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Alternative Assessment and Technology Enhanced Assessment practices: Research to inform Faculty Development processes

Beatrice Doria*, Federica Picasso**

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Abstract

Assessment practices in the Italian universities keep following a traditional approach, based on teaching methodologies connected to knowledge transmission and summative assessment of students' competences (Coggi, 2022), in contrast with the Bologna Process, which encourages the use of different assessment approaches capable of engaging students and providing them with lifelong learning opportunities which are useful for their professional future (European Commission et al., 2018).

Thus, there is a clear urgency to enhance academics' competences to introduce innovations both in teaching as well as in assessment practices (Grion et al., 2021). Starting from this assumption, the research aimed to investigate the assessment practices most frequently used by Italian university lecturers through the analysis of a representative sample of Syllabi. The results showed the prevalence of traditional assessment practices, rather than alternatives or enhanced by the use of technology. The concluding remarks aim to understand how to support the training of university lecturers in new, alternative and technology-enhanced assessment approaches and how to provide related implementation support.

Keywords: Alternative Assessment, Technology Enhanced Assessment, Faculty Development, Syllabus, Higher Education

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Author Contributions

This contribution represents the product of shared work. The actual drafting of the paragraphs took place according to the following assignments: Doria wrote paragraph 1.1; Picasso wrote paragraph 1.2; Doria and Picasso wrote paragraphs 3, 4 and 5.

Theoretical Framework

Alternative assessment in Higher Education

Assessment practices assume a central role within the university context, as they serve as a tool for lifelong learning: Some researchers (Boud & Soler, 2016) emphasise that, in order to become effective lifelong learners, students must be lifelong assessors, i.e. be prepared to address the assessment tasks they will currently face and encounter in their future lives. However, being able to assess in a relevant and balanced way is not a competence that arises spontaneously, but must be intentionally trained, by considering it an indispensable training goal of every discipline (Nicol, 2014).

The extensive literature in the field (Coggi, 2022; Grion & Serbati, 2019; Lipnevich et al., 2021; Nicol, 2021) recognises assessment as a strategic moment in teaching/learning, capable of improving the learning process of students (Boud & Falchikov, 2007; Doria et al., 2023). However, research notes that in order to implement an ‘effective’ assessment in relation to the learning contexts in which it is implemented, alternative practice (Dochy et al., 1999), capable of engaging and providing lifelong learning skills for students, must be used (Nicol, 2021; Panadero & Lipnevich, 2022), oriented by participatory assessment approaches (Carless, 2017; Sambell et al., 2013; Zhao & Qi, 2022).

According to the most well-known and recent international research approaches on assessment to supporting learning – Assessment for Learning and Sustainable Assessment (Grion & Serbati, 2019) –, assessment is closely integrated with learning and the circular process

teaching-learning-assessment must aim to offer and support students the opportunity to act consciously within the assessment processes (Sambell et al., 2013).

The assessment process, understood in these terms, would allow students to reflect on their own learning processes, stimulating moments of self-assessment (Jackel et al., 2017) and consequently fostering greater autonomy.

Bearing this in mind, a recent study conducted by Lipnevich and colleagues (2021) examined the assessment approaches and practices used in the US and Spanish university context through the analysis of Syllabi. In analysing Syllabi, the researchers referred to the theoretical framework proposed by Guskey (2019), who identified three categories of assessment approaches through which to assess student learning (Table 1).

Table 1.

The three categories of assessment approaches promoted by Guskey (2011; 2019)

Product	Approach category directed at measuring what students know how to do at a specific point in time. This approach is characterised by summative assessment, aimed at certifying students' final knowledge at the end of the course through examination.
Process	Approach category used to understand and assess the process by which a student arrives at the acquisition of skills and knowledge.
Progress	Approach category aimed at assessing the 'advantage' acquired by students through their learning experiences; Therefore it refers to 'added value', concretely measuring the students' actual index of improvement in relation to their initial situation.

