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The Digital Assessment of Learning: Current Situation and Perspectives: Case of Teachers of Life and Earth Sciences

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Abstract

The constant evolution of technological tools and the benefit of the introduction of new technologies in the teaching and learning process in schools, suggests that the possibilities of using digital technology in the practices of the evaluation of learning inside and outside the classroom.

Faced with the diversity of technical tools and methods, the teacher is called upon, before addressing his learners, to make a certain number of technical, didactic and pedagogical choices, to set his pedagogical scenario, this is all the more so. Necessary for the conduct of learning activities or to design and implement its assessment tool. In this perspective, we are entitled to ask the question relating to the attitudes and feedbacks of teachers and learners regarding the integration of ICT in assessment practices. This question is broken down into several sub-questions: "At what points, and how do teachers of Life and Earth Sciences integrate digital technology into their assessment practices?" is this integration determined by the educational pathways? What interest and what limit of the use of digital technology according to teachers and learners? "

To answer our problem, we opted for export research, the recommended methodology of which is based on a multidimensional survey, in which we first questioned the teachers around the use of new technologies in the evaluation process, and secondly, to identify the

degree of motivation and commitment of learners in instrumented and innovative assessment situations.

Our research context is represented by 34 schools, 22 from qualifying secondary education and 12 from college education (from the provincial delegation of Taza), with a varied population of 431 students of all levels and sectors, as well as than a number of 132 teachers of life and earth sciences.

Finally, confirming that despite the satisfaction of the majority of teachers and students with respect to the functional qualities and the contribution of technological tools in evaluation practices, some disparities were noted whether at the technical, spatiotemporal level or even organizational.

Keywords: Digitizing, Practice Assessment, Technology News.

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Introduction

For several decades, the uses of technologies in the educational sector have been a very dynamic field, both pedagogically and scientifically and also professionally. This area also contains its share of paradoxes, one of them being the gap that persists between the positive expectations attributed to technological uses to transform education, on the one hand, and the relative stability of teaching practices and learning, on the other hand.

Modern technology today provides education professionals with an array of new tools, processes and resources that teachers can use to manage content to be taught within and outside the classroom in a communication process. Continuous in order to monitor and evaluate the performance of their learners throughout the school year.

The increased diffusion of new technologies has given rise to remarkable improvements in terms of content development and management of the quality of educational interventions. However, it is surprising that technology is not equally present in the processes of educational assessment, modeling of school performance and judgment of subject competencies. Noting at the same time the poor use in the analysis and dissemination of school results.

As part of an initiative to pave the way for change in assessment, and the integration of innovative tools into all stages of the learning management process, we have developed this work, which sets out the current state of play. Recourse by teachers to new technologies in their assessment acts and which measures the feedback or attitude of the latter and their

learners towards innovation in pedagogy and models of judgment in and outside the classroom of the school context.

Literature Review

1. Learning assessment

Several definitions have been given to the evaluation of learning; they can be classified into three main groups: those which focus on the degree of achievement of objectives; those which emphasize the notion of judgment; and those that emphasize decision-making. In terms of choice one can retain the definition of De Ketele 1, which seems to us the most complete: "Evaluating means: collecting a set of sufficiently relevant, valid and reliable, and examine the adequacy between this set of information and a set of criteria appropriate to the objectives set at the start or added along the way, with a view to making a decision" 2.

The evaluation can have different objectives. They include: providing feedback, giving marks and motivating (Tarouco and Hack, 2000) 2, improving the learning of the learner, following him in a more individual way (Rizza et al. 2006) 3, identifying his strengths and weaknesses, communicating with stakeholders, or even individualizing educational paths.

Evaluations, even of similar forms, can therefore have different purposes. We distinguish most often:

• Diagnostic evaluation, done before or at the start of a course or program. Sometimes a distinction is made between diagnostic and prognostic evaluation. The first serves the learner, making it possible to adapt his course or to take remedial measures. The second rather serves the evaluator. It is used, among other things, to check the prerequisites and control access to courses or programs.

