

DIGITAL ASSESSMENT IN TRAINING OF FUTURE TEACHERS: STATE OF USE AND IMPACT ON TRAINEE PERFORMANCE

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Abstract- This article evaluates the impact of the utilization of computer-assisted learning in formative assessment to provide advantages such as immediate, objective, and appropriate feedback for the future teachers at the College of Teachers Training known as the Regional Center of Education and Training profession (CRMEF): The first contribution is based on a survey to collect data from 336 trainee teachers to sound out the perceptions of future teachers about the use of platforms for assessment and the influence of this practice on their training in the Information and Communication Technologies module (ICT). The second is a semi-experimental method with a student's t-test to assess the impact of digital assessment on student teachers' learning. To do this, we took a group of 163 student mathematics teachers, we used Student's t-test for paired samples. The data's normalcy was calculated using the Kolmogorov-Smirnov and Shapiro-Wilk statistics. In the event of non-normality of the data, we use the Wilcoxon statistic. The results have indicated that if an online platform for evaluation is properly integrated at the appropriate point in the stagiaire teacher training process, it may have a positive impact on the training of TIC modules.

Keywords: Assessment, Distance Assessment, Perceptions of Utility, ICT, Teacher Training.

1. INTRODUCTION

The Priority of initiatives for implementing the educational reform of the 2015-2030 strategic vision includes enhancing beginning training and integrating Information and Communication Technologies (ICT) into the Moroccan educational system. Today, thanks to ICT, e-learning platforms seem to be emerging as the most widely used pedagogical, technological, and communicational devices, and distance learning requires, in addition to resources, the readying of the teaching and administrative staff, the accessibility, and the student desire for integrated learning based on ICT [1], It is for this reason that education may rely on ICT to streamline

tasks, save time and energy, among other benefits. Distance education, also known as e-learning, has many benefits, especially in light of the COVID-19 pandemic, emergency situations, and confinement. It can support large-scale teaching and learning across all course formats, including MOOC, SPOC, and COOC, and help students select the most appropriate online training tool based on their needs as they rapidly diversify [2].

The use of ICT has improved teaching and learning, prompting a need to explore technology's role in enhancing formative assessment practices. Providing formative assessments of students' knowledge and abilities during the teaching and instructional process is one-way technology may greatly aid in teaching and learning. Teachers and learners must get prompt feedback to improve students' performance throughout the formative assessment process [3], As a result, technologies are included as educational materials as well as learning and assessment environments that support learning creation as well as cooperation and engagement [4].

This article aims to explore the relationship between formative assessment of learning, perceptions of its usefulness, teacher training and ICT, it analyses teaching practices following the integration of ICT in particular assessment platforms and assesses the impact of automated assessment on the training performance of future Moroccan teachers at the CRMEF in Beni Mellal. It will provide an overview of formative learning assessment and also explore the use of ICT in formative learning assessment and its benefits, and the challenges that arise when integrating ICT into assessment practices, it is imperative to investigate the ways in which technology can augment the practices of formative learning assessment and the underlying perceptions of its usefulness. Finally, this article will showcase examples of successful implementation of ICT in formative learning assessment practices and offer future directions and recommendations.

The present study aims to provide answers to three specific inquiries that concern the perspective of students:

- How effective is formative assessment in enhancing learning?
- What effect does it have on future teachers' formative assessment when they use computer-based learning response system technology to provide instant feedback?
- How beneficial is computer-based learning as a technological tool for formative assessment in teacher preparation programs?
- What is the trainees' perception of the assessment in the distance learning mode in the training center?

The remainder of this article is organized as follows: Section 2 looks at related work, exploring various aspects of assessment tools, computer-based testing, and formative assessment. In Section 3, we present the methodology used in this study, describing the study site, target audience, and approach used. Section 4 provides a comprehensive analysis of the study results, dividing it into subsections for an in-depth review of the investigation results and experimental findings. Section 5 follows with an in-depth discussion of these findings and their implications for teacher education. The article concludes with Section 6, summarizing the findings and their significance, while also suggesting potential directions for future research.