The US survey sample included 250 Syllabi, written by university teachers from different academic disciplines. The Spanish survey sample included 175 Syllabi, selected from the national database and referring to the same academic disciplines. The results showed that US university lecturers use product- and process-oriented assessment criteria equally (50.94% process and 49.06% product), in contrast to Spanish lecturers, who use more product-oriented criteria: 70.02% of lecturers say they use product-oriented assessment

more than process-oriented (29.98%). Furthermore, the researchers also found that in both the Spanish and the US contexts, the most innovative assessment practices, such as self and peer assessment, are hardly used and that in none of the Syllabi is progress assessment stated to be activated.

The authors conclude that assessment remains a difficult and largely unaddressed issue (Lipnevich et al., 2021). In fact, according to an EU Report (Rauhvargers et al., 2009), most countries claim to still use summative assessment, neglecting the recommendation of the Bologna Process regarding moving beyond more traditional assessment methods (European Commission et al., 2018; Karran, 2005). One of the foundations of this transformation appears to be the shift towards increasing understanding of the importance of assessment in lifelong learning. Assuming this perspective, only a few countries have moved towards proposing more participatory forms of assessment in which learners can experience, and thus acquire skills with respect to the assessment approaches and practices.

Technology Enhanced Assessment

The JISC Report “Effective Assessment in a Digital Age. A guide to technology-enhanced assessment and feedback” (2010), emphasises that the relationship between technology, assessment and feedback should support the improvement of these practices by adding value to current practices, making assessment experience more authentic, also by enabling learners to effectively monitor their own learning, increasing the validity and efficiency of assessments, and improving the quality and timeliness of feedback (JISC, 2010, p. 17).

The report outlines the following focal points on how technology integration can influence assessment processes:

- Discussion and communication for improving feedback procedures and the explanation of learning objectives;
- Immediacy and flexibility through interactive online technologies (formative assessment learner-driven, rapid feedback for supporting deep learning and deepening);

- Authenticity (online simulations and technology for the efficient administration of assessments);
- Speed and ease of processing through assessment management systems (feedback for students, academics and educational experts supported by specific data);
- Self, peer assessment and self-regulated learning activities (promotion of critical thinking skills);
- Technology can support the assessment of complex and dynamic skills and processes involved in learning, adding personal quality to feedback, even in large group contexts (JISC, 2010).

Starting from this overview and taking into account the importance of the alignment, in terms of design, of the teaching, learning and assessment process (Sansone & Grion, 2022), the assessment processes enhanced by the use of technology – also understood as Technology Enhanced Assessment (TEA) (Devedzic & Devedzic, 2019) – especially after the pandemic, seem to acquire a renewed consistency. The pandemic can represent in this sense an “important opportunity for observation, analysis, rethinking, related to teaching/learning forms alternative to the traditional educational relations in presence” (Grion et al., 2021, p. 76).

What is Technology Enhanced Assessment (TEA)?

TEA is a broad term that encompasses different methods and approaches to assessment and feedback in which technology takes a strategic role, in supporting the organisation and implementation of assessment practices within learning environments. Through TEA approaches, academics can introduce assessment through innovative approaches and help learners apply higher-order knowledge (Devedzic & Devedzic, 2019) and the creation of new skills.

With respect to learning processes, TEA methods and tools support richer experiences, enhancing their effectiveness, as they support environments in which the learner becomes the central player in the act of assessment (Sambell et al., 2013).

Thanks to an exploration of the literature, different categories of analysis were identified under the TEA umbrella (Table 2).

Table 2.

TEA categories used for the analysis

Computer Based Assessment practices (CBA – Sim et al., 2004; Tonelli et al., 2018)	Techniques that include the use of computers in the assignment, verification and assessment processes of assignments or examinations.
Self- and peer-assessment and formative assessment activities through the use of Learning Management Systems (LMS – Burrows & Shortis, 2011; Yoo et al., 2015)	Learning Management Systems that implement components to support comprehensive solutions for education and training, submission of assignment management for self, peer and formative assessment.
Semi-automated assessment systems and tools (Shortis & Burrows, 2009)	Semi-automated systems of peer assessment, self-assessment and timely and detailed feedback to individual students to facilitate more efficient and effective assessment for large classes, both formative and summative.
E-activities (Picasso et al., 2023)	Online assessment and feedback activities proposed in online learning environments.

