The Effectiveness of Distance Learning Assessment Practices: Case Study

Hamzaoui Radoine[1], Boudhar Abdeslam[2], Elhoucine OUASSAM[1], Younes-Aziz Bachiri[2], Bouikhalene Belaid[1]

[1] Polydisciplinary Faculty, Sultan Moulay Sliman University, Beni Mellal, Morocco
[2] FST Beni Mellal, Sultan Moulay Slimane University, Beni Mellal, Morocco
[3] Faculty of Economics, Sultan Moulay Slimane University, Beni Mellal, Morocco

Abstract:
Assessment is an essential component of the educational process as it tracks the progress of lessons, activities and facilitates learning through formative assessment or measures performance towards graduation or entry to higher levels of education or employment through summative assessment. However, increasing student enrollments in open access educational institutions and the need for frequent assessments have led to a shift towards ICT (information and communication technologies) based remote assessment methods. The emergence of health emergencies and the strategy of Moroccan higher education has further accelerated this transition from traditional in-person assessments to remote assessments. This study uses a transversal research design to analyze the impact of distance assessment practices at Sultan Moulay Slimane University in Morocco. The research method includes the development of a benchmark for distance education evaluation methods and a statistical survey of randomly selected students (293) in eight establishments of the university, as well as other stakeholders involved in the remote assessment process. The objective is to determine the evaluation methodologies most appropriate to the specific context of Sultan Moulay Slimane University. Data is analyzed using descriptive statistics.

Keywords: Distance assessment, Distance Learning, Universal Design of Learning, Assessment Practices, ICT.

1. Introduction

Evaluation is an integral aspect of the educational process and is essential to education[1], as it allows for monitoring student progress and facilitating learning. But the shift to remote learning, which was accelerated after the global COVID-19 pandemic, has brought out new assessment challenges. The use of ICT has led to a need for new assessment methodologies that go beyond conventional approaches. The massification of the number of students in open-access higher education institutions and the need to schedule continuous learning assessments for large numbers of students has led researchers and universities to research distance learning assessment methods.

Distance learning has become increasingly prevalent in universities due to advancements in technology, and the utilization of ICT in education has created a need for new methods of assessment that go beyond traditional approaches[2]. Like in other countries, remote education is not a novel idea in Morocco. The challenge is in developing appropriate assessment methods that support students' growth and are in line with learning objectives. Evaluations have an impact on what student's value; they also have an impact on how well students understand learning tasks and how well they participate in them; finally, they have an impact on how well these skills are transferred to future learning[3].

This study aims to analyze the effects of remote assessment practices at the Sultan Moulay Slimane University in Morocco. The goal of the research is to assess the decisions and procedures made by the university to continue offering remote learning courses and evaluation activities. This article will be organized as follows: In the first section, we will discuss the study's backdrop and provide a review of the literature on practices in distant education evaluation. In the second section, we will outline the research

methodology, which includes an account of the current approaches to evaluating distant education. We will present the study's findings and comments in the third segment. Finally, we will summarize the key findings and offer recommendations for further research in the conclusion section.

The transition from the present to the distant to remote assessment has been a significant change in the education system. The shift towards distance learning has been driven by the advancements in technology and the need for flexibility in the learning process. Remote assessment allows for the continuity of courses and assessment activities, even in the face of unexpected challenges. However, this shift also presents new challenges, such as ensuring the integrity and fairness of assessments, maintaining student engagement and motivation, and addressing potential technical issues. It is important to note that this transition requires a re-evaluation of assessment methods and the development of new strategies to ensure that remote assessment is effective in evaluating student learning.

The higher education has emerged as a priority area for implementing policies that encourage universities and other educational institutions to move away from traditional classroom instruction in favor of remote learning and student enrollment. This adjustment aims to prevent an anticipated academic year's end and ensure the teaching-learning process's continuity. This change has been greatly facilitated by the accessibility of ICT like the Internet and social media, which has made remote assessment methods necessary. Teachers, essential players in this new experience, quickly adjusted by using their technological resources and skills to generate, count, and distribute resources and run online courses, sometimes with institutional help.

