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THE PRESENCE AND ROLE OF ASSESSMENT IN UNIMORE MOOCS

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This contribution presents a reflection on the relationship between the use of assessment tools and the two-sided phenomenon of the completion rate and dropout rate in MOOCs. In support of this reflection, the experience of the MOOCs proposed by the University of Modena and Reggio Emilia (UNIMORE) within the EduOpen network is described. In particular, data relating to the quantity and quality of the assessment tools used in the MOOCs UNIMORE and data on the completion rates of the five pathways currently active in the training offer on EduOpen, specifically of an MOOC with a complex evaluation system and high completion rates, are reported.

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1 Introduction

UNIMORE's participation in the EduOpen network has prompted both the inter-athenaeum structure dedicated to e-learning (Centro Edunova) and the teachers individually involved in the process of didactic innovation (blended courses and MOOCs) to address problems of a different nature, which are often unprecedented.

The Edunova Centre, for example, had to face and manage the transition from the season in which it provided blended and online courses, reserved only for enrolled students, to a new season in which the learning offer was characterized by a) the MOOCs model, which was also open to non-enrolled students and therefore at least potentially extended to a much wider population of users, and b) the need to define common criteria, both from the technological point of view and from the methodological and didactic points of view to be shared with other universities in the network for the design, development, and delivery of MOOCs. All this has led in a short time to making choices, equipping oneself with resources, and implementing actions concerning two areas: on one hand, the structure of the Learning Management System and the production of video and live streaming, and on the other hand, the creation of a staff of designers and methodologists able to support the teachers in different disciplinary areas, engaged in the redesign of the teachings according to the guidelines prepared by the network. This process, carried out in forced stages, has also led UNIMORE to build a didactic offer that, even if it does not reach the massive dimensions typical of MOOCs, is still characterized by a remarkable openness, if only within the network that involves 17 Italian universities with a student population of over 400,000.

This process, which is still in full development, has led to some choices of priorities that have temporarily marginalized some important issues such as the management of learning analytics within the LMS of EduOpen.

2 A New Priority

Sometimes, some aspects of reality are given priority only after having experienced them, even if awareness of their existence and importance had existed for some time. Although the UNIMORE community was aware of the literature and experiences on learning analytics and on the positive role that these can play in assessment processes, the focus on these issues and the decision to devote resources for in-depth study—and, above all, to develop ad hoc tools—came only after the first three years of experimentation of MOOCs (2016–2018). This is how, in February 2019, the DELAC (Digital Education and Learning Analitycs Center) of UNIMORE was born, an example of pri-

orities acquired ex post, of which psychologists, jurists, pedagogists, statisticians, and linguists are parts. The relationship between learning analytics and assessment is one of the themes that DELAC intends to deepen in the different disciplinary areas involved in the didactic offer of EduOpen, and it is precisely on this theme that this contribution focuses. It collects in written form one of the speeches made by the members of DELAC at the "Conference on Learning Analytics: For a dialogue between teaching practices and educational research" jointly promoted by SIRD (Italian Society of Educational Research) and SIe-L (Italian Society of e-Learning) and held at the Sapienza University of Rome on 9–10 May 2019.

The questions from which the reflection proposed in this paper starts are the following:

- How can the data produced by the EduOpen LMS help to understand the role played by assessment methods and tools in MOOC courses and pathways?
- Does this role play a positive role in ensuring the quality of the courses and, above all, their completion by the students?

These are the numbers of MOOCs UNIMORE (May 2019):

Table 1
DATA ON UNIMORE MOOCS

Courses	67
Pathways	12
Students	14.000
Instructors and tutors	73

2.1 Assessment in MOOCs

The assessment of student learning in MOOCs is unanimously considered a topic of great interest that depends (among other things) on the credibility and future development of this model within formal learning contexts such as academic ones. The most relevant elements of this interest are two: a) the role of assessment in determining the pedagogical quality of a course and b) the difficulty of using traditional methods and tools of assessment in MOOCs, especially when considering the massive participation of students.

The first element, the presence of evaluation in all its functions (formative and summative), is fundamental in all training proposals, but it is even more so in those at a distance because, on one hand, it helps to activate that feedback toward the student that is so important in distance interactions, and on the other hand, the same feedback provides the teacher and the training organisation with

very important information on the progress and difficulties of the students and therefore on the possibility of actively supporting them. It should be remembered that many MOOCs, based essentially on the delivery of video lessons, are devoid of any assessment apparatus. Its presence, therefore, is a good indicator of the pedagogical quality of a course. If this assessment is also well done, then the quality of the whole MOOC will benefit even more.

