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Empower teachers for remote online assessments in higher education

Framework and taxonomy development of online assessment

Report on IO1

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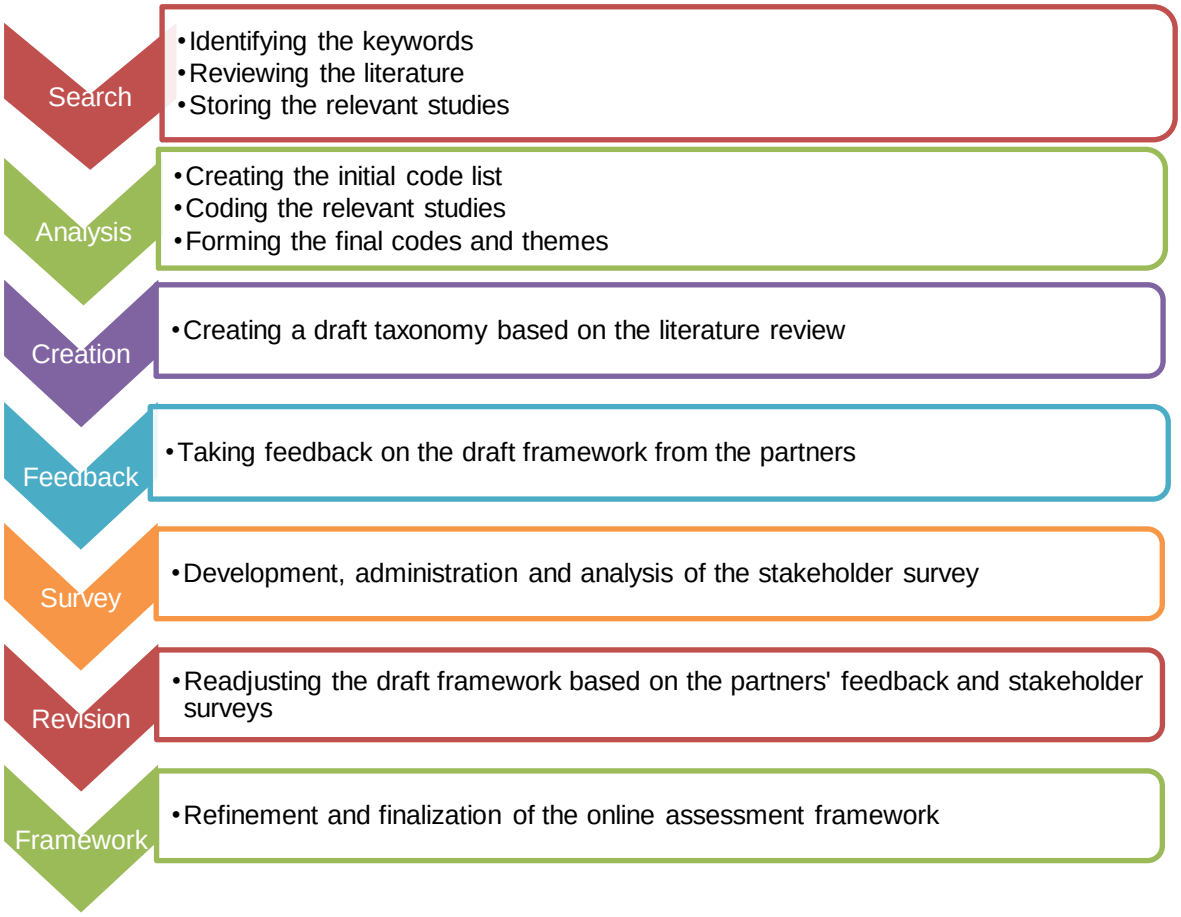
Report on framework and taxonomy development (Intellectual Output 1)

For the first intellectual output (IO1), the aim was to review the literature to identify the relevant concepts, theories, and different online assessment practices and approaches used in the context of higher education. This literature review was meant to inform the creation of the framework to be used as a guideline by higher education practitioners in online assessment. The framework development process for the IO1 entailed two main stages. In the first stage, relevant studies in the literature were searched, analyzed, and interpreted, which led to the initial version of the framework. In the second stage, feedback from stakeholders was solicited on the draft framework. The framework was refined based on their input, and its final version was created. Figure 1 depicts the whole process for the development of the framework. In this report, all these phases are explained in a detailed way.