• The objective of formative assessment is to improve learning. Feedback therefore plays a central role. It is often more continuous or repeated at regular intervals during a training. Despont (2008) 3 distinguishes formative and formative assessment, the second leading to self-regulation by the learner of his learning.

• Summative evaluation, which links a quantitative result or rating to a task, often assigned to several individuals in the same group. Summative evaluation usually takes place at the end of the process and serves as a check. This terminal function aims to "categorize, certify and validate practices, behaviors or knowledge" (Ardoino and Berger, 1986) 2 and to report on it.

Generally, formative and diagnostic assessments are referred to as assessment for learning as opposed to summative assessment, seen as an assessment of learning. E-Learning also refers to the notion of Assessment as Learning 6, which joins the notion of formative assessment and can include diagnostic elements 4.

2. Educational technology

Educational technology (ET) refers to the various tools, processes, documents and material supports used by teachers and learners for educational purposes, it is the study of different ways of organizing and mobilizing the IT resources to its students. different levels to manage educational situations. 10

The integration of technology in the act of teaching and learning is framed by three approaches to the study of uses, namely the dissemination approach, the innovation approach 7 and the appropriation. For each of them are specified: the intellectual context which made them emerge, the postulates on which they are based, and the paradigm in which they are inscribed. This reality poses the teacher before a three-fold methodological choice to succeed in his teaching practices.

Putting the evaluation in front of technology consists in choosing between the three models of the integration of new technologies in the education sector : thus the deterministic model 5 directs the researcher towards the pragmatic aspect of the technology from which he must benefit to develop the evaluation process, against the innovative model which consists in introducing evaluation as a means to develop technological practices, and thirdly we present the constructivist model which is based on the win-win relationship including the reconciliation between technology and the evaluation will make it possible to develop both processes at the same time. This last approach is the basis of our intervention while seeking to verify the existing relationship between evaluation and technology in order to try to facilitate the act of judging through digitization on the one hand and to accelerate the integration. new technologies in particular to guarantee more certainty and objectivity in the assessment.

3. Numerical assessment

Numerous possibilities offered by technological innovations were generally used in the management of evaluation in a digital regime. Indeed, with the digitization of assessment tools and the rise of distance learning courses, space and time are no longer conceived in the same way. These design changes also do they feel at the assessment methods and teaching approaches is to diagnose, to drive or to certify learning 9.

The following model "the cube of remote evaluation" presents the dimensions of digital evaluation and explains the components of this process, particularly in a digital mode.

The evaluation of learning in digital training involves three starting dimensions that we believe are central to dealing with this question 6:

X axis: Evaluate why? In this axis we determine the functions of the numerical evaluation (diagnostic, formative, summative, Formative (Self-evaluation and co-evaluation)) 8;

Y axis: Evaluate what? This section defines the objects of digital assessment (knowledge, skills, attitudes or attitudes, skills) (Scallon, 2007; Tardif, 2006) 6;

Z axis: Evaluate from where? this axis specifies the evaluation methods used (face-to-face, enriched face-to-face, hybrid, online or remote).

Each of these axes has been arbitrarily defined in 4 levels 7, but the whole range of nuances exists naturally for each of them. Thus, we represent the goals of the evaluation through a cube formed of 64 distinct zones, as shown in figure 2.

