MEDI@ÇÕES
Revista OnLine

EDUCAÇÃO
ESCOLA SUPERIOR
POLITÉCNICO SETÚBAL

Use of a Massive Open Online Course (MOOC) in Teacher Training: Assessment of Learning Mediated by Digital Technologies in the Context of Environmental Education

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Resumo

O presente estudo tem como objetivo oferecer um produto educacional em formato de Curso Online Aberto e Massivo, popularmente conhecido como MOOC. O curso aborda os conceitos de avaliação da aprendizagem, seus métodos e o uso das tecnologias digitais, considerando a perspectiva formativa no contexto da Educação Ambiental. Em relação à metodologia, trata-se de um estudo de natureza qualitativa, seguindo uma abordagem exploratória descritiva. Para a realização do curso, utilizamos o modelo ADDIEM. Em relação aos resultados e à relevância do estudo, pode-se constatar que o curso contribuiu para desenvolver e aplicar propostas educacionais inovadoras. O estudo está vinculado ao Projeto Rio Doce Escolar.

Palavras-chave:

Avaliação da Aprendizagem, Tecnologias Digitais, Educação Ambiental, Formação de Professores, MOOC.

Abstract

The aim of this study is to offer an educational product in the form of a Massive Open Online Course, popularly known as a MOOC. The course addresses the concepts of learning assessment, its methods and the use of digital technologies, considering the formative perspective in the context of Environmental Education. In terms of methodology, this is a qualitative study, following a descriptive exploratory approach. We used the ADDIEM model to carry out the course. With regard to the results and relevance of the study, it can be seen that the course contributed to developing and applying innovative educational proposals. The study is linked to the Rio Doce School Project.

Key concepts:

Learning Assessment, Digital Technologies, Environmental Education, Teacher Training, MOOC.

Introduction

In the midst of the dialogical needs between what is traditional and what is contemporary, environmental education becomes an important mechanism for valuing the knowledge and skills of the actors involved in the educational action, expanding the possibilities for strengthening autonomy and empowerment. Through environmental education, dialogue is favored, valuing the historical context in the face of an exclusionary process in social, political and economic relations, as well as being affected by territorial interventions promoted by the implementation of industrial economic enterprises, environmental disasters, urban expansion and municipal policies.

From this perspective, evaluation, in its broadest sense, is an essentially human activity associated with the daily experience of all of us. Being part of our daily lives, it often determines our way of being or acting. Therefore, the more dialogical this process is, the more aware we become of it, thus constituting us as individual and social subjects. It is therefore important to understand why learning assessment is often used as a simple instrument to measure students' progress throughout the educational process.

Given this scenario, digital technologies can help with assessment processes, become drivers of learning, and promote interdisciplinary learning across the board. In addition, by using technologies consciously and responsibly, students can be encouraged to think critically, creatively and logically, both in the educational context and in everyday tasks.

Therefore, as an initial objective, the study offered training through a MOOC course, with content to help educators reflect on assessment in the teaching and learning process, specifically in the context of environmental education, as well as guidance and instrumentalization for the use of digital technologies.

The study is supported by the Rio Doce School Project (https://projetoriodoceescolar.ifes.edu.br/), which is a partnership between the Federal Institute of Espírito Santo (Ifes) and the Renova Foundation, which aims to provide postgraduate training for educators (teachers, managers and community representatives working in schools) working in public basic education schools in four municipalities (Baixo Guandu, Colatina, Marilândia and Linhares) located in the Rio Doce basin region, in the state of Espírito Santo, Brazil, integrating teaching, research and extension activities.

In order to support the necessary theoretical dialogue, in addition to

this introductory section, we have organized the study into 5 (five) other sections, namely: theoretical framework; methodological path; analysis and results; acknowledgements; and final considerations.

1. Theoretical Reference

We believe that the theoretical-methodological framework, as a pedagogical structure, should support the organization and execution of educational and evaluative processes, as well as seeking to respond to the proposed problem, developing with the subjects of the educational action, the necessary capacities both to understand the complexity of the evaluation relationship in the teaching and learning process, and to intervene in this relationship, in a reflective, structured and qualified way.