Figure 1: *Stages of Framework Development*



Stage 1: Creation of the draft framework

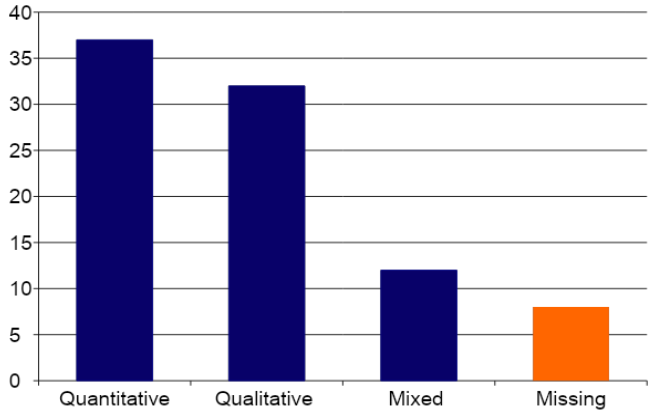
Search phase

In this phase, the first step was to determine the inclusion criteria for the published papers to be included in the literature. Specifically, the papers in English, published in peer-reviewed journals, and full-text accession were the first criteria determined. At this point, types of papers were not distinguished to enrich the content to be covered and avoid missing relevant papers. Subsequently, search terms were identified based on the initial scanning of the literature as assessment practices, online assessment, remote assessment, e-assessment, computer-based assessment, and higher

education. To better understand how the Covid-19 pandemic has impacted the online assessment practices of instructors and if there has been a change in the transition process, studies conducted before and during the pandemic were included in the review. To be more representative, each partner also searched the literature using the same keywords in their own languages. To ease the process for all contributors, a shared excel file was created, and each partner added the relevant studies identified to this file. After all relevant studies were identified, review papers and conceptual papers (*n* = 17) were eliminated, but they were used for further confirmation of the taxonomy.

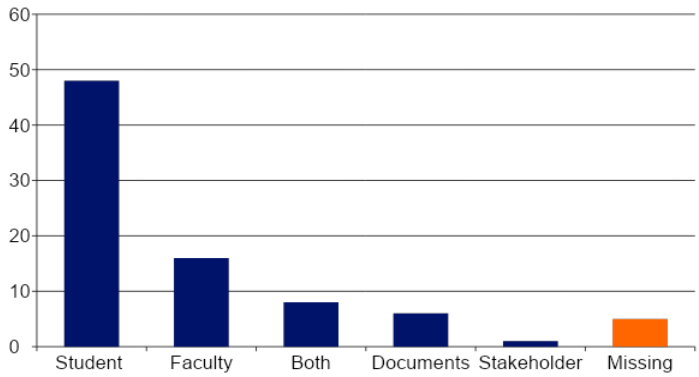
Overall, a total of 106 articles were identified, but the analysis included 89 empirical ones. Of those articles, 50 of them were found by the partners: Germany, Belgium, and Spain. When the characteristics of the selected studies were investigated, the distribution of the quantitative (*n* = 37) and qualitative (*n* = 32) were similar; however, the number of studies with the mixed-method design was very low (*n* = 12). There were also eight studies in the literature review that included no information about their methods. Table 1 presents the method distribution of the selected studies.

Table 1: *Methods Utilized by the Selected Studies*



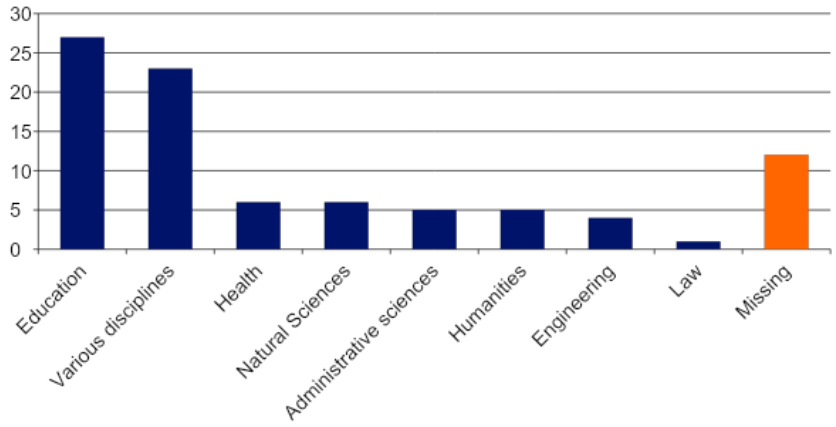
Moreover, the samples of the selected studies were explored, and the results indicated that the majority of the studies focused on the students as their samples (*n* = 48). In contrast, fewer studies were based on the data collected from instructors (*n* = 16). However, the number of studies that included both instructors and students, other stakeholders, or documents such as syllabi as their samples were very few. Table 2 shows the sample distribution of the selected studies.

