% of the trainees surveyed felt that the remote self-training platform allowed them to learn independently. However, accessing the platform and downloading the tutorials and explanatory videos available on the platform requires an internet connection, and this has resulted in additional costs for the trainees. Similarly, the implementation of more motivating digital resources as well as the support and accompaniment of the trainer during the remote self-training phase proved to be a need for some trainees. To improve this self-training method, the trainees questioned suggest that digital educational resources be made available to them offline as an alternative to a platform that requires an Internet connection. In addition, they recommend a follow-up and support from the trainer, a reduction in the size of the video clips as well as the implementation of quizzes to assess themselves before the Posttest. The results of our survey showed that 93.5% of the trainees expressed their satisfaction with the remote diagnostic evaluation mode (pre-test and post-test). This mode of assessment allowed them to automatically and instantly learn about their correct answers, questions with incorrect answers, and their final scores upon submission of the answers. 81% of the trainees surveyed prefer to take remote diagnostic assessments in the future.

These innovative experiences of training and remote diagnostic assessment have helped trainers of the ICTE module to save time and effort thanks to the automation of the processing of the results of the pre-test and post-test at a distance. These trainers were able to immediately and automatically receive a summary of the trainees' results, know the gaps of each trainee, establish reinforcement and remediation sessions and plan training activities and strategies according to the trainees' needs and in accordance with the training device. Moreover, the design phase of the platform required a considerable effort, as trainers have to carefully record explanatory videos on ICT beforehand, prepare digital course materials and practical workshops, choose the most adequate tutorials and digital resources and plan all this with the time allocated to self-training.

These results help us to deduce that online diagnostic assessment and distance self-training could effectively contribute to the development of training within the CRMEFs

and pave the way for a generalized use of these innovative approaches on a national scale. Nevertheless, the availability of digital pedagogical resources for trainees to self-train and self-evaluate offline with the support and guidance of the trainer is a necessity. This will reduce on the one hand the cost and problems of the internet connection and will create on the other hand an equal opportunity between trainees during offline self-training.

This work invites further research on the specific contributions of different technological tools in university pedagogy. Our study is limited to distance diagnostic assessment and online self-training. It also appears essential to use artificial intelligence in a future study and to study how to automate the processing of the results of the summative distance assessment and how to make the summative distance assessment more credible.

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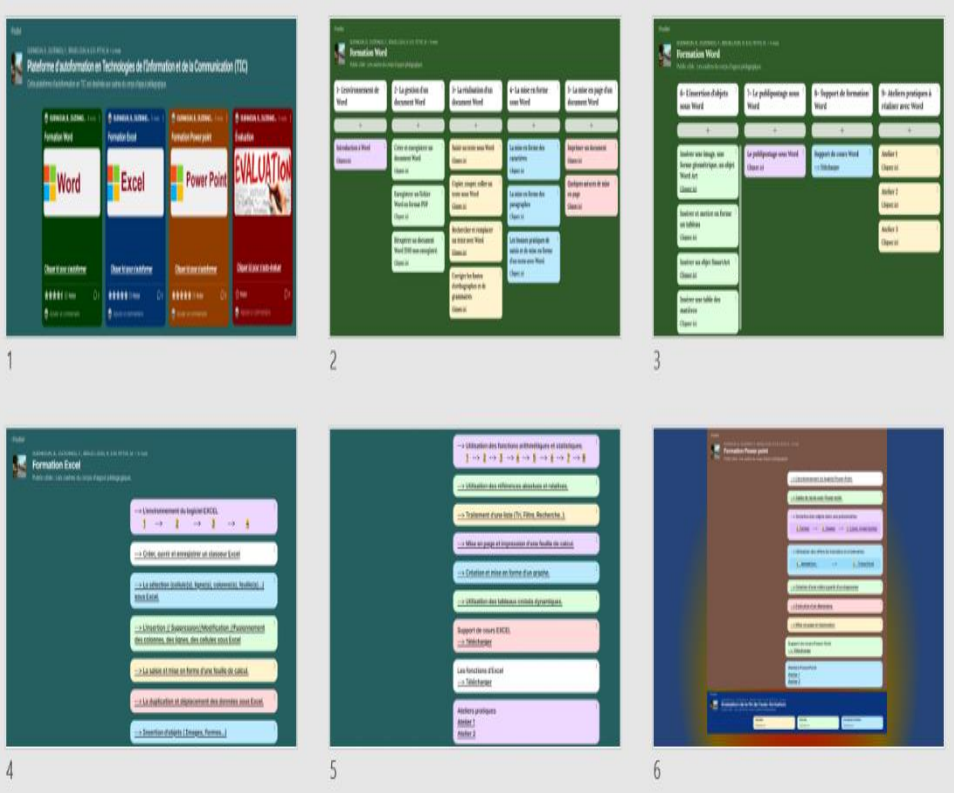
APPENDIX

Interface of the self-training platform (Padlet)

Interface of the self-training platform (Padlet)



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