1.1 Environmental education: from traditional practice to emancipatory intentions

According to the National Curriculum Guidelines for Education (Brazil, 2012, p. 2), this is understood to be: "[...] a dimension of education", being "[...] an intentional activity of social practice, which must give individual development a social character in its relationship with nature and with other human beings". Therefore: "[...] all educational action must be directed towards building equality and promoting diversity so that we can satisfy our needs without oppression, discrimination and the reproduction of domination and mechanisms of expropriation" (Loureiro, 2015, p. 167).

From this perspective, the globalization process has homogenized the knowledge and know-how of small groups and specific communities. In this sense, environmental education plays an important role in the transmission and preservation of what is traditional, becoming a voice for communities and allowing them to express their desires and needs. Environmental education must be translated into the actuality of the subjects of the educational action involved as an enhancer of integration between subjects, as opposed to systems of instruction based on teaching as a mere transfer of content, valuing the concrete reality of each community in the subjects with their knowledge, actions, perspectives and modes of resistance. Therefore, the particularities of each community must be understood, allowing a relationship between the environment and society to be proposed from a local perspective, focusing on culture as a process of shaping social relations and traditional community activities, as well as political and economic scales.

It should therefore be considered that the knowledge and know-how that comes from individuals and the community becomes fundamental to the act of personal and collective emancipation, as well as to the construction of a collective identity and critical awareness of the world.

Environmental education should "[...] contribute to the formation of conscious citizens, able to decide and act in the socio-environmental reality in a way that is committed to life, to the well-being of each individual, and to society, both local and global" (Brasil, 1998, p. 67). In order to do this, the dialogues must start from the (re)thinking of the "environmental education" practiced in their daily context, making it necessary to understand the most appropriate ways of transmitting, mediating and enhancing the feeling of valuing culture, social autonomy and the defense of each community's territoriality, guaranteeing education through the meaning of curricular content.

From this context, Vygotsky's (2007) thinking is reinforced, when he says that man's relationship with the world is not direct, but mediated through instruments and signs, which occurs through personal or shared experience. Vygotsky (2007) argues that psychological functions such as language and memory are built up over the course of man's social history and his relationship with the world. It should be considered that education is the appropriation of culture and through education we become human and historical subjects.

Thus, considering theory and practice in the context of environmental education, Sauvé (1997) presents paradigmatic and typological conceptions influenced by systematic thinking, which can be observed in different pedagogical approaches, whether from a more conservative viewpoint or from a contemporary perspective. These conceptions "[...] can be considered from a synchronic perspective: they coexist and can be identified in different current discourses and practices" (Sauvé, 1997, p. 76).

Each conception of environmental education develops from a particular and specific compression, according to each representation, where "[...] knowing, acting and perceiving the environment ceases to be a theoretical-cognitive act and becomes a process that begins with generic and intuitive impressions and becomes complex and concrete in praxis" (Loureiro, 2006a, p. 130).

Corroborating the context presented, the National Environmental Education Policy (PNEA), under Law No. 9.795, in its Art. 4, brings some basic principles such as the humanistic, holistic, democratic and

participatory approach that environmental education should have; the pluralism of ideas and pedagogical conceptions from the perspective of inter, multi and transdisciplinary; the articulated approach to local, regional, national and global environmental issues; and the recognition and respect for plurality and individual and cultural diversity, among others.

Therefore, Environmental Education should be worked on with the actors involved, not just as receivers of information, but as subjects who think, act and reshape the information according to their practices, experiences and cultures and, therefore, based on the different meanings found. Therefore, thinking about building an emancipatory intentionality means thinking about promoting means and resources for exercising citizenship.

Through dialogue and together "[...] with feelings, with emotions, with desires, with fears, with doubts, with passion and also with critical reason" (Freire, 1997, p. 8), we will be able to problematize the reality and essence of each community as a practice of autonomy and empowerment, broadening critical awareness and enabling those involved to act and change realities. "[...] men liberate themselves in communion" (Freire, 2011, p. 97), making it possible for this awareness to be through "[...] an effort through which, by analyzing the practice we carry out, we perceive in critical terms the very conditioning to which we are subjected" (Freire, 1981, p. 69).