The study's context is the shift in higher education from traditional face-to-face instruction to distance learning, which has been brought about by the growth in enrollment in open-access educational institutions and the need to implement ongoing quality assurance measures. This study focuses specifically on analyzing the effects of distant learning practice at Sultan Moulay Slimane University in Morocco and identifying appropriate assessment methods for the university system.

This article will be organized as follows: We will provide an overview of the literature on the methods for evaluating distant learning in the first part. In the second section, we will outline the methodology of the research, including a description of existing distance learning assessment methods. In the third section, we will present the study's results and discussion, Finally the conclusion section, we will summarize the main findings and provide recommendations for future research.

2. Literature Review

The history of educational assessment is challenging since the term "evaluation" is used by several different notions. There is no clear definition for the distinction between formative and summative evaluation, and it remains ambiguous [4]. There has been much discussion in the literature on the nature of formative and summative evaluations as well as the challenges associated with characterizing their differences and relationships [5]. Furthermore, other terms have been introduced, such as assessment focused on learning that emphasizes the development of assessment learning elements [6], assessment lasting that provides support to students' learning beyond the formal learning framework [7], or covert assessment. Regarding assessments that go place in the background without the user's observation [8]. Recently, the use of online assessments has grown quickly because they promise to be a less expensive way to administer and record evaluations as well as provide access to large amounts of evaluation data from which a wide range of judgments can be made about students, teachers, schools, and educational systems [9]. However, the variety of options provided by online assessment has also led to conceptual inconsistencies regarding online assessment formats, modes, and kinds. Online assessment is defined as a systematic method of gathering data or artifacts on a learner and the learning process in order to draw conclusions about the person's dispositions with the use of information and communication technologies[10]. The future of evaluation is faced with many challenges, the most significant of which may be figuring out how well online environments can support both the needs of educational institutions and learners by providing simultaneous support for teachers and learners. [11] have highlighted the opportunities provided by online assessments to enable meaningful feedback and providing interactive support to learners. Additional empirical research on online assessment highlights potential impacts on learners' engagement and learning outcomes [12]. Owing to the increasing use of online learning environments, such as MOOCs (Massive Open Online Courses) [13] and the prevalence of distance learning programs[14], empirical studies have focused on various online

evaluation implementations, such as online formative assessments[15], digital assessments based on games [16], online pair assessments, and online self-evaluations[17]. A special focus has also been placed on exemplary best practices for integrating assessments into online learning environments[18]. Furthermore, advances in the field of data analysis have led to an increased awareness of automatic learning and related algorithms for semi-automated assessment approaches[19] or for online evaluation enhanced by analysis [20] et al.. A promising research line focuses on the opportunities provided by online assessments and learning analysis to give educators and learners insightful feedback in near real time [20] [21]et al..

According to the results of current research, online assessment systems meet a number of specific needs, including (a) adaptability to various domains, (b) flexibility for experimental as well as learning and teaching contexts, (c) massive data management, (d) quick analysis of complex and non-structured data, (e) instantaneous information return for learners and educators, and (f) automated result report generation for educational decision making. Online assessments have an effect on students' learning outcomes, but they also have an effect on their motivation, self-control, engagement, and reflection. A successful online assessment implementation requires educational support, clear guidelines, and regulations, as well as alignment of available assessment forms, modes, and kinds with expected learning outcomes[22].

2.1 Distance learning

Distance education is not so much a teaching methodology as it is an educational philosophy in that it allows students to learn from home or at a location of their choice without having to interact directly with the teacher. Thus, technology plays a crucial role in distant education. As a result, remote learning is a kind of educational system in which students and teachers communicate through various media to exchange knowledge, including publications and educational media, while utilizing contemporary audiovisual technology[23]. There are two kinds of remote learning: synchronous and asynchronous. The courses are delivered in real time via asynchronous video conference, allowing for direct student-teacher interaction. The teacher's materials serve as the basis for instruction, and students engage in synchronous or asynchronous learning through forums, emails, discussion forums, and salons de discussion. Furthermore, other researches have shown that the majority of students preferred asynchronous learning over synchronous learning, with the other students being either strongly in disagreement, in agreement, or indifferent to the issue[24]. Additionally, mixed learning occurs when online and presentiel learning are systematically combined[25]. The study used a questionnaire and relevant statistical tools to find out what the students thought about the remote learning procedure.