The second element indicates a structural criticality of the assessment in MOOCs, at least as we know it today. The massive participation in MOOCs makes it extremely difficult if not impossible to proceed to a direct evaluation of learning. However, even the use of well-established online testing techniques based on Multiple Choice Questions (MCQs) can sometimes compromise the quality of MOOCs when the test items are not properly constructed and therefore compromise the reliability and validity of the test (Costello *et al.*, 2018). The growing interest in experimenting with new evaluation methods and tools specifically designed for MOOCs is therefore justified.

2.2 Assessment tools and dropout

The dropout rate of participants in distance learning courses has always been one of the most critical and investigated aspects of the research. Recently, alerts on dropout rates have increased due to the success of MOOCs mainly because of their massive participation and the significant increase in dropout rates.

In line with a more constructive view, some recent surveys have focused more on the dropout rate of MOOCs than on the completion rate and the perception of the students completing the courses. Coursera, one of the first and most important MOOC platforms, investigated the perceptions of students who completed MOOCs and found that 65% of them believe that MOOCs have contributed positively to their education, while 72% believe that they have brought benefits to their working careers (Zhenghao *et al.*, 2015). From this point of view (i.e., that of those who have completed MOOCs), these data seem to confirm the usefulness of MOOCs. However, it cannot be ignored that students who complete MOOCs are a small minority—for example, on edX (another important MOOCs platform)—who complete the course represents on average 5% of the total (Onah *et al.*, 2014; Kizilcec *et al.*, 2013; Seaton *et al.*, 2014). In this case, the dropout rate is about 95%. Another survey of MOOCs from the Chinese platform XuetangX found a similar dropout rate of 4.5% (Feng *et al.*, 2019). Although users sign up for an MOOC with the intention of following it in whole or in part, for a number of reasons, they leave it early before its completion (Halava *et al.*, 2014).

As a result, the central questions that have inspired most of the recent rese-

arch are about this huge population of dropouts.

- What are the factors that push MOOC users to drop out of courses?
- Is there a way to identify students at risk and prevent dropouts?

To identify the reasons for the disengagement and abandonment of participants in MOOCs, it is necessary to start from the awareness that the "monolithic" approach adopted by some analysts, who consider participants in MOOCs as a homogeneous body characterized by the same motivations and the same behaviours (like students in an academic course), does not help to find a realistic explanation of the phenomenon. In the reality of MOOCs, participants have individual differences that are sometimes very marked, so it is more useful to consider them as "unique" cases that interact with the platform in different ways (Kizilcec *et al.*, 2013) because their motivations and their ability to resist from the beginning to the end of the course are different. This heterogeneity of characteristics, including a very weak motivation, is also determined by the great ease with which you access and exit an MOOC. As a result, MOOC dropouts are also exceptionally heterogeneous, and their decision to abandon can be caused by any combination of the many factors that characterize their condition (Breslow *et al.*, 2013).

In recent years, many efforts have been devoted to the development of predictive models that are able to identify activities considered possible factors of disengagement and abandonment by students and to keep them constantly under control to identify early risk of abandonment.

Considering the factors that contribute to determine the completion of MOOCs, we can distinguish between: a) persistence, i.e., the set of abilities to manage the learning process and to complete the course; b) abandonment, i.e., the set of elements that lead to the decision to abandon the course. Naturally, the two aspects are linked together; the absence of the abilities indicated in the first point can lead to abandonment, just as the absence of the elements indicated in the second point can increase persistence.

Factors of persistence include the capacities of self-regulation (such as the ability to manage time), the mastery of independent study methods, and the ability to self-evaluate (Halawa *et al.*, 2014). Factors of abandonment include the real intention to conclude the course, the lack of time needed for study, the level of difficulty of the course and lack of support, the lack of digital skills and study skills, negative experiences during the course, unrealistic expectations, and delays in starting the study (Onah *et al.*, 2014).

Activities of an assessing nature such as MCQs, assessed tasks, and reports can be considered both within the first group (persistence) and within the second (abandonment). The ability to evaluate some aspects such as the difficulty of the course, as well as one's own study skills and the results achieved, can

increase persistence, as well as the lack of support (therefore also linked to the evaluative feedback) can lead to abandonment.