Price and Kirkwood (2014) point out that “the use of technology often replicates existing assessment practices rather than embracing transformative practices [...] However, there is little evidence that technology has improved student learning at tertiary level or, if so, to what extent” (Price & Kirkwood, 2014; Sweeney et al., 2017).

In relation to this, the literature underlines the growing interest in TEA practices in higher education. TEA is seen as a set of strategies that enables peer assessment, self-assessment and can support assessment challenges such as distance and flexible learning and large student enrolments (Oldfield et al., 2012; Whitelock & Watt, 2008), while also developing the ability to generate “constructive, timely and ‘easy to understand’ feedback” (Sweeney et al., 2017; Whitelock et al., 2011, p. 2).

To conclude, Oldfield and colleagues (2012) analyse the change brought about by the introduction of the use of digital technologies in assessment; The implementation of these new strategies and tools could, in fact, stimulate these elements:

- the implementation of multiple types of assessment to facilitate learner choice;
- the development of new strategies to introduce summative assessment;
- the achievement of important skills such as peer interaction and collaboration;
- the use of data analysis to inform assessment practices.

Methods

Research aims and questions

The research aims to analyse academics' New Assessment (Varisco, 2004) or Alternative Assessment (Dochy et al., 1999) and Technology Enhanced Assessment (TEA) practices (Devedzic & Devedzic, 2019) in the Italian context.

Using the framework proposed by Lipnevich and colleagues (2021) integrated with the TEA framework, the study aims to answer the following research questions:

1. What are the specific assessment methods Italian academics declare to adopt in their teaching?
2. Are TEA approaches included in Italian academics' assessment processes?

Sampling methodology

The research conceives the syllabus as the official document that reflects faculty's teaching practice, thus considering it as an essential tool for understanding the assessment and feedback approaches adopted by university teachers in the national context (Serbati et al., 2021; Serbati et al., 2022).

In order to answer the research questions, we thus decided to consider the Syllabus as the unit of analysis. However, since a national list of Syllabi was not available, to form the sample for analysis we chose to

refer to the list of Italian academics as proposed by MIUR (a.y. 2021-22) in collaboration with Cineca, of whom one Syllabus was to be taken into consideration. In particular, we decided to start from the MIUR list of the Italian academics, selecting randomly one syllabus per academic (connecting to their University website) because in the Italian reality there is no shared collection of syllabi at national level. The sample was selected by stratifying the entire population into subpopulations, such as scientific-disciplinary fields, to which the individual professor belonged. It was then selected a representative sample of 3,008 academics, related to Italian State and Non-State Universities (Centro Studi Investimenti Sociali [CENSIS], 2021-22), corresponding to 5% of the total population ($n = 60,158$ academics). This resulted in an articulated sample (Table 3).

Table 3.

Detailed description of the sample composition of the analysed syllabi

Scientific Disciplinary Area	Sample Size	% Sample
A1. Mathematics and Computer Science	168	5.58%
A2. Physical sciences	129	4.30%
A3. Chemical sciences	155	5.15%
A4. Earth sciences	56	1.86%
A5. Biological sciences	255	8.48%
A6. Medical sciences	471	15.65%
A7. Agricultural and veterinary sciences	163	5.43%
A8. Civil Engineering and Architecture	191	6.36%
A9. Industrial and information engineering	322	10.69%
A10. Ancient, Philological-Literary and Historical-Artistic Sciences	251	8.35%
A11. Historical, philosophical, pedagogical and psychological sciences	236	7.83%
A12. Legal sciences	246	8.17%
A13. Economic sciences and statistics	272	9.06%
A14. Political and social sciences	93	3.10%
Total	3,008	100.00%

The Syllabi, which were retrieved from the websites of each university, were first examined in order to ensure that all the elements characterizing the assessment methods had been included in, namely: a) expected learning outcomes; b) teaching practices; c) assessment methods.