2.2 Online assessment techniques

Online assessments have become a major concern for all educational institutions worldwide these days. Exams and evaluations are now mostly completed online by students due to the closure of all campuses and the lack of in-person instruction[26]. Some benefits of online assessment include the ability to provide students with immediate, personalized feedback to help them improve their knowledge and performance, the ability to access the evaluation from multiple geographic locations at any time according to the student's convenience, and the ability to pass evaluation tests multiple times. to assess and refine their knowledge et al. [27]. Students may take exams from home by using apps like Lockdown Browser and Blackboard Learn. Given that these solutions include safeguards against students using third-party software to cheat on assessments, they enable more fair and legitimate exams[28].

Group discussion results indicate that mixed education should be considered to supplement the learning process and raise the levels of satisfaction, success, and quality in order for online presentations to be successful[29]. On the other hand, online exams can help overcome some of the difficulties associated with an online learning environment. However, proper planning is required to ensure that the examinations adhere to the fundamental principles of a successful evaluation strategy: accuracy, quality, and honesty[30].

3. Methodology

This study employs a benchmarking approach to analyze the impact of distance assessment practice at Sultan Moulay Slimane University. The benchmarking approach allows for the comparison and evaluation of the distance assessment methods and procedures used by the university against best practices and standards in the field. This approach is very helpful when evaluating distant education since it allows for the identification of both the strong aspects and areas that need improvement in university evaluation practices.

A cross-sectional research design is implemented, which allows for the collection of data at a single point in time. This approach is appropriate for this study, as it allows for the analysis of the current distance assessment practices at Sultan Moulay Slimane University. The method adopted in this research consists of developing a benchmark on the methods of distance learning assessment and conducting a statistical survey among students.

The survey is designed to collect data on the assessment methods used by students, as well as their perceptions and experiences with distance assessment. This data is essential for the analysis of the university's distance assessment practices, as it provides insight into the effectiveness of the methods used and the student's perceptions and experiences with distance assessment.

The quantitative approach is used, and data is collected through an online survey[31]. The survey is designed to gather both quantitative and qualitative information, and it is distributed to a sample of 239 students from Sultan Moulay Slimane University using the Google Forms tool. The survey is designed to be user-friendly and accessible to all participants, and it is available in multiple languages to ensure that all students can participate.

Data is analyzed using descriptive statistics and IBM SPSS Statistics ver. 20.0 software. The data is analyzed to identify the most used assessment methods, the perceptions, and experiences of students with distance assessment, and any patterns or trends in the data. The results of the survey are used to develop a benchmark for distance learning assessment methods and to identify areas for improvement at Sultan Moulay Slimane University. Additionally, the study includes a qualitative analysis of the data gathered throughout the investigation, enabling a deeper understanding of students' perspectives and experiences with remote assessment. This analysis is conducted using open coding and thematic analysis, which allows for the identification of key themes and patterns in the data.

Overall, to assure the validity and reliability of the results, this study uses a strict and methodical approach that makes use of the right research tools and data analysis strategies. The study is to identify best practices and opportunities for development in remote teaching assessment, as well as to offer insightful data on the effects of Sultan Moulay Slimane University's remote assessment practice. The institution may use the study's findings to enhance its procedures for remote assessments and guarantee that its pupils get top-notch instruction.

4. Result and Discussion

4.1 Title and authors Presentation of the Results of the Statistical Survey

4.1.1 switch to distance learning

The study's preliminary findings, which are displayed in Table 1 and Figure 1, show that the majority of the students surveyed (75%) at the Sultan Moulay Slimane University in Morocco believe that remote learning is a good option to use after their period of confinement. This suggests that, as a result of the most recent global pandemic and new strategies in higher education in Morocco, traditional present-day learning has given way to remote learning. Additionally, this means that students have been able to adjust to the new learning format and find it useful in certain situations.