Based on this conviction, assessment has been assumed in this contribution as a significant indicator of both the pedagogical quality of MOOCs and the probability of course completion and, therefore, of student success.

2.3 Assessment in UNIMORE MOOCs

The assessment system of MOOCs UNIMORE is inspired by the guidelines developed by the EduOpen network, which in several places make an explicit reference to the methods and tools of assessment.

According to these guidelines, the macro-structure of an MOOC must have three levels: headers (all the information concerning the course), sections (set of activities, equivalent to a chapter in paper publishing), activities (real educational activities).

Sections

In describing the macro-structure of an MOOC, the Guidelines suggest that each Section should contain "at least one formative evaluation activity, usually at the end of the same."

Activities

In line with the ANVUR (Italian National Agency for the Evaluation of Universities and Research Institutes) guidelines, they are divided into erogative or transmissive activities and interactive activities or e-activities. It is precisely within the latter that some tools with an evaluative function are mentioned:

"discussion forum on the topics of the course;

- interactive sessions by videoconference;
- formative assessment activities (peer assessment, closed-answer questionnaires, assignments, reports, etc.);
- collaborative activities, possibly in small groups;
- exercises;
- project work."

Among these instruments, in addition to the third of an explicitly evaluative nature, the others can also be used in an evaluative function. Nevertheless, the focus here will be on "formative evaluation activities" such as peer assessments, closed-ended questionnaires, assignments, and reports.

The EduOpen Guidelines also contain an important indication from the evaluation point of view, that of human resources: "The University must pro-

vide for the creation of a working group that includes at least the following professionals:

"an expert in instructional design;

- expert in the management of the Mooc platform (EduOpen Manager);
- instructors and tutors;
- multimedia production experts (video and graphics)."

The first professionalism indicated in the list is that of the expert in "instructional design," a professionalism that includes significant skills in the field of evaluation.

Two other important references from the evaluation point of view contained in the Guidelines are those relating to macro and micro instructional design. Among the tasks of macro-design, the definition of "evaluation and verification strategies" and "certification strategies" is explicitly mentioned. Among those of microprojecting, there is an indication of the need for each Activity to define, among other things, the "tools of assessment and collaboration between students."

Finally, in the EduOpen Guidelines, there are attached operational sheets for macro and micro design, which provide more detailed information, including on assessment. In the 11-point macro-design sheet, the last two points concern the "Formative assessment tools" and the "Final assessment":

10. FORMATIVE ASSESSMENT TOOLS It is suggested to plan during the course the development of tests such as closed-ended questionnaires, projects, or reports. For these activities, forms of self-assessment or peer review and discussion in the forums are envisaged.
11. FINAL ASSESSMENT The final assessment can take place online or in the presence and provide for the issue of training credits. Indicate: - the typology of the test (open/closed questionnaire, project work, interview); - the way in which it is carried out (online or in presence); - the possible attribution of CFU/ECTS. In particular, remember that: - after passing an online test, a certificate of attendance or a verified certificate (no CFU/ECTS) can be issued; - after a test in presence, a certificate of completion of the course (with CFU/ECTS) will be issued by the university of reference.

The microproject card is divided into three parts, one of which is reserved for formative assessment:

FORMATIVE ASSESSMENT
Which assessment tool would you like to use? - Closed-ended questionnaire - Project work - Experience/simulation
What form of evaluation do you envisage? - Self-assessment - Peer assessment - Teacher Feedback
If the questionnaires are closed-ended, please indicate: - How many questions does the assessment test consist of? - How many response options are there? - What is the percentage of correct answers required to pass the test?
If it is project work: - provide a trace - provide an assessment rubric

The EduOpen Guidelines recognise an important role for assessment. Given the extreme heterogeneity of teaching methods implemented in academic contexts by individual teachers, it is essential that the implementation of MOOCs is oriented not only on the technological level but also on the pedagogical and didactical levels, of which the assessment is undoubtedly one of the main aspects.

EduOpen's MOOCs offer is developed in

- single courses;
- paths that consist of a sequence of courses that define a single set of learning objectives.

In this framework, the offer of UNIMORE MOOCs (active in May 2019) is composed of 19 courses and 5 pathways.