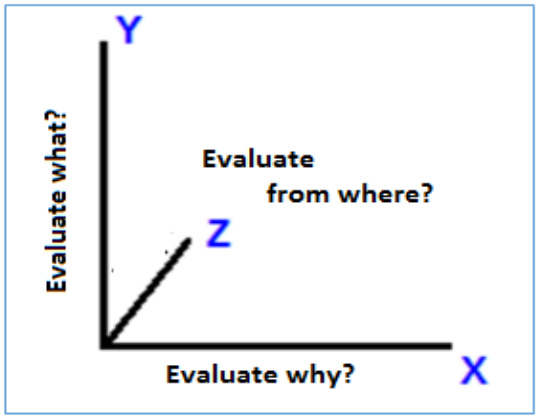

Figure 1. Axes of the remote assessment cube

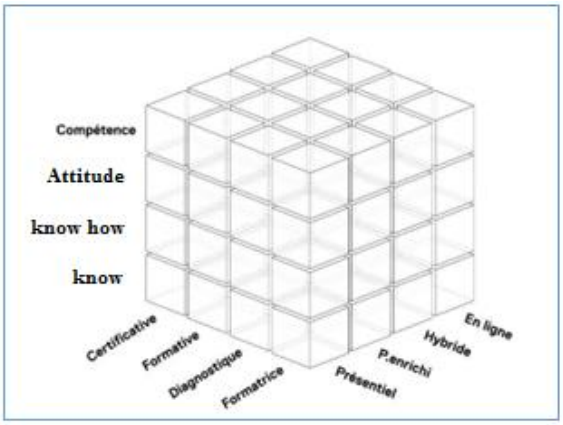

Figure 2. Remote assessment cube

This model specifies the presence of 64 choices to assess in digital mode 7 , depending on the objective set, the tool used and the location chosen, this reality demonstrates the dynamic and complex aspect of the assessment, particularly in digital mode.

Methodology

1. Research typology

Our research falls within the framework of export research, of which the recommendedmethodology is based on a multidimensional survey, in which we firstly questioned the teachers around the use of new technologies in the evaluation process, and to identify in second, the degree of motivation and commitment of learners in innovative situations, and finally, to frame all the advantages and limits of this reconciliation between technology and evaluation.

2. Researchcontext

Our research context is represented by 34 schools, 22 from qualifying secondary education and 12 from college education (from the provincial delegation of Taza), with a varied population of 431 students of all levels and streams, as well a number of 132 teachers of life and earth sciences, without forgetting the important role played by the heads of these establishments and the head of the guidance and supervision division at the provincial delegation of Taza, Morocco.

3. Data collection tools

To conduct our investigations, we combined both qualitative and quantitative elements of the research. For this reason, we adopted the mixed methodology based on the results of three questionnaires:

- Questionnaire 1: intended for teachers to assess the degree and patterns of use of technology in the act of assessment;

- Questionnaires 2: always administered to teachers to measure and model the advantages and limitations of using technology in the evaluation of learning;

- Questionnaire 3 : intended for pupils in order to judge their feedback and their attitudes towards the use of technology.

The questionnaire is created from the models offered by the Google Forms tool and distributed online by email and WhatsApp to teachers (by school directors) between February 15 and May 9, 2021, to students (by their teachers) between May 10 and May 30, 2021.

We note that the average collection of responses recorded is 81% for teachers (106 for 132 targeted teachers) and 88% for students (379 for 431 selected students), this reflects the interest given to this research.

On the other hand, the percentage of responses recorded in the private sector was 92%, and that of the public sector was 69%.

4. Result sanalysis tools

To carry out our analysis and interpretation of the results, we adopted the model of Krippendorff 2003 5, which mobilizes a set of data collection means and methods of processing mixed quantitative and qualitative results. To give us more details, we are based on technological tools (Sphinx, Trideux and Excel), which have assured us of the confirmation of the validity of the results.

Results

The questionnaire intended for teachers is made up of five sub-parts, four of which aimed at analyzing the technological practices of teachers in the area of evaluation.

The results of this survey are as follows:

1. The disciplines represented

The questionnaire appealed to teachers who teach three distinct streams (Table 1).

Table 1. Sectors represented in the questionnaire

General scientificstreams	Literary courses	International scientificfields
37%	41%	22%
160 students	176 students	95 students

Our sample is made up of 160 students from general science branches (a percentage of 37%), 176 students from literary branches (a percentage of 41%), and 95 students from international science branches (a percentage of 22%).

2. Use of technology in teacher assessment

Our second item of the questionnaire focused on the use of technology in evaluation by teachers, the responses of which are shown in Table 2:

Table 2. Use of technology in teacher assessment

Answers	All sectors	General scientificstreams	literarybranch	International scientificfields
Yes	61%	87%	15%	84%
No	39%	13%	85%	16%

The questionnaire shows that 61% of those questioned affirmed to practice innovative methods in the evaluation, that is to say 81 teachers out of 132, unlike 39% who still privilege to evaluate with traditional methods.