Table 1: Representative sample information for our research

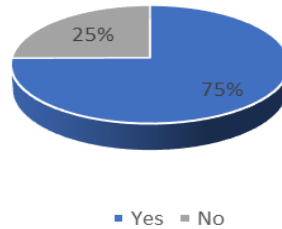| Answer		Workforce	Percentage	Valid percentage	Cumulative percentage
Valid	No	72	24,6	24,6	24,6
	Yes	221	75,4	75,4	100,0
	Total	293	100,0	100,0	

Figure 1: Students' perception of distance education as a solution during times of crisis

The data presented in Figure 2 indicates that most of the surveyed students (53%) at Sultan Moulay Slimane University prefer traditional face-to-face learning in a physical classroom setting. This suggests that students prefer in-person learning and that they might not find distance learning as effective as traditional learning. Additionally, it implies that students have a strong attachment to traditional education. However, a significant portion of the students (41%) prefer a hybrid approach that combines both face-to-face and distance learning. This suggests that students are open to new forms of education and are willing to adapt to different modes of learning. Only a small percentage of students (5%) prefer distance learning. This may indicate that students find it less effective than traditional or hybrid learning, or that they don't have the appropriate resources to participate in distance learning.
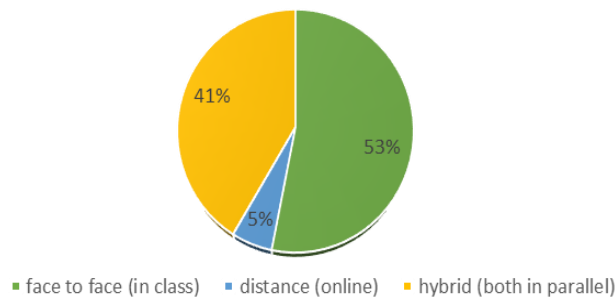

Figure 2: Students' preferences in relation to face-to-face, distance or hybrid learning

4.1.2 Proportion of students who participated in online testing

The figure 3 can be interpreted as follows: half of the students questioned completed an online test or exam, while the other half did not. This suggests that remote assessment is not yet a common practice among the students surveyed, and that more widespread adoption and implementation of online assessment methods may be required. This might also mean that the institution has not offered any online assessments or exams, or that the students are unfamiliar with the online testing procedure.
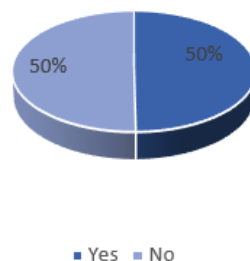

Figure 3: Proportion of students who took tests (exams) online

4.1.3 Difficulties in using remote assessment platforms

According to graphique 4, the majority of students (57%) reported experiencing difficulties with online exams. This may suggest that there are issues with remote assessment platforms that need to be fixed to enhance students' online assessment experiences. Conversely, 43% of students say they have not encountered any difficulties, which may indicate that these students have a solid understanding of the platforms and the skills needed to use them effectively. Overall, the results of this study highlight the need for further research and improvements in distance learning assessment methods to ensure that students have an easy and effective experience.
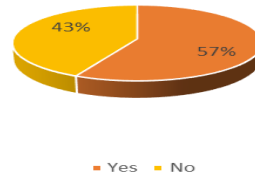

Figure 4: Difficulties encountered by students during online exams

The data in Figure 5 suggests that 60% of students were able to use the platforms for online assessment without needing assistance, while 40% of students required help. This suggests that while some students may have had a relatively smooth experience with the platforms, others may have encountered difficulties and needed assistance to complete their assignments. Overall, the data in this figure indicates that there is some level of variability in student's ability to navigate and utilize these online assessment platforms independently.
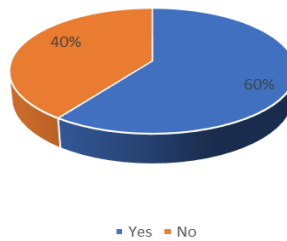

Figure 5: Proportion of students who used platforms for online assessment without needing help

4.1.4 Online learning platform used by students

The results of Table 2 show that Microsoft Teams is the most used platform for distance assessment among students at Sultan Moulay Slimane University. This is likely since the university has adopted this platform as the main means of communication and online learning. Zoom and Moodle are also used by a significant number of students, but to a lesser extent. It's also worth noting that a small percentage of students (49) used other platforms, indicating that there is a diversity of platforms being used by students.