Another important perspective in the context of environmental education is to consider that learning can and should take place in different learning spaces. These spaces designate "[...] a process with various dimensions that enables [...] a reading of the world from the point of view of understanding what is going on around you" (Gohn, 2009, p. 31), being concrete places of "[...] formation with the learning of knowledge for life in collectives" (Gohn, 2009, p. 32). However, these learning spaces (formal and non-formal) need to be redefined, connected and part of people's daily lives.

In this sense, with the help of methodologies and technologies, environmental education must assume its social role in the formation of reflective and critical citizens and, above all, those who participate in tackling environmental problems, based on a broader and more dynamic understanding of the world, its challenges and potential, as well as fostering a sense of responsibility for the conservation and preservation of our natural resources. To do this, we need to reflect on "how

to teach", moving from an essentially traditional approach to a critical and emancipatory perspective.

1.2 Evaluation in the Educational Context

Historically, evaluating means attributing value and/or judgment to the object of study, to behaviors, situations and even to people and products. It is inherent in our daily lives, being present in various activities, of any order or aspect, in such a way that we judge, compare and consequently evaluate on a daily basis. According to Luckesi (2002), "[...] the term evaluate comes etymologically from two other Latin terms: prefix a and verb valere, which means 'to give price to', 'to give value to'; in short, to attribute 'quality to'" (2002, p. 86).

In the school context, the act of evaluating and the sense of attributing quality often becomes contradictory to what is expected of an educational process based on the development of skills and abilities that enable the construction of critical, reflective subjects with a social and collective role. In this sense, assessment has become an exclusionary, authoritarian and anti-democratic tradition, being a classification and selective mechanism centered on the educator and the education system and often not prioritizing those who learn.

Therefore, assessment instruments should be important data collection tools, which are essential for teacher planning and understanding the needs of each student. Still, according to Luckesi (2013), "[...] with the classificatory function, evaluation is a static instrument; [...] with the diagnostic function, on the other hand, it is a dialectical moment" (p. 77-78), in the development of students' actions, autonomy, skills and competencies.

However, we don't rule out the importance of grades in the teaching and learning process, but we must use them as a reference for checking studies and not as a way of judging which student has learned more or less. We must remember that every act of evaluation must be the means of a greater process, but never the end. We must not judge values, but recognize limitations and needs, valuing each student's pace and way of learning. Acting from this point of view implies qualifying assessment methods.

Learning assessment should be an important pedagogical tool, enabling teachers to define and propose improvements to the educational context, and students should be able to make progressive and qualitative progress during the teaching and learning process in which they are involved.

Therefore, "[...] evaluation is the act of diagnosing an experience, with a view to reorienting it to produce the best possible result; for this reason, it is neither classification nor selective; on the contrary, it is diagnostic and inclusive" (Luckesi, 2002, p. 84). Thus, based on theoretical assumptions and the understanding that assessment concepts should be diagnostic, continuous, formative and systematic, this section provides dialogues and reflections on the types of assessment and everyday practice.

In this sense, assessment in the educational context plays a fundamental role in the teaching and learning process and is a valuable tool for improving teaching and ensuring better student performance. However, it is essential that it be used in an authentic and meaningful way, taking into account learning objectives, student needs and best educational practices.

According to Hoffmann (2009a), the system based on grades and traditional tests is vague, reinforcing the idea of a school for the few, since this evaluation model only points out flaws in the learning process, with quantitative aspects prevailing over qualitative ones. Thus, "[...] in the concept of classification assessment, quality refers to pre-established standards on a comparative basis: promotion criteria (elitist, discriminatory), templates for answers to tasks, standards of ideal behavior" (Hoffmann, 2009a, p. 31).

When we understand the reality of each student, we come to understand that assessment is not about examining or measuring, but about monitoring the construction of learning. And even though each student is part of a collective construction, each subject has specificities and distinct characteristics. When we assess in this context, we allow the student to reflect on each question and thus stimulate their emancipation and, consequently, their autonomy.