2. RELATED WORKS

The assessment in teacher training proceeds by assessment of writing, presentations, self-reflection, and observation of teaching practice - all largely assessed by professional staff. Assessment of a fully qualified and employed teacher is largely by writing of teaching programs and statements of teaching practice, done mainly by head teachers or senior teachers, or by school inspectors. The emphasis is very much on summative assessment, and formative assessment is given little weight [5]. Formative assessment has to be viewed as an essential component of classroom instruction due to the pressing requirement to modify instruction and learning in order to collect data that will enhance student learning. This is because formative evaluation helps students grasp ideas and abilities throughout class and makes judgments about how to proceed to meet the learning objectives of the course [3]. Formative assessments can take many different forms, and online assessments are becoming more and more common. Using inexpensive wireless technology intended to improve student learning, formative assessment produced significant learning increases. Furthermore, one benefit of utilizing technology in formative assessment is the ability to quickly and instantly gather data on pupils' comprehension, according to a study [6]. Two significant benefits were found by another search: a) promoting customized learning and b) freeing up lecture time for interactive sessions [7].

Online tests also have the benefit of allowing students to use them in accordance with their chosen learning styles, such as doing them at their own pace, repeating them, and getting quick feedback [8]. Online testing with

computer assistance is seen as a viable way to spread formative assessment procedures at universities in the twenty-first century [9-11] in order to achieve successful methods for online formative assessment for educators [12, 13] it is necessary to understand the extent and limitations of such online formative assessment tools and how they may be correctly used [14]. Additionally, it is necessary to reconsider online and digital pedagogy. Another study was based on a randomized experimental design, in which the groups were divided as follows the students used an OFAT (Online Formative Assessment Tool) and various assessments in which they participated throughout their four-year course [15].

On the other hand, virtual classroom interactivity plays a crucial role in the teaching and learning process. Therefore, feedback and formative assessment with helping technology are necessary for an online course [3]. Mentioned that using technology for formative assessment improves learning and teaching activities. Moreover, to enhance interaction between teacher and students during teaching and learning, the SRS (Student response system) was applied [16]. Applying SRS to technology devices (i.e., computers, iPads, smartphones) with an internet connection promotes interaction between teacher and students by posing questions and polling students' answers during teaching and learning. Technology-assisted formative assessment (TEFA) has been found to improve student learning outcomes in another study [17]. Another study that examined the impact of computer-based feedback and formative assessment on learning outcomes combined SRS and TEFA to ask students questions and gather their responses, giving teachers and students real-time information about their progress and allowing to modify their teaching strategies and learning processes [18].

Moreover, advancements in information technology (IT) have had a significant influence on the delivery and assessment of higher education courses, with computer-assisted assessments (CAA) and virtual learning environments (VLE) becoming commonplace [19]. Engaging in online formative evaluations can provide favorable results for students, and research indicates that consistent use of online multiple-choice questions (MCQs) for evaluation purposes is linked to enhanced exam performance [20].

3. METHODOLOGY

3.1. Study Site and Target Audience

To answer the research questions mentioned above, we targeted all the student teachers at the Regional Centre for Education Professions et de la Formation CRMEF in BENI MELLAL- KHENIFRA. This establishment is one of twelve centers in the country whose mission is to prepare future teachers and administrative staff for primary and secondary education. The specialties covered in this center are languages (Arabic, French, and Amazigh), mathematics, physical sciences, life and earth sciences, philosophy, and social disciplines. The public targeted by our study is made up of all the trainee teachers in the various specialties at the CRMEF.

3.2. Study Approach

In this research, the participants are trainee teachers from different scientific and literary branches at the CRMEF main regional training center in Beni-Mallal. Our research is being conducted in two stages:

In the first stage, we carried out a survey using a 24-item questionnaire that was administered to all trainee teachers at the CRMEF. Our aim in this phase is to sound out the opinions of those questioned about digital assessment and to assess the extent of its acceptance, as well as its impact on the achievements of student trainees. A week before to the investigation, a pre-test was carried out to ensure that the questions were clear. The number of respondents was 336 (44.9% of whom were women). Tables 1 and 2 show the breakdown by gender and level of education.

Table 1. The different disciplines in the training center

Gender	Male			Female		
	Bac+3	Bac+5	Bac+8	Bac+3	Bac+5	Bac+8
Study Level						
Number of trainees	122	25	4	155	29	1

Table 2. The numbers of participants by gender and level of study

Specialty In Section	Primary	Islamic Education	Scientific Matter	Languages	Social Disciplines
Percentage	33%	18%	13%	5%	31%

In the second stage, we conducted an experiment to evaluate the performance of the use of assessment by integrating ICT into the learning for future teachers. To do this, we took a group of 163 student mathematics teachers over a 12-week training period in a single module. During the first six weeks, all the assessments were carried out in the traditional way (paper, pencil, blackboard, etc.), and at the end of the six weeks, a test was taken to assess the trainees' skills. Then, for the remaining six weeks, we changed the type of assessment from traditional to digital. And once again, after 6 weeks, the trainees took a second test. To compare the results obtained, we used Student's t-test for paired samples. The data's normalcy was calculated using the Kolmogorov-Smirnov and Shapiro-Wilk statistics. In the event of non-normality of the data, we use the Wicoxon statistic.