The 19 courses, which have an average duration of 19.3 hours, have an average of 3.3 assessment tools each, distributed as follows:

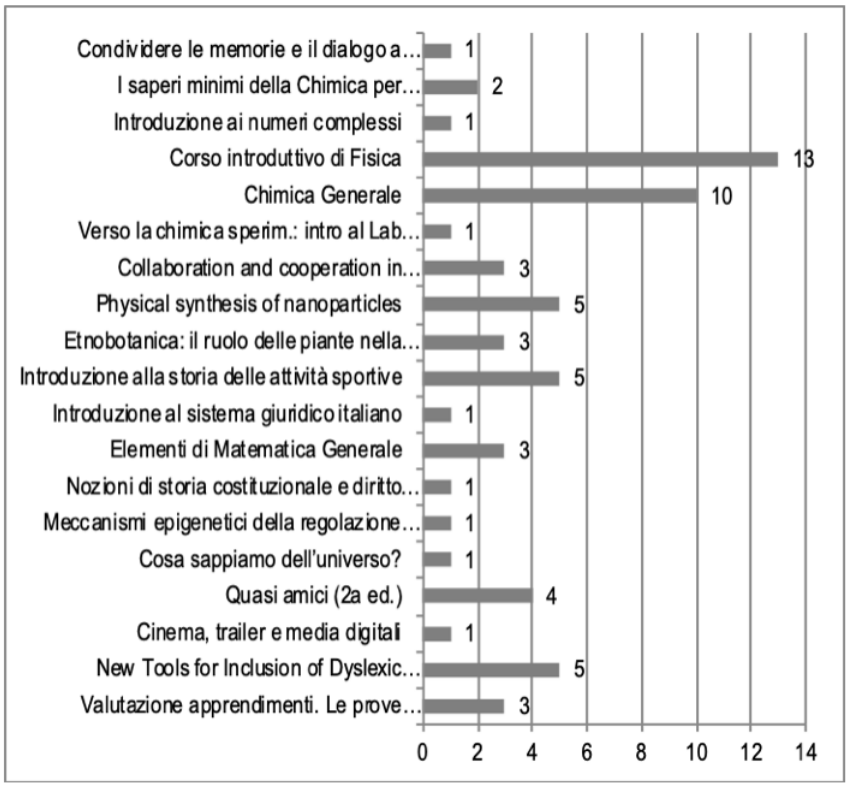

Fig. 1 - Assessment tools in the 19 MOOCs UNIMORE in courses mod

As for the different typologies of assessment tools, in the 19 courses there are: informative questionnaires administered with initial assessment function (5/19); informative questionnaires administered with final assessment function (1/19); MCQs administered with intermediate assessment function (4/19); and MCQs administered with final assessment function (17/19). In one case, the wiki tool with intermediate assessment function was used.

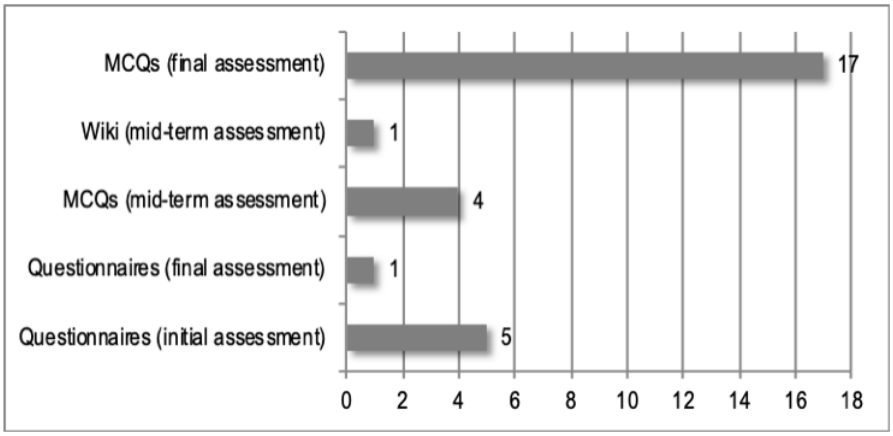

Fig. 2 - Typology of assessment tools in the 19 MOOCs UNIMORE in courses mode.