Table 2: Online learning platforms used by students

Platforms	Microsoft Teams	Zoom	Moodle	others
	165	112	31	49

The data in Table 3 suggests that most of students surveyed (142 out of 239) preferred to use Microsoft Teams as their primary platform for online learning. Zoom was the second most preferred platform with 81 students expressing preference for it. Moodle was the least preferred platform among the students surveyed, with only 16 students expressing a preference for it. This may be because the university has made Microsoft Teams its primary platform for remote learning, making it more familiar and approachable for students.

Table 3: Students' preferences for online learning platforms

Favorite platform	*Microsoft Teams*	*Zoom*	*Moodle*
	142	*81*	*16*

4.1.5 Remote evaluation methods used

The study's findings show that there were two main methods for evaluating distance that were employed. The first mode is traditional written exams, which require students to register and enroll, and submit written copies that are scanned in PDF format to ensure authenticity. The second mode is multiple-choice exams, which employ measures such as webcam monitoring and short exam duration to reduce cheating. Additionally, students are only given one attempt at answering and are not permitted to go back and change their responses. These measures aim to minimize opportunities for cheating and maintain the integrity of the assessment process. In comparison to other methods used in other places, the study revealed that the use of classical examinations and multiple-choice examinations (MCQ) as modes of distance assessment are commonly used in universities. However, other institutions and educational systems may also use other methods such as online quizzes, open-book exams, and online portfolio assessments. Certain places may also use adaptive tests, which modify the degree of difficulty of the questions based on the student's performance, and gamified assessments, which incorporate elements of game design to make the evaluation process more interactive and engaging. Additionally, some institutions may also use peer assessment or self-assessment to evaluate student performance in a distance learning setting.

4.2 Discussion and Recommendations

This study, which was based on information gathered from an online survey given to USMS participants, demonstrates the significant need for high-quality assessments of distant learning. The results of this research show that most of the participants indicated a need for further training on the various e-learning platforms. on the various online distance learning platforms, which is considered a which is considered a relevant tool for pedagogical continuity.

Through a review of the state-of-the-art and benchmark models of learner evaluation and based on the findings of our statistical investigation, we have discovered that there are several methods of learner evaluation in various application domains. However, it is important to note the limitations of conventional evaluation techniques as instruments for determining the knowledge and skills that students have attained.

The suggested modes of assessment offer only semi-automatic and static assessment of assignments for most of the modules taught in the university program which is carried out by lecturers following the guidelines of the tool. Thus, formative, and summative assessments are performed by the instructor.

This study, which is supported by other research, finds that the lack of technology, infrastructure, Internet access, and poor quality Internet service in remote areas is the main barrier to online learning[32]. The main challenges to the development and implementation of online learning include time constraints, a lack of technical expertise, inadequate infrastructure, and a lack of institutional strategies[33]. However, our approach does not need to predefine a sequence of situations. They are dynamically defined according to the learner's level and knowledge acquisition.

The assessment methods proposed in these systems are classical and static. Our approach covers three types of assessments: diagnostic, formative and summative based on time traces and number of attempts which are useful for the diagnostic process to assess the level of knowledge of learners. The proposed approach can also be used during the training process providing a formative evaluation or a summative evaluation after a training session.Assessment interventions through e-learning initiatives could be of great help in minimizing the problem of face-to-face assessments especially in health crises such as covid 19, It was not compulsory to travel for further training, which was costly and time-consuming.

It is important to note that these findings are unique to the research conducted at the Sultan Moulay Slimane University and may not accurately reflect the experiences and preferences of students at other universities or institutions. However, this study offers invaluable information about the current state of distance learning and assessment practices at universities and emphasizes the significance of considering students' preferences and experiences when implementing these distance learning and assessment methods.

In comparison to other studies conducted at universities in different countries, the methods and platforms used for distance learning and assessment may vary depending on the context and resources available. For example, some universities may have access to more advanced technologies and resources, while others may have limited access. Additionally, cultural, and societal factors may also influence the adoption and implementation of distance learning and assessment methods. It is therefore important for universities to consider their unique context and resources when implementing distance learning and assessment methods to ensure the best possible outcome for their students.

5. Conclusion

Our study on the modalities of assessment in the context of distance learning at Sultan Moulay Slimane University in Morocco found that this mode of teaching is effective and relevant for maintaining the continuity of courses and assessment activities. The study's findings indicate that home evaluation and distant learning provide a workable alternative for both teachers and students. The use of digital learning platforms and online learning has made content accessible and accelerated learning possible.