4. RESULT AND DISCUSSION

4.1. Analysis of Results

Two types of data were collected during this research: data from the questionnaire, which was nominal or based on a 5-point Likert scale (1 for "often", 5 for "never"); and numerical data from the test. Initially, we employed descriptive statistics and used the Cronbach's alpha coefficient to confirm the reliability of the questionnaire items [21][22][23] et al. The second phase was the use of inferential statistics, where the student's t test for emergence was employed. The software used was SPSS 22 for analyzing the results, and Excel for presenting the data.

4.1.1. Results of the First Stage

The initial results of the study show that the integration of ICTs into teacher training (98% of respondents) and above all computer-based assessment tools is very important for properly training new teachers, as shown in Figure 1.

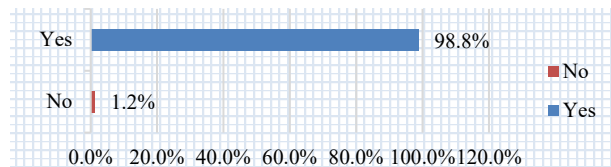


Figure 1. The importance of the ICTE module in your teacher training program

Figure 2 shows that the trainees (59%) have embraced technological tools and are able to follow and understand all the online courses on offer without difficulty.

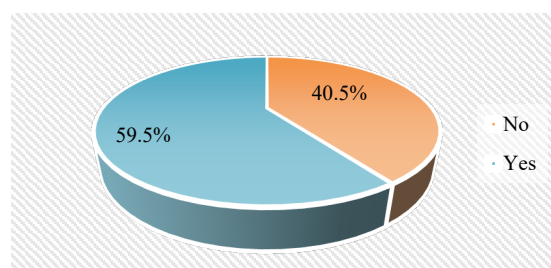


Figure 2. The ability to follow and understand all online courses without difficulty

Regarding the use of technological tools by trainees in the ICT module, most participants (46%) were satisfied with the content of the platforms and 19% confirmed that the content was rich, as shown in Figure 3.

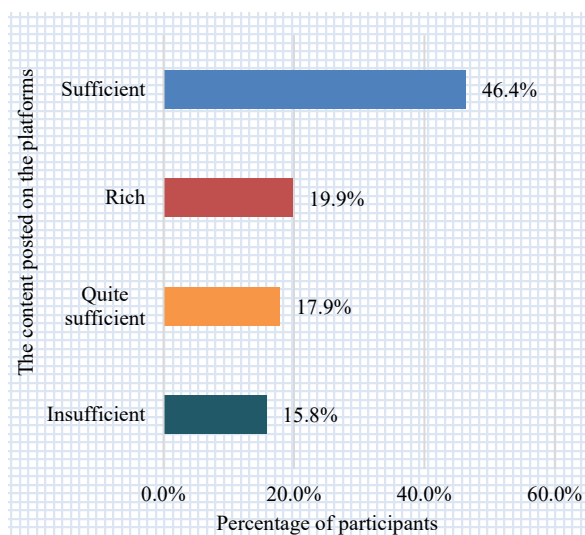


Figure 3. Opinions on the content posted on the platforms

Regarding assessment practices on platforms, 70% of respondents are satisfied with the use of online tests, as shown in Figure 4.

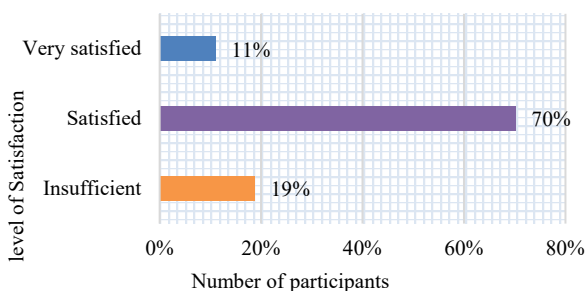


Figure 4. level of satisfaction with remote assessment

The graph in Figure 5 shows that despite trainees' attachment to traditional training, there is a trend towards distance learning, with over 42% of respondents opting for hybrid training.