The 5 UNIMORE pathways have an average duration of 97 hours and use an average of 9 assessment tools each, distributed as follows:

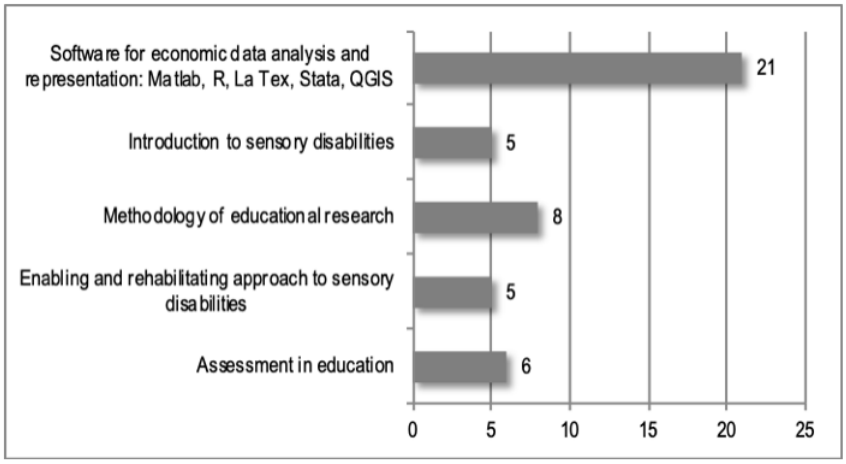

Fig. 3 - Assessment tools in the 5 MOOCs UNIMORE in pathways mode.

The types of assessment tools present in the 5 pathways are: information questionnaires administered with initial evaluation function (2/5); information questionnaires administered with final evaluation function (2/5); MCQs administered with intermediate and final assessment function (5/5); assignments for the final assessment (2/5).

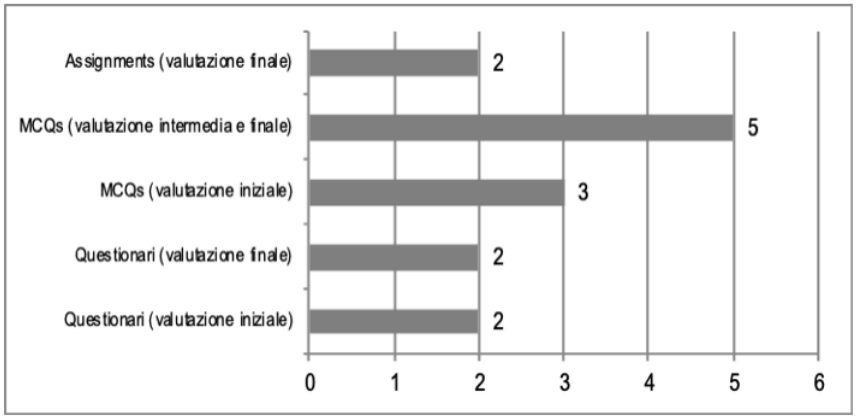

Fig. 4 - Typology of assessment tools in the 5 MOOCs UNIMORE in pathways mode.

As shown in Figure 4, assessment tools are present in all MOOC UNIMORE (at least one is present in all courses). They are mainly used at the end of the courses as final assessment tests; when courses are part of pathways, assessment tools can be considered intermediate tests of pathways (Figure 4). Finally, assessment tools are used, both in courses and in pathways, mostly in the form of MCQs or information and/or approval questionnaires (Figures 2 and 4).

The consideration on the completion rate of the 5 UNIMORE pathways is conditioned by the fact that the participants are almost all UNIMORE registered students. This explains the high completion rates (see Figure 5), certainly higher than the 5% mentioned above.

If, for the 5 UNIMORE pathways, we associate the values relating to the number of assessment tools with the percentages of completion of the path, we obtain the two curves shown in Figure 5:

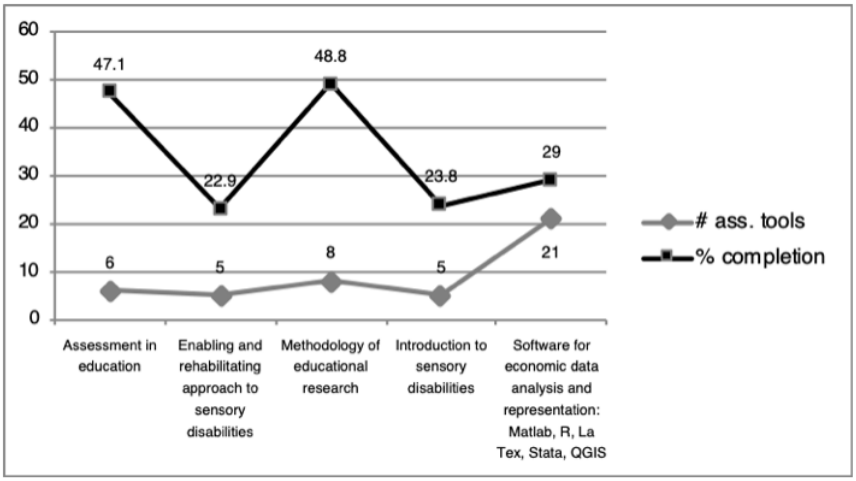

Fig. 5 - Quantity of assessment tools and completion rate in the 5 MOOCs UNIMORE in pathways mode.