Likewise, recourse to new technologies is frequent in scientific branches (general or international), against little use by teachers of literary disciplines.

3. Moments of use of technology in teacher assessment

The third question of our questionnaire measures the use of technological tools in the different phases of the assessment (diagnostic, formative, summative and certification)

Table 3. Moments of the use of technology in teacher assessment

Times and functions of the evaluation	General scientificstreams	literarybranch	International scientificfields	Average of all sectors
Diagnostic Evaluation	87%	15%	84%	62%
Formative assessment	63%	5%	72%	46%
Summativeevaluation	87%	15%	84%	62%
Formative evaluation	31%	0%	66%	32%

The re-thinking of this question revealed that the diagnostic and summative evaluations are the most concerned with the integration of new technologies in all sectors with a percentage of 62% each, followed by the formative evaluation with a percentage of 46%, the least represented is the formative evaluation with a percentage of 32%.

The same ranking is observed by comparing the percentages of the use of technology at the different points in the evaluation process for each sector.

4. Typology of evaluations mobilized by teachers

For the third question, we will present the results of the different assessment methods used by teachers from different fields as follows:

Table 4. Assessment methods used by teachers

	Scientific fields	literarybranch	International scientificfields	Average of all sectors
Face-to-face	30%	15%	100%	48%
Enriched face-to-face	60%	5%	71%	45%
In hybrid mode	38%	5%	31%	25%
In distancing	0%	0%	25%	8%

The re-thinking of this question revealed that the evaluation in face-to-face mode and in enriched face-to-face mode are the most concerned by the integration of new technologies in all sectors with a percentage of 48% and 45% respectively; followed by the evaluation in hybrid mode with a percentage of 25%, the least represented is the evaluation in distance with a percentage of 8%.

5. Methods of evaluation mobilized by teachers

For the fourth question, we will present the results of the different evaluation methods used by the teachers in Table 5 below:

Table 5. Assessment methods mobilized by teachers

Assessmentmethods	General scientificstreams	literarybranch	International scientificfields	Average of all sectors
Oral and practicalassessment	20%	25%	31%	25%
Writtenassessment	80%	75%	68%	74%
Evaluation by project	42%	15%	71%	43%
Paired assessment / Co-assessment	37%	0%	62%	33%
Self evaluation	27%	10%	34%	24%

According to the averages calculated for all the sectors, it can be seen that the evaluation method which uses digital technology is the written evaluation (74%), followed by the evaluation by project (43%). The use of digital technology during a self-assessment is the least represented (24%).

The comparison of the percentages of the three streams for each assessment method shows that oral and practical assessment, evaluation by project, co-assessment and self-assessment are more frequent at the level of international streams than at the level of others. channels. The use of digital technology during the written assessment is more frequent at the level of general scientific fields.

6. Technological tools used during assessment by teachers

The last question of our first questionnaire aims to diagnose the technological tools used by our population of teachers in their evaluation practices.

Table 6. Technological tools used during evaluation by teachers

Technologicaltoolsused		General scientificstreams	literarybranch	International scientificfields	Average of all sectors
PTT Quiz		42%	0%	71%	38%
Specific software		27%	10%	41%	26%
Seriousgames		15%	0%	0%	5%
Social networks	WhatsApp	24%	10%	62%	32%
	Facebook	24%	10%	54%	29%
Videoconferencing	Skype	11%	0%	12%	7%
	Zoom	5%	0%	14%	6%
	Google meet	8%	0%	24%	10%

The comparison of the results shown in Table 6 defends the marked gap between international channels and other channels compared to the tools used, in particular social networks and videoconferencing means.

We notice at the same time that the use of serious games in evaluation is almost absent by our population of teachers.

7. Benefit of the use of technology by teachers during assessment

In the 2 nd questionnaire, we questioned teachers (61% who have already had the opportunity to integrate ICT in their assessment practices) on the benefits of using new technologies in their assessment practices (Table 7), their feedback and their attitude regarding the use of ICT (Table 8), as well as the nuances encountered in the implementation of a digitalization of the evaluation process (Table 9).