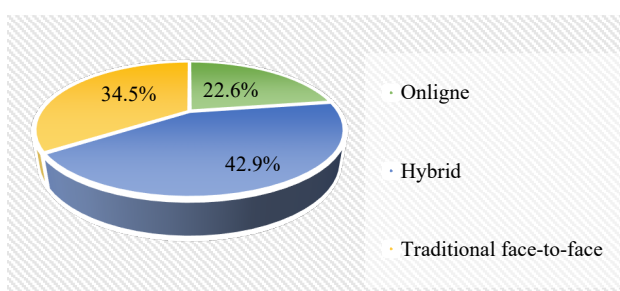


Figure 5. The possibilities offered by online assessment compared to traditional assessment

Similarly, Figure 6 shows that more than 80% of those questioned chose distance learning as a good solution in complex situations such as the covid 19.

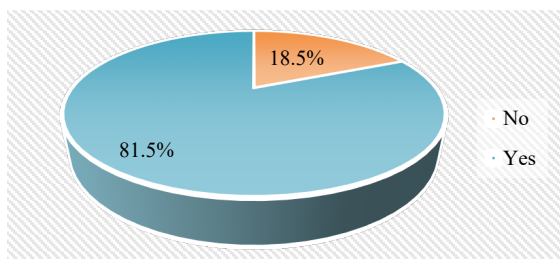


Figure 6. the choice of distance learning assessment in crisis situations

Finally, we conclude from Figure 7 that trainees (78%) prefer to integrate new technology into assessment and to carry out practical work using online resources on remote platforms.

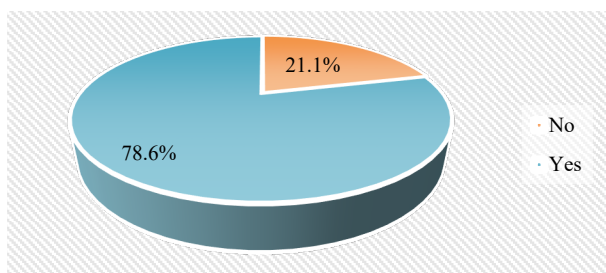


Figure 7. The possibility of completing assignments using online resources on remote platforms

4.1.2. Results of the Second Stage

As mentioned above, the aim of this stage is to highlight any impact that might result from the use of digital evaluation. To do this, we considered using a student's t-test for paired samples. The result is shown in Table 3.

Table 3. Table of Test for paired samples

	Test for paired samples							
	Matched differences				t	ddl	Sig. bilateral	
	Medim	Ecart type	Mean standard error	Confidence interval of the difference at 95%				
			Below	Superior				
Note_ posttest Note_ pretest	4.0981	3.687	0.28883	3.52779	4.66853	14.189	162	0.000

The student's t-test was significant, showing that the digital assessment had a discriminating effect on the learning achievements of the student teachers. However, this test requires the data to be normal. This led us to use the statistics of Kolgomorov Smirnov and Shapiro Wilk. But the results were unsatisfactory. This led us to use the Wilcoxon test, which is a non-parametric test. The results of the rankings, presented in Table 4, further support our findings.

Table 4. Table of Rangs

		Rangs		
		N	Average rank	Sum of ranks
Note_ posttest Note_ pretest	Rangs Negative	22	27.64	608.00
	Rangs positives	131	85.29	11173.00
	Ex aequo	10°		
	Total	163		

In addition, the value of this statistic was significant ($Z = 9.633$ and $p = 0.000$). This shows once again that the use of digital assessment has had a positive impact on the learning achievements of student teachers.

4.2. Discussion

Overall, in this study, trainee teachers' attitudes were generally more positive towards proctored computer-based tests than towards classroom-based tests. This means that trainee teachers can work autonomously when faced with such tests in computer platforms and can thus adapt to new teaching approaches that incorporate ICT. It is therefore possible to conclude that the platform selected for the evaluation had a positive effect on the stagiaire teachers' performance in terms of improving their technical application skills in the training process and, as a result, enabled them to overcome some technological learning challenges related to the evaluation topic.