The completion rate, which reaches up to 48%, never drops below 22%. The number of assessment tools for each pathway ranges from a minimum of 5 to a maximum of 21. The trend of the two curves is quite similar, as an increase in the number of assessment tools corresponds to an increase in the completion rate, even if not proportionally. The pathway that has the highest number of assessment tools is not the one with the highest completion rate. The two pathways with the lowest completion rates are still those with the fewest of assessment tools. This lack of proportionality can be explained by the fact that there are elements other than the assessment that affect the completion rate, and therefore the assessment tools only partially explain the change in completion rate. Among the determining factors other than the assessment tools, one is present in the two pathways with the highest rates (47.1% and 48.8%)—the mandatory nature of some educational requirements. In particular, the participants in the two pathways are UNIMORE students who must be in compliance with these requirements to take the final exam.

It is useful to see more detailed data regarding the pathway Methodology of Educational Research (MER). In 2018–2019, the cohort consisted of 516 students, and there were 577 registered participants. The excess is mainly made up of teachers in service who use the pathway as a form of updating. Among the eight assessment tools provided with the MER pathway, there are two questionnaires for the collection of personal information, expectations, and satisfaction; three self-assessments in the form of MCQs; and three reports assessed.

Table 2
DATA RELATED TO THE ASSESSMENT TOOLS OF THE PATHWAY METHODOLOGY OF THE EDUCATIONAL RESEARCH
* MANDATORY; ** MANDATORY AND ASSESSED; *** OPTIONAL AND ASSESSED

Assessment tools	Enrolled	Submitted	Completion rate
Initial Questionnaire*	577	439	76,0%
Final Questionnaire*	577	210	36,3%
Self-assessment (MCQs) 1*	577	383	66,3%
Self-assessment (MCQs) 2*	577	401	69,4%
Self-assessment (MCQs) 3*	577	322	55,8%
Assignment (Report) 1*	577	329	57,0%
Assignment (Report) 2*	577	316	54,7%
Assignment (Report) 3**	577	268	46,4%

It should be noted that the data in the table were collected in May 2019 before the end of the pathway. This explains the low completion rate of the final questionnaire (administered at the end of the pathway) and the third self-assessment. In addition, it is important to note that the deadlines for submission remain open for examination appeals after the first until September. Finally, the figure for the third assignment is conditioned by the fact that, unlike the other two, it was optional. All of them exceed (in some cases abundantly) 50% completion just before the end of the course.

Table 3 shows a small historical series. Some data are reported for the first of the three courses in which the pathway Methodology of Educational Research is divided, the Elements of Educational Research (EER) course, the most challenging in terms of duration and complexity of content, in the three-year period from 2016–2018.

Table 3
DATA RELATED TO THE COURSE ELEMENTS OF EDUCATIONAL RESEARCH (EER) FOR THE THREE-YEAR PERIOD 2016-2018.

EER	Completed learners	Total learners	% completion	% open badge
2016-17	270	657	41,1	7,4
2017-18	377	794	47,5	34,2
2018-19	370	698	53	51,8

Conclusion

Systematically acquiring data on the interactions between MOOC students and the LMS platform and carefully reflecting on them can be useful for the monitoring and management of the MOOC, during its development, for the identification after its conclusion of useful elements for its redesign, and for comparisons between different MOOCs at the Department and/or University level for the overall improvement of the training offer—for example, by increasing both the quantity and quality of the assessment tools present in the MOOCs.

In the case of UNIMORE, an analysis has begun aimed firstly at evaluating the experimental three-year period of the MOOCs and secondly at the elaboration of a model that, based on the experiences conducted at an international level and traceable in the literature, is able to identify early cases of students at risk of dropping out. This is just beginning, and there is still a long way to go.

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