This evaluation process is referred to by Hoffmann (2009a) as mediating evaluation, which is an introspective and reflective moment about each student's results. From this perspective, the teacher cannot limit himself to just transferring knowledge and correcting right or wrong answers; he must encourage dialogue, stimulate questioning and formulate challenges, favoring the discovery of better solutions to a given content or question. We must understand that assessment is a singular process. Each student is different and learns differently.

Therefore, there is a need for more detailed planning and monitoring

of students' performance at school, so that teachers can adapt their assessment methods. This requires a stance that enables them to pay more attention to students' behavior as well as getting to know them, i.e., not just assessing mistakes and successes, but also socio-emotional issues, which directly influence the teaching and learning process.

1.3 Digital technologies as mediation tools in learning assessment processes

When we use digital technologies, especially in the context of assessment, it is necessary for teachers to be key players and promote the movement of these tools from the margins of education to its center, presenting students with a clear path to improve educational efficiency. Modern society is undergoing increasingly impactful and rapid changes, be they social, political, economic or cultural. As such, education and technology cannot be dissociated.

Through digital technologies, it is possible to enhance learning in its various learning spaces, transforming the way education is offered. In this scenario, the teacher is the main actor in this context of social and educational transformation, where they will have to deal with the day-to-day running of classes, making their use intelligent and creative. In this way, teacher and student must be in tune so that these technologies can be used in an ethical and didactic way, provoking an exchange of knowledge and making it possible to expand the capacity for the search for knowledge.

It is necessary to provide students with new ways of learning, based on more dynamic and integrative learning, which leads to the expansion of the classroom and, consequently, encourages the engagement of all those involved in the teaching and learning process and, above all, minimizes the anguish and anxiety that can be generated, especially at times when evaluative activities are involved.

We need to recognize that digital technologies are part of students' lives and use them as a teaching resource, reducing the distance between school and everyday life. We must consider that "[...] there is an indisputable growing need" (Brasil, 1998, p. 96) for the use of digital technologies "[...] as an instrument of school learning" so that students can be updated "[...] and equipped for present and future social demands" (Brasil, 1998, p. 96). And consequently, to enhance the construction of knowledge through the exchange of experiences, learning and wider access to information.

It is important to understand that there is still a conflict of generations

between the actors involved in the educational context. Many teachers come from traditional backgrounds based on blackboards, chalk and books, and access to computers, the internet and cell phones came about gradually and with many restrictions. On the other hand, students were born adapted to the use of digital technologies.

In this sense, it is also necessary to equip and guide teachers in their teaching practice. Especially in relation to lesson planning, once the scenario and the subjects involved have been understood, it is necessary to define the best didactic and methodological proposals, as well as the best resources to be used. The challenge is to adapt the lessons and the respective planning to the needs of the current student profile. And like any other resource, the use of digital technologies, especially in the assessment process, must be planned and guided by the teacher. Technology should be an ally of education, and its use should promote the development of knowledge. Therefore, it is necessary to understand the importance of aligning the pedagogical proposal with everyday praxis, making planning flexible but with clear and defined objectives.

It is then up to the teacher to define the rules and agreements that establish the conscious use of these tools, in addition to the fact that in some situations it is necessary to overcome challenges such as problems with the internet connection or even the lack of this resource; the poor infrastructure of some schools; the lack of specialized training or support; and above all, the insecurity of proposing new teaching methods and resources.

However, it's important to remember that teachers need support when planning. The use of digital technologies in the educational context is still new to many schools. It is therefore necessary for the bodies responsible to be aligned with current teaching methods and to develop mechanisms that can help teachers. According to Moran et al. (2013, p. 12) "[...] schools need to relearn how to be effectively meaningful, innovative and entrepreneurial organizations".