The distance learning offers students flexibility in their learning and easy access to materials through digital platforms and university websites from their homes. It is a new pedagogy that promotes autonomy in the acquisition of knowledge for students and an excellent mode for teachers who can ensure the continuity of their teaching practices and easily assess their students online.

In conclusion, remote learning and assessment have shown to be useful and relevant in the current environment, and they may continue to play a significant role in the educational system in the future. It is important for universities and educators to continue to explore and develop appropriate assessment methods that align with the learning objectives and support student progress in a distance learning context. One potential direction for future research in the field of distance learning assessment is the development and implementation of methods utilizing artificial intelligence (AI) algorithms. The use of IA algorithms in evaluation has the potential to increase the process's accuracy and efficiency.

6. Other recommendations

A specific number of recommendations may be made based on the study's findings to enhance the procedures for evaluating remote learning in higher education establishments.

1. Providing teachers and students with guidance and assistance on using online learning platforms: The results of this study indicate a need for further training on the various e-learning platforms. Institutions should provide training and support to students and faculty on the use of these platforms to ensure effective and efficient use.

2. Creating and implementing institutional strategies for online learning the study's findings demonstrate that one of the main barriers to the development and implementation of e-learning is the absence of institutional strategies. Institutions should develop and implement strategies to support e-learning, including infrastructure, technology, and internet access.

3. Implement formative and summative assessments based on time traces and number of attempts: The study shows that the assessment methods proposed in these systems are classical and static. Institutions should consider implementing formative and summative assessments based on time traces and number of attempts, which are useful for the diagnostic process to assess the level of knowledge of learners.

4. Investing in the creation of advanced online learning assessment tools: the study's findings show that conventional assessment methods are insufficient as tools to ascertain the knowledge and skills that students have acquired. The development of sophisticated online learning assessment tools that can provide a more thorough assessment of students' learning should be funded by educational institutions.

5. Encourage the use of hybrid learning: The study shows that there is a trend towards distance learning, with more than 50% of respondents opting for hybrid education. Institutions should encourage the use of hybrid learning, we blend in-person and online instruction to give students the best of both worlds.

6. Increasing infrastructure and technology investments will ensure that students have access to a reliable Internet connection and devices for online learning. In particular in rural areas, this will help to lower the barriers to online learning.

7. Develop and implement institutional strategies for e-learning, including guidelines for assessment and evaluation. This will help to ensure consistency and fairness across all modules and programs.

8. Consider using more dynamic and adaptive assessment methods, such as those that consider the time taken to solve a problem, the number of attempts, and the quality of the answer. These methods can give a more comprehensive picture of a student's knowledge and abilities.

9. Provide formative and summative evaluations using different time traces and number of attempts. This will help to diagnose the level of knowledge of learners and evaluate the progress of their learning.

10. Create a system that detects cheating by webcam video capture behind the student, use of short exams, and one-attempt assessment to keep the student as busy as possible to avoid cheating.

11. Encourage the use of hybrid education and multiple modes of assessment. This will help to meet the diverse needs and preferences of students.

12. Continuously monitor and evaluate the effectiveness of distance learning assessment practices to identify areas for improvement and make necessary adjustments.

13. Encourage the use of technology-based assessments that are interactive and adaptive to the learner's level and knowledge acquisition.

14. Encourage the use of platforms that are widely adopted by universities such as Microsoft Teams and Zoom, which are easy to use, and have a user-friendly interface.

References

1. M. C. Heitink, F. M. Van der Kleij, B. P. Veldkamp, K. Schildkamp, and W. B. Kippers, "A systematic review of prerequisites for implementing assessment for learning in classroom practice," *Educational Research Review*, vol. 17. Elsevier Ltd, pp. 50–62, Feb. 01, 2016, doi: 10.1016/j.edurev.2015.12.002.

2. A. De Brún, L. Rogers, A. Drury, and B. Gilmore, "Nurse Education Today Evaluation of a formative peer assessment in research methods teaching using an online platform : A mixed methods pre-post study," *Nurse Educ. Today*, vol. 108, no. September 2021, p. 105166, 2022, doi: 10.1016/j.nedt.2021.105166.