From the number of Syllabi in the sample identified, 466 Syllabi were excluded because they were not present on the official University website and 322 Syllabi were excluded because of the absence of all the fundamental sections (one or more element of analysis elements were not included). This resulted in 2,220 analyzable Syllabi with a total of 508,075 words.

Analysis procedure

The chosen syllabi were investigated using a shared content analysis approach (Stemler, 2001); In fact, two independent judges guided the investigation throughout the ongoing discussion of meanings. In order to define similar actions and practices and apply the shared meanings consistently, the analytical process was initially established collectively. This first part was concluded with an individual analysis process which ended with the identification and calculation of the inter-rater reliability (Hallgren, 2012). To calculate the inter-rater agreement for the syllabi we applied the Intraclass correlation coefficient (ICC) method. For the related inter-rater reliability for the ratings, we first applied an ANOVA analysis Two-Factor Without Replication. The interpretation was conducted following the model of Koo & Li (2016)¹: The according rate between the two judges was greater than 0.9, that we can consider as an excellent reliability value.

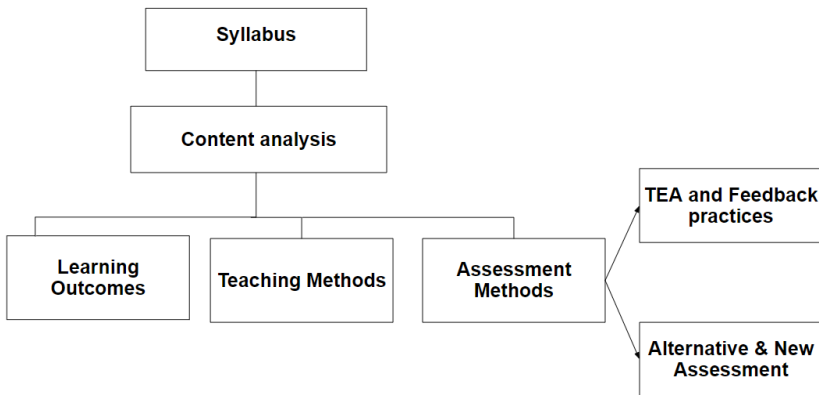
After this collaborative phase, the independent judges continued the analysis individually; At the end of the entire process, the judges

¹ Values less than 0.5 are indicative of poor reliability; Values between 0.5 and 0.75 indicate moderate reliability; Values between 0.75 and 0.9 indicate good reliability, and values greater than 0.9 indicate excellent reliability (Koo & Li, 2016; Portney & Watkins, 2000).

revised together the sample and the related results derived by the use of the shared codes and meanings.

Starting from the Italian Syllabus structure – that comprehends the sections dedicated to the learning outcomes of the course, the connected teaching methodologies and then the assessment methods – it was decided to focus on the assessment methods part, specifically identifying Alternative Assessment and Technology enhanced Assessment and Feedback practices (Figure 1).

Figure 1.
Syllabi analysis process



During the analysis, the whole syllabus document was analysed, in order to deeply explore the design, approaches, tools and practices declared.

Results

The sample of professors from which the Syllabi were randomly selected is mainly composed of associate professors (44.5%) and male professors (61.35%), who work in Northern Italy (52.66%) and in mega universities (37.03%), i.e. universities with more than 40,000 students (Table 4).

Table 4.
Sample description

Variables	Values	Fq	%
Role	Full Professor	578	26.04%
	Associate Professor	988	44.50%
	Permanent researcher	221	9.95%
	Temporary researcher	433	19.50%
Gender	F	858	38.65%
	M	1.362	61.35%
Geographical area	North	1.169	52.66%
	Center	463	20.86%
	South	575	25.90%
	Online	13	0.59%
University typology	Mega	822	37.03%
	Big	806	36.31%
	Medium	343	15.45%
	Little	76	3.56%
	Polytechnic Institute	155	6.98%
	Online	15	0.68%

Regarding the assessment approaches used by the academics, the data underline that all professors (n = 2,220) declare to use a product assessment, i.e. aimed at verifying student learning outcomes (100% of the teachers). Only one third of the university teachers (n = 731; 32.92%) state that they implement process assessment. The progress criteria is utilised in only one circumstance (n = 1; 0.04%).