However, for all this to make sense and be effective in daily practice, we need to reflect on the entire educational structure. Starting with classes, which must be translated into the student's reality as potentializes of interaction between subjects, as opposed to instructional systems based on teaching as a mere transfer of content. However, educators need to receive adequate training based on "[...] competencies and skills that need to be developed [...], so that they can draw up their lesson plans and carry out the pedagogical practices they expect"

(Unesco, 2018b, p. 18) in the face of a new context.

In addition, it is necessary for the educational processes that take place in the various learning spaces to be organized and based on valuing personal relationships and their relevance to everyday praxis. According to Vygotsky (2007, p. 104) "[...] each subject dealt with at school has its own specific relationship with the course of the student's development", considering that learning and development are interrelated.

It is therefore up to the educator to lead the student to develop the knowledge, skills and attitudes necessary to make them a protagonist in the learning process. And it is up to the student to engage in the search for knowledge, taking responsibility and creating autonomy. According to Moran (2007, p. 4), the educator "[...] does not impose", but "[...] accompanies, suggests, encourages, questions and learns together with the student", making learning more efficient and social rather than competitive and isolated.

Finally, we conclude that by using digital technologies as mediation tools, it is possible to make learning assessment processes more targeted, bringing agility to the management of students and the correction of activities, making it possible to obtain data in real time and being able to intervene promptly when necessary, as well as the possibility of drawing up the next plans more efficiently. For the student, it is possible to follow their development in a clearer and more organized way and to receive more assertive feedback, without the punitive weight of how a mistake is handled in traditional assessment processes.

2. Methodological Path

The research is qualitative in nature, where, according to Lüdke and André (2013), "[...] the focus of observation is basically determined by the specific purposes of the study, which in turn derive from a general theoretical framework drawn up by the researcher". The research also followed a descriptive exploratory approach, using participant observation as a data collection technique, where "[...] the researcher comes into contact with the community, group or reality being studied" (Marconi and Lakatos, 2011), the application of questionnaires, interviews, conversation circles, document analysis and reports.

In this sense, the research was carried out with educators working in the municipality of Linhares, located in the state of Espírito Santo - Brazil, who can be understood as teachers (of any subject, modality

or stage of education), managers and community agents. These educators are taking courses in "Specialization in Environmental Education" and "Improvement in Environmental Education Methodologies" as part of the Rio Doce School Project.

The research is guided by the provision of teacher training through a massive open online course, popularly known as a MOOC, which is an acronym for Massive Open Online Course. As it is a type of online education, it makes it possible to offer free courses to different segments and audiences. This format allows certain content to be presented in a more comprehensive and democratic way.

To carry out this stage, we used the ADDIEM model (Analysis, Design, Development, Implement, Evaluate and MOOC), as shown in "Fig. 1", which is a model based on the development of MOOC courses, which aims to create experiences in the context of instructional design, which "[...] is dedicated to planning, preparing, designing, producing texts, images, movements, simulations, activities and tasks anchored in virtual media" (Filatro and Piconez, 2004), with the aim of improving the quality of learning. “It is dedicated to planning, preparing, designing, producing and publishing texts, images, graphics, sounds and movements, simulations, activities and tasks anchored in virtual supports" (Filatro and Piconez, 2004), with the aim of improving learning processes, in which each phase and result supports the next steps in an integrated manner.

A	Analysis	Establish the objectives of the course, the justification, the methodology, the target audience, the language, the necessary resources, etc.		Course Project
D	Design	Planning the course - detailing the methodology, the content to be covered, the activities to be carried out and the learning assessment.		Activity Map
D	Development	Course construction - producing videos, texts and other course media, activities and assessments.		Media and Activities
I	Implement	Configuring and testing the course - setting up the virtual room on the MOOC platform with the materials and activities available; testing by the teacher.		Virtual Room Checklist
E	Evaluate	Evaluation by the experts; by a grammar checker and by the CGTE - before starting the course. Monitoring by the teacher - during the course. Evaluation by students - after the course.		Reviews
M		Massive Open Online Course		**MOOC**

Fig. 1. Adaptation of the ADDIEM Model (Battestin and Santos, 2022)

The research used participant observation, questionnaires and analysis of documents and reports as data collection techniques. Even though the research is qualitative, quantitative data is also important in the process of analyzing and discussing the results. In addition to the data collection instruments, we used the records of the forums and activities provided for in the organization of the MOOC, taking into account

elements that can give meaning to the researcher and the research subjects.