3. D. Boud and N. Falchikov, "Aligning assessment with long-term learning," *Assess. Eval. High. Educ.*, vol. 31, no. 4, pp. 399–413, Aug. 2006, doi: 10.1080/02602930600679050.

4. P. E. Newton, "Clarifying the purposes of educational assessment," *Assess. Educ.*, vol. 14, no. 2, pp. 149–170, 2007.

5. P. Black and D. Wiliam, "Developing the theory of formative assessment," *Educ. Assessment, Eval. Accountability(formerly J. Pers. Eval. Educ.*, vol. 21, no. 1, p. 5, 2009, doi: 10.1007/s11092-008-9068-5.

6. D. Carless, "Learning-oriented assessment: conceptual bases and practical implications," *Innov. Educ. Teach. Int.*, vol. 44, no. 1, pp. 57–66, 2007.

7. D. Boud, "Sustainable assessment: rethinking assessment for the learning society," *Stud. Contin. Educ.*, vol. 22, no. 2, pp. 151–167, 2000.

8. V. J. Shute, L. Wang, S. Greiff, W. Zhao, and G. Moore, "Measuring problem solving skills via stealth assessment in an engaging video game," *Comput. Human Behav.*, vol. 63, pp. 106–117, 2016.

9. M. Webb and D. Ifenthaler, "Assessment as, for and of 21st Century learning using information technology: An overview," 2018.

10. E. L. Baker, G. K. W. K. Chung, and L. Cai, "Assessment gaze, refraction, and blur: The course of achievement testing in the past 100 years," *Rev. Res. Educ.*, vol. 40, no. 1, pp. 94–142, 2016.

11. J. W. Gikandi, D. Morrow, and N. E. Davis, "Online formative assessment in higher education: A review of the literature," *Comput. Educ.*, vol. 57, no. 4, pp. 2333–2351, 2011, doi: 10.1016/j.compedu.2011.06.004.

12. Q. Nguyen, B. Rienties, L. Toetenel, R. Ferguson, and D. Whitelock, "Examining the designs of computer-based assessment and its impact on student engagement, satisfaction, and pass rates,"

Comput. Human Behav., vol. 76, pp. 703–714, 2017.

13. C. J. Bonk, M. M. Lee, T. C. Reeves, and T. H. Reynolds, *MOOCs and open education around the world*. Routledge, 2015.

14. M. G. Moore and G. Kearsley, *Distance education: A systems view of online learning*. Cengage Learning, 2011.

15. Z. G. Baleni, "Online formative assessment in higher education: Its pros and cons," *Electron. J. e-Learning*, vol. 13, no. 4, pp. pp228-236, 2015.

16. Y. A. Kim *et al.*, "Responsive teaching in online learning environments," *J. Coll. Sci. Teach.*, vol. 50, no. 4, pp. 17–24, 2021.

17. W. Admiraal, B. Huisman, and M. Van de Ven, "Self-and peer assessment in massive open online courses.," *Int. J. High. Educ.*, vol. 3, no. 3, pp. 119–128, 2014.

18. F. Martin, A. Ritzhaupt, S. Kumar, and K. Budhrani, "Award-winning faculty online teaching practices: Course design, assessment and evaluation, and facilitation," *Internet High. Educ.*, vol. 42, pp. 34–43, 2019.

19. H.-S. Lee, G.-H. Gweon, T. Lord, N. Paessel, A. Pallant, and S. Pryputniewicz, "Machine learning-enabled automated feedback: supporting students' revision of scientific arguments based on data drawn from simulation," *J. Sci. Educ. Technol.*, vol. 30, pp. 168–192, 2021.

20. D. Gašević, S. Greiff, and D. W. Shaffer, "Towards strengthening links between learning analytics and assessment: Challenges and potentials of a promising new bond," *Computers in Human Behavior*, vol. 134. Elsevier, p. 107304, 2022.

21. J. Liebowitz, *Online learning analytics*. CRC Press, 2021.

22. J. Heil and D. Ifenthaler, "Online Assessment in Higher Education: A Systematic Review.," *Online Learn.*, vol. 27, no. 1, 2023.