The results show that the majority of lecturers use a traditional approach (n = 3,170; 72%), rather than Alternative Assessment prac-

tices (n = 1,126; 25.6%) and Technology Enhanced Assessment & Feedback (n = 144; 3.3%) (Table 5).

Table 5.

Alternative Assessment and Technology Enhanced Assessment & Feedback approaches noted during the syllabi analysis at national level (Doria et al., 2023; Picasso et al., 2023)

Total of the identified assessment practices: 4.400	Traditional Assessment practices	Alternative Assessment	Technology Enhanced Assessment & Feedback
Count	3,170	1,126	144
%	72%	25.6%	3.3%

Here below, we show the assessment practices in detail, connected to the specific approaches mentioned in Table 6.

The results highlight that the majority of assessment practices designed and implemented in the university context refer to traditional approaches, mainly final oral exam (37.5%) and/or final written exam (22.1%), in contrast to the scarce and limited use of alternative practices that place the student as an active player in the assessment process such as self-assessment and self-feedback (1%), and peer feedback (0.2%).

Regarding the use of TEA practices by Italian academics, the analysis revealed that only 3.3% of syllabi (n = 144) included them. In detail, 91 (2%) CBA (Sim et al., 2004; Tonelli et al., 2018) practices were cited; 42 (1%) self, peer and formative assessment practices implemented through the use of a LMS (Burrows & Shortis, 2011) were identified; 2 (0.05%) proposed activities through semi-automated evaluation systems and tools (Shortis & Burrows, 2009), and 9 (0.2%) E-activities connected to the use of online learning environments (Picasso et al., 2023) (Table 6).

Some examples of the most common identified alternative and TEA practices are reported below in Table 7.

Table 6.

Overview of the alternative or Technology Enhanced Assessment & Feedback practices collected during the syllabi analysis at national level (Doria et al., 2023; Picasso et al., 2023)

Assessment practices	Frequency	%
Traditional assessment		
Final oral exam	1,652	37.5%
Final written exam	971	22.1%
Partial exam	296	6.7%
Practical exam	251	5.7%
Alternative Assessment		
Individual activities (report, project, oral report)	391	8.9%
Group activities (report, project, oral report)	150	3.4%
Authentic assessment practices	254	5.8%
In class participation and frequency	115	2.6%
Self-assessment and self-feedback practices	44	1%
Peer assessment	6	0.1%
Peer Feedback	9	0.2%
Feedback	58	1.3%
Formative assessment practices	95	2.2%
Initial diagnostic assessment	4	0.1%
TEA		
Computer Based Assessment	91	2%
Learning Management System (LMS) – Formative, Self and Peer Assessment	42	1%
Semi-automated feedback and Marking tools	2	0.05%
E-tivity	9	0.2%
Total number of occurrences	4,400	100%

Table 7.

Alternative assessment and TEA practices more quoted in the Italian syllabi analysed

Practice	Citation
Alternative – Individual activities (report, project, oral report)	8:29 “Report on a scientific paper on rock fracturing and practical applications to fluid circulation or extraction of lithoid materials.”
Alternative – Authentic assessment practices	29:61 “The project will be self-contained and performed in groups, where the group members are called to develop a solution to a specific real-life problem using the material presented in the course, implement that solution (programming), evaluate it using synthetic and real datasets, compare it against other state-of-the-art solutions, and report the findings.”
TEA – Computer Based Assessment	1:534 “A quiz to be taken on the Moodle platform based on a mix of multiple-choice questions, exercises and graphical analysis”
TEA – Learning Management System (LMS) – Formative, Self and Peer Assessment	30:64 “The reports will be collected within a digital platform that, in addition to being a teaching tool for reviewing the work produced by individuals, will enable the sharing of content among students, thus offering the possibility of organising peer assessment paths”.