The data obtained ware treated using content analysis in light of Bardin (2011) assumptions in such a way as "[...] to be meaningful and valid". When we analyze faithful data, we can propose inferences and advance interpretations for the purposes of the planned objectives or those that relate to other unexpected discoveries.

In this sense, we sought to create a model of content analysis categories that would allow us to understand the evaluation processes carried out by educators, henceforth the subjects of the research, considering the pedagogical perspectives in the theoretical and practical spheres. Therefore, when creating the coding process, it was necessary to define the following items:

- Categories: are in line with the research theme, based on theoretical and practical conceptions of learning assessment, digital technology and environmental education.
- Subcategories: based on the research objectives, with a focus on the pedagogical intentions of evaluative acts, considering two analysis scenarios: the traditional approach and the emancipatory intent.
- Registration units: these were based on the subcategories, with their parameters coming from the theoretical framework underpinning the research.
- Counting rules: the presence or absence technique was used, based on the simple frequency of incidences. The incidence count will also be converted into percentage data.

TABLE I. CONTENT ANALYSIS CATEGORY: LEARNING ASSESSMENT

Subcategories	**Registration Units**
Approach to traditional making	Content-focused assessment model
	Standardized assessment model
	Quantitative assessment model
	Teacher-centered assessment model
	Verifiable assessment model
	Sentential assessment model
Approaching emancipatory intentionality	Learning-focused assessment
	Personalized assessment model
	Qualitative assessment model
	Assessment model that enhances student autonomy
	Mediating assessment model
	Reflective assessment model

As a result of the coding process and according to "Table I", the following structure was defined: a content analysis category: conceptions of learning assessment. The category was divided into two subcategories (or axes): approach to traditional practice and approach to emancipatory intent. Each subcategory had 6 (six) recording units as a parameter for analysis.

The structure of the category of analysis was drawn up according to perspectives that corroborate the integration of traditional practice allied to the insertion of new environments/knowledge through an emancipatory intentionality, considering evaluation processes, supported by the use of digital technologies and based on content referring to Environmental Education.

The study was approved by the Research Ethics Committee (CEP) under opinion number 5.980.615. In addition, all the teaching material, technical productions and pedagogical and bureaucratic procedures were validated by the "Innovation and Creativity in Education" Research Group (INOCRIE), linked to the Federal Institute of Espírito Santo.

3. Analysis and Results

The first results obtained come from the application of a MOOC for the "Specialization in Environmental Education" and "Improvement in Environmental Education Methodologies" courses, within the scope of the Rio Doce School Project. The MOOC, entitled "Assessment of Learning in the Context of Environmental Education" (https://mooc.cefor.ifes.edu.br/), provides content that aims to equip course participants in relation to ways of assessing, considering different perspectives, as well as promoting the use of digital technologies to support assessment processes based on content relating to Environmental Education.

In the virtual environment, the course is divided into three modules: I. Learning assessment; II. Use of digital technologies; and III. Assessment in the context of environmental education. In addition, the modules are organized into three sessions: to learn; to learn by doing; and to go beyond. The course has a total workload of 20 hours.

A priori, the participants were educators working in the municipality of Linhares, including teachers (of any subject, modality or stage of education), managers and community agents. Therefore, the questionnaire involved questions related to the daily lives of these educators, according to the themes available in the modules. We had a total of 92 (ninety-two) enrolments in the MOOC, but only 71 (seventy-one)

participants set out to carry out all or part of the proposed activities.

Among the main data, 62.1% of the participants had between 7 and 25 years of professional experience; 45.5% of the educators have a weekly workload of between 30 and 40 hours; 75.8% have a postgraduate degree; 42.4% of the educators work in primary schools; only 27.3% use some digital technology in their assessment processes; 77.3% have never had specific training in environmental education; 40.9% have never had specific training in digital technologies; and 42.4% point to their limited knowledge of technology as the main difficulty factor.