Table 7. Benefit of the use of technology during assessment according to teachers integrating ICT

	General scientificstreams	literarybranch	International scientificfields	All sectors
Save time	100%	65%	100%	88%
Workforce management (group - pairs)	100%	75%	90%	88%
Facilitates corrections	100%	80%	100%	93%
Comparison and classification of levels	100%	80%	100%	93%
Performance monitoring and management	100%	100%	100%	100%
Identification of learners in difficulty	100%	80%	100%	93%

The entire population (100%) of our sample and which integrates technology into evaluation practices (i.e. 61% of all respondents) affirm that the use of technology during evaluation allows monitoring and monitoring the performance of learners, and the overwhelming majority of this sample underline the other advantages of the use of technology throughout the assessment process, in the different learning spaces (in and outside the classroom)), (during evaluation, when processing evaluation results, and for making appropriate decisions after evaluation).

8. Teachers' attitudes towards the use of technology in assessment

This question is asked in order to detect teachers' attitudes towards the use oftechnologyin learning assessment practices.

Table 8. Teachers' attitudes towards the use of technology during assessment

Answers	All sectors	General scientificstreams	literarybranch	International scientificfields
For	88%	100%	65%	100%
Versus	12%	0%	35%	0%

The results of Table 8 show that all (i.e. 100%) of teachers in science and the majority of teachers in literature (i.e. 100%) estimate the advantages of technology and support its integration during practice. Evaluation. By comparing these results with the results presented in tables: 2 and 7, we deduce that there is a great desire of the teachers for the integration of technology during the evaluation, but this frill is limited by a set of hindrances and limitations.

9. Limits of the digital assessment according to the teachers surveyed

We have grouped the limits proven by teachers into categories (according to our conceptual framework), the results are shown in Table 9.

Table 9. Limits of the digital assessment according to the teachers surveyed

Obstacles and limitations	Percentage
Human	6%
Material	16%
epistemological	4%
Techniques (technologicalskills)	32%
Spatiotemporal	22%
Didactic and organizational.	20%

We note that the technical obstacle relating to the technological incompetence of teachers is the most represented (32%) followed by spatiotemporal problems relating to learning and evaluation spaces (22%), then the didactic and organizational constraints relating to the way of teaching evaluation situations, to the school program, to the load of the content to be taught in relation to the time allocated, and to the setting of the evaluation times by the benchmarks (20%).

Our third questionnaire is reserved for feedback and learners' attitudes towards digital assessment. The resultsobtained are shown in Tables 10,11 and 12.

10. Attitudes of learners towards the use of technology in assessment

This question is asked in order to detect the attitudes of learners vis-à-vis the use of technology in learning assessment practices.

Table 10. Attitude of learners towards the use of technology in assessment

Answers	All branches	General scientificstreams	literarybranch	International scientificfields
For	100%	100%	100%	100%
Versus	0%	0%	0%	0%

The use of digital technology in evaluation is a practice estimated and preferred by the entire population of our research (100%).

11. Benefits of digital assessment according to learners

We asked learners about the benefits of using new technologies in assessment practices. The learners used different expressions, so we grouped the answers according to our conceptual framework in the form of criteria. The results obtained are shown in Table 11.

Table 11. Benefits of digital assessment according to the learners questioned

Criteria	Percentage
Motivation and perseverance	100%
Mutualaid and complementarity	81%
Availablity	100%
Physical and psychologicalcomfort	100%
Immediate feedback	100%
Self-compare and co-compare	81%
Regulation of learning and remediation of difficulties	100%

The answer to this question shows that the use of technologies during the assessment arouses the motivation of all the learners in our sample and thus contributes to the physical and psychological comfort of those assessed, so it is a means of ensuring self-assessment. , and self-healing for learning difficulties.

12. Limits of digital assessment according to learners

We have grouped the limits expressed by the learners into categories (according to our conceptual framework), the results obtained are mentioned in table 12.