23. E. Liguori and C. Winkler, "From offline to online: Challenges and opportunities for entrepreneurship education following the COVID-19 pandemic," *Entrepreneurship Education and Pedagogy*, vol. 3, no. 4. SAGE Publications Sage CA: Los Angeles, CA, pp. 346–351, 2020.

24. W. Al-Mawee, K. M. Kwayu, and T. Gharaibeh, "Student's perspective on distance learning during COVID-19 pandemic: A case study of Western Michigan University, United States," *Int. J. Educ. Res. Open*, vol. 2, p. 100080, 2021.

25. M. Bączek, M. Zagańczyk-Bączek, M. Szpringer, A. Jaroszyński, and B. Wożakowska-Kapłon, "Students' perception of online learning during the COVID-19 pandemic: a survey study of Polish medical students," *Medicine (Baltimore).*, vol. 100, no. 7, 2021.

26. T. Barker and S. Bennett, "The use of electronic voting and peer assessment to encourage the development of higher order thinking skills in learners," *Int. J. e-Assessment*, 2012.

27. I. Sikurajapathi, K. Henderson, and R. Gwynllyw, "Using e-assessment to address mathematical misconceptions in engineering students," *Int. J. Inf. Educ. Technol.*, vol. 10, no. 5, pp. 356–361, 2020.

28. L. Ali and N. Dmour, "The shift to online assessment due to COVID-19: An empirical study of university students, behaviour and performance, in the region of UAE," *Int. J. Inf. Educ. Technol.*, vol. 11, no. 5, pp. 220–228, 2021.

29. J.-J. Choi, C. A. Robb, M. Mifli, and Z. Zainuddin, "University students' perception to online class delivery methods during the COVID-19 pandemic: A focus on hospitality education in Korea and Malaysia," *J. Hosp. Leis. Sport Tour. Educ.*, vol. 29, p. 100336, 2021.

30. A. Akimov and M. Malin, "When old becomes new: a case study of oral examination as an online assessment tool," *Assess. Eval. High. Educ.*, vol. 45, no. 8, pp. 1205–1221, 2020.

31. M. De Rond and R. Thietart, "Responsabilité stratégique des dirigeants: Entre hasard, choix et inévitabilité," *Rev. française Gest.*, no. 3, pp. 63–77, 2007.

32. M. Al-Balas *et al.*, "Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives," *BMC Med. Educ.*, vol. 20, no. 1, pp. 1–7, 2020.

33. D. O'Doherty, M. Dromey, J. Lougheed, A. Hannigan, J. Last, and D. McGrath, "Barriers and solutions to online learning in medical education–an integrative review," *BMC Med. Educ.*, vol. 18, no. 1, pp. 1–11, 2018.

Author Profile

Hamzaoui Radoine *PhD student in computer science,Innovation Laboratory in Mathematics, Applications & Information Technologies Polydisciplinary Faculty Sultan Moulay Sliman University Beni Mellal, Morocco, Professor trainer of ICTE at CRMEF of Beni mellal-Khenifra, obtained a Master specialized in Mathematics and Technology Education, field of interest: ICT and e-learning, research topic: evaluation of distance learning in the bachelor cycle -case of Beni mellal.*
Boudhar Abdeslam *Teacher researcher Laboratory of Studies and Research in Economic Sciences and Management (LERSEG), Polydisciplinary Faculty, Beni mellal, Morocco*
Elhoucine OUASSAM *Doctor in Artificial Intelligence in the service of education, Engineer-consultant-expert in information systems at national and international level. Polydisciplinary Faculty Sultan Moulay Sliman University Beni Mellal, Morocco*
Younes-Aziz Bachiri *Doctor in Artificial Intelligence in the service of education, Engineer-consultant-expert in information systems at national and international level. FST Beni Mellal, Sultan Moulay Slimane University, Beni Mellal, Morocco*
Bouikhalene Belaid *obtained a Ph.D. degree in Mathematics in 2001 and a degree of Master in Telecommunication and Computer science in 2007 from the University of Ibn Tofel Kenitra, Morocco. He is currently a professor at University Sultan Moulay Slimane, Morocco, His research focuses on mathematics and applications, decision information systems, e-learning, pattern recognition and artificial intelligence.*