During the course of the MOOC, the participating educators had contact with various activities, from which we selected the discussion forum entitled "How do you assess your student?", available in the module on learning assessment, and the activity "Sharing experiences", in database format, as one of the practical activities in the module on assessment in the context of environmental education.

We therefore began the process of content analysis by looking at the records of the discussion forum, which posed the following question to the course participants: "as a process of reflection and sharing experiences, with a brief report, tell us how you assess your students". The use of this resource was intended to promote debate and broaden reflections on the subject of learning assessment, as a starting point for the other theoretical and practical content of the training.

In all, we had a total of 149 (one hundred and forty-nine) interactions, which were analyzed in light of Bardin (2011) assumptions, based on the content analysis category of conceptions about formative assessment models. The organization of the content analysis was described in the section dedicated to the methodological path. The data obtained shows a scenario that was predicted, considering the results of the tabulation and analysis of the diagnostic questionnaire. Of the interactions in the discussion forum, 77% represent an approximation to the traditional way of assessing students, compared to 26%, which show an approximation to emancipatory intentions.

In this sense, the results of the recording units provide a better understanding of each subcategory. In relation to the approach to traditional practice, we had the following results: 79% of the interactions indicated a preference for using an assessment model focused on content; 89% of the educators use standardized assessment models; 77% prioritize quantitative assessments; 64% design their assessments based

on the teacher's interests; 77% use evaluative models that are verifiable; and 77% have a preference for assessments that are sententious.

The recording units of the subcategory "approaching emancipatory intent" show the following results: 37% of educators say they use an assessment model that focuses on student learning; 13% indicate that they create personalized assessments; 37% prioritize qualitative assessments; 15% seek to enhance student autonomy in assessment moments; 21% seek to use assessment models that mediate the teaching and learning process; and 31% use assessment models that promote student reflection.

In relation to conceptions of formative assessment models, it is possible to see a predominance of attitudes that refer to a traditional process in relation to assessment practices. Most of the interactions highlighted the use of assessment models in which the teacher feels more in control of the results, such as standardized, quantitative assessments that allow students to be verified and classified.

Another important finding is in relation to the use of digital technologies. Of the 149 (one hundred and forty-nine) interactions in the discussion forum, there was only one mention of their use as a mediating resource in assessment processes. This information should be accompanied by a more in-depth reflection on the dissociation between discourse and practice in the educational context, considering that in the diagnostic questionnaire, 65.2% of educators considered the use of digital technologies to be an important contribution to assessment processes, and a considerable percentage indicated that they used several of these technologies when assessing their students.

Regarding the use of assessment models that demonstrated an approach to emancipatory intent, the interactions highlighted the educators' preference for qualitative activities, focusing on student learning and on mediation and reflection in the teaching and learning process, referring to an educational action "[...] based on the search for alternatives for student-school integration, so that, through challenging questions, students develop their autonomy in the various fields of their education, be it moral, affective, intellectual or social" (Lüdke and André, 2013).

It is important to recognize the efforts of educators who seek to (re)signify evaluation processes, often against the grain of curricular guidelines, bureaucratic procedures and the precarious infrastructure

offered by schools, making evaluation an "[...] instrument for recognizing the paths taken and identifying the paths to be pursued" (Muenchen and Delizoicov, 2014).

Therefore, we highlight the importance of the data presented in elucidating a reality that needs proposals and interventions that favor problematizing, transformative, critical and dialogical education, which is precisely the training model proposed in the MOOC "Assessment of Learning in the Context of Environmental Education", which seeks to guide and equip educators in the face of assessment processes and, above all, considering the different perspectives and scenarios involved and knowing that the ways of learning are unique and multidimensional.

The "Sharing experiences" activity was the time to put into practice what had been learned during the course. In this sense, we shared a lesson plan model based on the three pedagogical moments proposed by Muenchen and Delizoicov (2014), in which it was possible to create a lesson plan or adapt one that had already been made or seen elsewhere. We designed the activity to be a time for students to put into practice what they had learned during the course, making it possible to relate different contents and develop new teaching knowledge and skills.