Table 12. Limits of digital assessment according to learners

Obstacles and limitations	Percentage
Educational	21%
Material and economicproblems	44%
Evaluation planning issue	12%
Technicalproblems	12%
Social and communication issues	11%

The difficulties mainly raised by learners are difficulties that we will qualify of a material and economic nature (a rate of 44%), this is explained by the socioeconomic level of the majority of families, also adding the educational difficulties related to the communicational relationship in class in parallel with the use of digital technology.

Discussion

The analysis of the results obtained by our research enabled us to identify the following points:

Teachers of life and earth sciences express a great desire and a great interest in integrating new technologies into evaluation practices, these teachers affirm the potential of digital technology in the organization of evaluation activities, management learner performance, processing assessment results, and for making appropriate decisions. But this frill is limited by a set of constraints, above all of a technical nature relating to technological incompetence,

of a spatiotemporal order relating to the spaces of learning and evaluation or of a didactic order relating to the way of didacticizing situations of 'Evaluation.

Difficulties have been raised regarding the use of digital technology by learners, they are above all of a material nature, explained by the socioeconomic level of their family or of an educational nature linked to functional interactivity with the digital tool. Despite these difficulties, all learners affirm the potential of digital during the assessment to arouse their motivation and to participate in their especially psychological comfort, for them it is also a means to ensure the self-evaluation of learning, and l 'self-remedy for learning difficulties. This is in keeping with the foundations of active pedagogies which underlines the importance of the self-socio-construction of learning, and also aligns with the changes in the learning and evaluation paradigms that have become centered on a learner actor in the didactic-pedagogical process.

The potential of digital technology is especially exploited during assessment activities dedicated to learners in international scientific fields, teachers in these fields try to exploit the potential of digital technology, using different technological tools, this could be explained by the performance of learners. who choose these streams, and the attitude of teachers in these streams towards the use of digital technology, the technological competence of these teachers could also be an explanatory factor.

The use of digital technology during formative evaluations, or by distance or by self-evaluation for the different sectors remains modest, this could be explained by the lack of initial and continuous training on the change experienced by the paradigm of evaluation in recent years.

Digitization makes it possible to vary and diversify the means and times of assessment, offers choices to better exploit the results and performance of learners and allows the planning of remedial situations in an automatic way. However, the use of digital technology during the evaluation process requires a significant investment in time and effort and a basic technical and technological development.

Suggestions

Without a doubt, the use of digital assessment has shown its contribution to the didactic-pedagogical relationship and the development of learners' skills. However, the operationalization of this method of evaluation requires a three-dimensional and coordinated intervention.

- At the macrostructure level

The digitization of assessment requires a revision of the official texts governing the assessment of learning in Morocco, in parallel with the integration of technology into the assessment modules in training centers for future teachers.

- At the mesostructure level

The implementation of digital in the practices of evaluation necessitates the implementation of an interdisciplinary institution project promoting the development of digital resources and technological tools for evaluation, parallel to the programming of training sessions. specific to teachers and learners.

- At the microstructure level

The integration of digital technology at this level depends much more on organizational factors and the didactic capacity of teachers, in other words it is interesting to choose the moment, the tools and the conditions to use digital technology and translate all the practices into an educational project. feasible.

Conclusion

Technological development calls for the renovation of education systems so that they can improve the quality of teaching, learning and the assessment process. In this regard, ICTs are seen as a means to meet these challenges. Digital assessment undoubtedly offers teachers and learners the opportunity to make didactic and pedagogical choices and to break the classic teaching-learning routine, while promoting motivation to teach and learn. In other words, the use of innovative pedagogical assessment strategies could respond to the diversification of learning styles by proposing motivating content for learners and have a positive effect on their success and their school perseverance.

Our study focused on the different uses of ICT that actually exist in the evaluation practices of teachers of life and earth sciences and it was able to respond to a problem relating to the attitudes and feedbacks of teachers and learners. regarding the integration of ICT in evaluation practices. This problem has been broken down into several questions: "At what points, and how do teachers of Life and Earth Sciences integrate digital technology into their assessment practices?" is this integration determined by the educational pathways? What interest and what limit of the use of digital technology according to teachers and learners? "

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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