The results of this study show consistency with other research in experimental disciplines for improving learner performance and understanding. For example, a review of the literature examining the findings of a study on the

gains and losses in learning experienced by sixth- to twelfth-grade students using virtual laboratories and computer simulations revealed that about 53% of the studies (42 articles) reported global gains, or at least 18%. (14 papers) reported increases under favorable settings, over 25% (20 articles) reported mitigated results, where some groups showed learning benefits but others did not, and about 4% of studies (2 articles) reported no gains at all [24].

In addition, during the use of evaluation platforms, we observed a high level of motivation among trainee teachers, who increasingly communicated and interacted using IT tools. This result is corroborated by a study focusing on the cognitive and affective domains, which indicates that a synchronous active methodology based on software encourages discussion between students and the teacher in the context of brainstorming and improves student participation and initiative compared with traditional teaching [25].

The approach used for evaluation through e-learning initiatives could be very useful in minimizing the problem of face-to-face evaluations in teacher training particularly during health crises such as covid 19, It was not compulsory to travel to follow further training such as the Moroccan education system's hybrid in-service training, which was costly and time-consuming. It should be noted that these results are specific to the study conducted at CRMEF and do not necessarily reflect the experiences and preferences of trainee teachers at other training centers or institutions. However, this research provides valuable information about the current state of distance learning and assessment practices at the training center and highlights the importance of taking into account students' experiences in implementing distance learning and assessment methods.

The platforms used for distance assessment may vary depending on the context and the resources available. While the study's outcomes indicate the positive impact of digital assessment platforms, it is essential to recognize that the success of these platforms may be contingent on contextual factors and available resources. Various institutions may possess differing levels of technological infrastructure and resources. Educational institutions must tailor their approaches to digital assessment to align with their unique contexts. This involves considering not only the digital tools but also the availability of technical support and faculty development programs that empower educators to use these tools effectively.

In addition, sociocultural factors play a significant role in the acceptance and adoption of digital assessment platforms. The study reveals the importance of examining these influences when implementing distance learning methods. Societal norms, expectations, and beliefs can either facilitate or hinder the transition to technology-enhanced assessment. Acknowledging these sociocultural nuances is instrumental in crafting strategies that resonate with the values and preferences of both educators and students. In summary, the researchers suggest that the use of computerized assessment platforms can be used as a very important alternative pedagogical tool in teacher training to facilitate the understanding of new concepts,

as our results from this research show that the use of digital assessment had a positive impact on the learning achievements of student teachers.

5. CONCLUSIONS

This research is used to assess the impact of using of computer-based learning assessment tools on the assessment performance of future teachers at the Teacher Training College known as CRMEF. Our research is being conducted in two stages:

- In the first stage, we carried out a survey using a 24-item questionnaire that was administered to all trainee teachers at the CRMEF in the town of Beni Mellal (Morocco). Our aim in this phase is to sound out the opinions of those questioned about digital assessment and to assess the extent of its acceptance, as well as its impact on the achievements of student trainees. One week before to the study, an investigation pre-test was conducted to make sure the questions were clear.

- In the second stage, we conducted an experiment to evaluate the performance of the use of assessment by integrating ICT into the learning for future teachers. To do this, we took a group of 163 student mathematics teachers, we used Student's t-test for paired samples. The data's normalcy was calculated using the Kolmogorov-Smirnov and Shapiro-Wilk statistics. In the event of non-normality of the data, we use the Wicoxon statistic. The results from this research show that the use of digital assessment had a positive impact on the learning achievements of student teachers.

The educational application employed in this study, which relied on the use of assessment platforms, improved the stagiaire teachers' performance, confirming the idea that integrating TIC into a chronological learning environment has, at least in part, had a positive impact on the success of teacher preparation. The fact that technology has greatly changed evaluation from a manual to an automatic process shown how vital it has become to education and teaching. Indeed, the assessment of teacher preparation has been used in the learning environment through practice to strengthen cognitive skills and motivate stagiaire teachers to be more active and independent. The current approach to evaluation has undergone a significant transition from the traditional method. The automated evaluation is more adaptable and gives aspiring instructors immediate feedback. It lessens the time and effort that teachers must expend throughout the evaluation process.

Thus, we believe that the integration of ICT in assessment is effective and contributes effectively to solving certain training problems if it is implemented appropriately at the right time in training. However, this suggests the availability of top-notch digital technological solutions that are suitable for and tailored to teacher preparation programs in order to drastically change the evaluation process by switching from a manual to an automatic one. Our future research efforts will examine the nuanced relationship between digital formative assessment tools and various disciplinary areas, exploring whether some subjects benefit more than others from technology-enhanced assessment.

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