By sending the lesson plan, the course participant had access to the other participants' posts and could comment and/or collaborate. In total, we had 63 (sixty-three) plans posted, which were also analyzed in light of Bardin (2011) assumptions and according to the category of analysis already mentioned. As this was the closing activity of the training, the results of the content analysis brought different results, but they were satisfactory in relation to the proposed objectives.

In the content analysis of the lesson plans, we had the following result: 79% of the lesson plans showed an approximation of the emancipatory intent in relation to the activities and resources proposed. The other 21% showed difficulties in articulating assessment moments and the use of digital technologies.

Especially in classes involving environmental education content, it is essential to have diagnostic assessment moments. The intrinsic knowledge of each student is important in constructing the meaning of the proposed content and in organizing the formative assessment process.

However, we have made progress in relation to the assessment models used: 62% have sought to use assessment models focused on student

learning, 62% have prioritized qualitative assessment moments, and more than 60% have also used mediating and reflective assessments, contributing directly to the formation of student autonomy in the face of possible difficulties and training that enhances critical and active thinking in the face of individual and collective responsibilities involving environmental issues.

The MOOC offered proved to be in line with the proposed objective, enabling students to: Understand learning assessment in terms of its different approaches, as a field for investigating and reconstructing teaching and student practices; Expand their mastery of assessment concepts and processes in accordance with the parameters established by the BNCC, especially in the context of environmental education; Develop skills for developing different assessment tools and practices through the use of digital technologies; and promote dialogues and reflections on learning assessment in the context of environmental education.

At the end of the analysis, it can be seen that the course fulfilled its purpose of building the knowledge and skills needed to develop and apply innovative educational proposals in the context of learning assessment, considering the pillars surrounding environmental education and making use of digital technologies.

Final Reflections

The aim of this study was to delve into the theories and practices that involve evaluation processes from a formative perspective, supported by the use of digital technologies and based on Environmental Education content, considering the integration of traditional practice combined with the insertion of new environments/knowledge through an emancipatory intentionality. The study is linked to the Rio Doce School Program, which is a partnership between the Federal Institute of Espírito Santo (Ifes), the Renova Foundation, the State Department of Education (Sedu), the Science and Technology Development Support Foundation (Facto) and the ES Technical Chamber for Education, Culture, Leisure, Sport and Tourism (CT-ECLET).

The analysis and results led to the conclusion that the MOOC offered proved to be in line with the proposed objective, enabling course participants to: understand learning assessment in terms of its different approaches, as a field for investigating and reconstructing teaching and student practices; broaden their mastery of assessment concepts and processes in accordance with the parameters established by the

National Common Curriculum Base (BNCC), especially with regard to the context of environmental education; develop skills for designing different assessment tools and practices through the use of digital technologies; and provide dialogues and reflections on learning assessment in the context of environmental education.

Therefore, it can be seen that the MOOC fulfilled its purpose of fostering the construction of knowledge and skills necessary for the development and application of innovative educational proposals in the context of learning assessment, considering the pillars that involve environmental education and making use of digital technologies.

In this sense, the damage collection instruments used during the study were fundamental for obtaining relevant and reliable information that was essential for understanding, evaluating and improving educational processes, supporting decision-making and advancing knowledge in the field of education.

In addition, we have also responded to the study's problem by considering that, through emancipatory intentionality, we can promote the application of assessment methods that, in addition to giving meaning to the content covered, allow us to qualitatively diagnose students' learning deficiencies in the educational process.

We therefore reiterate the importance of continuing this study, seeking to deepen the nuances surrounding school assessment and the use of digital technologies, especially in the context of environmental education, as well as the planning and monitoring of educational actions, the instruments to be used in assessment processes, the analysis of results, and the different conceptions of assessment in relation to its theoretical and practical manifestations.

Acknowledgment

This work was carried out with financial support from the Renova Foundation, under an agreement between Ifes, FACTO and the RENOVA Foundation - Ifes Process No. 23187.001719/2021-93.

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Curriculum Note

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