Discussions and conclusions

This research presents some limitations. First, the sample used in this research is the result of a process that entailed specific choices, which could in some way influence the results obtained. The sampling, in fact, was carried out according to a stratification by disciplinary areas, without considering other possible stratifications, such as those related to academic positions (full professors, associates, researchers etc.), the size of the universities or the gender of the lecturers.

Secondly, in the syllabus, university teachers might not explicitly declare the use of alternative approaches and technology but, in contrast, they could use these tools and strategies during their lessons. Despite these limitations, the research hopefully offers a contribution to the literature in this area, enriching the scientific evidence in this field from a national perspective.

Concerning the first research question, the qualitative analysis reveals the clear prevalence of traditional assessment practices – oral final examinations (74.4% occurrences out of the total) and/or written final examinations (43.74% occurrences out of the total) – oriented exclusively to the product (100%), rather than to the process (32.92%) and the progress (0.04%). This result confirms the findings of Panadero et al. (2019), who point out that academics still prefer ‘traditional’ approaches to assess. The results seem more similar to the Spanish situation investigated by Lipnevich and colleagues (2021), which at the same time differs from the American one (Lipnevich et al., 2021), in which process assessment is conducted by more than half of the lecturers.

As for the second research question, the findings of the syllabi analysis show a very limited (3.3%) usage of assessment and feedback practices that are supported by the use of technology, in contrast to the literature. It is evident that only a small percentage of academics TEA effectively, both for formative and summative practices. The most frequently reported practice refers to the use of Computer Based Assessment (2%): In this case, it appears that the digital medium is merely used to transpose summative traditional assessment practices into an online environment and, thanks to the content analysis of the syllabi, it is possible to notice that there is no real redesign process connected to the implementation of these practices.

Only 1% uses LMS for the implementation of formative, self and peer assessment activities: The literature points out that, in fact, visual panels and dashboards can play a powerful role as medium to involve students in their learning process, in order to share information about their progress and to address their attention on the pedagogical process (Yoo et al., 2015), but these tools seem really underused. Moreover, despite the literature emphasises the effectiveness and the greater

formative value of the automatic feedback provided by the technological system, with special attention paid to the topic of semi-automated feedback systems (Tang et al., 2012; Wang, 2014; Wilson et al., 2014), the analysis shows that semi-automated feedback and marking systems (Burrows & Shortis, 2011) are underused by the university teachers included in the sample (0.05%). In terms of E-tivities (Picasso et al., 2023) these practices seem to be declared and thus used only in online universities, i.e. in learning systems that work by default on online platforms in terms of design and implementation of specific training programs and related teaching, learning and assessment experiences.

In the light of these results, the urgency of a deep reflection from Italian academics emerges with respect to the possibility of “capturing” learning and competences through the assessment processes they propose. In fact, there is a need to change the Italian assessment culture linked to a certification approach to learning, by enhancing the formative vision of assessment, i.e. an Assessment for Learning (Sambell et al., 2013) that supports the real progress of students’ learning.

Therefore, there is a clear need for university teachers to develop specific pedagogical skills and digital capabilities, in order to be able to improve the use of assessment approaches and tools, which recent research considers the most effective and appropriate for the development of student learning and for effective and comprehensive assessment. In this sense, the work presented is part of a broader research, which will see the development of a toolkit, dedicated to the self-training of academics, to scaffold the design and the implementation of new and alternative assessment practices and an Academic Development model aimed at supporting the development of digital assessment competencies of Italian university teachers.

This exploratory study has strong educational implications since it aims to provide guidance and support to developing models and actions of faculty development, with a particular focus on new skills and practices also related to the use of technology, to support a gradual process of innovation of assessment in teaching practice. It appears also crucial to continue research related to these particular themes in order to disseminate good practices and to sustain a culture of innovation in education.

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