Table 2: *Sample of the Selected Studies*



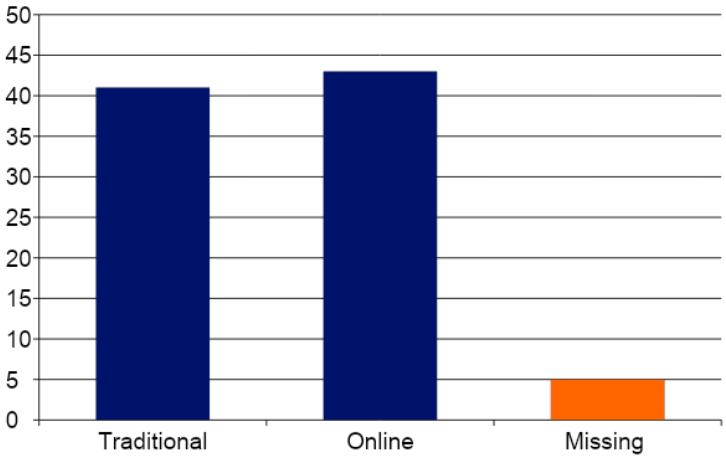
When the distribution of the disciplines was checked, the majority of the studies relied on participants from the field of education (*n* = 27), but a considerable number of studies also focused on participants coming from more than one discipline (*n* = 23). The rest of the studies reflected the experiences of the samples from diverse disciplines, including health and natural sciences. The discipline distribution of the reviewed studies is presented in Table 3.

Table 3: *The Distribution of the Disciplines in the Selected Studies*



Lastly, the selected studies were further analyzed regarding the type of assessment utilized. As could be observed in Table 4, the distribution of the traditional (*n* = 41) and online assessment (*n* = 43) in the sampled studies were almost the same, with a minor difference.

Table 4: *Type of Assessment*



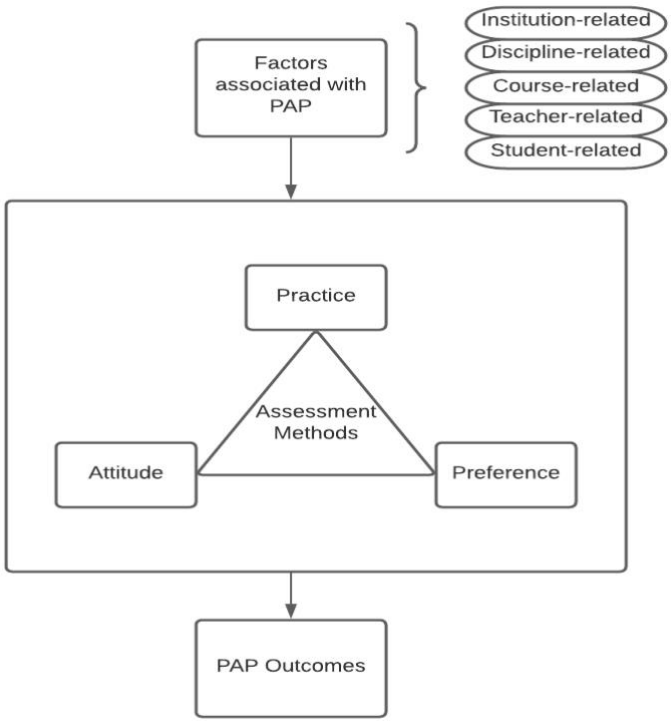
Analysis and creation phase

This phase presented the analysis of the 89 empirical studies. All selected studies were inductively analyzed by four researchers. The first step in the analysis phase was the creation of an initial code list through agreement. Based on the analysis of a small set of articles by all researchers independently, a list of codes was reached by consensus. Subsequently, researchers coded the whole articles selected as a pair and extended the initial code list. After they agreed on the final codes, several themes were created to be the dimensions of the initial framework.

The first and central theme created was the preferences, attitudes, and practices (PAP) of the key stakeholders concerning online assessment. The second one, which was directly linked to the PAP, was the factors that likely influence those perceptions, attitudes, and practices of the key

stakeholders. These factors were categorized as institution-related, discipline-related, course-related, teacher-related, and student-related factors. The last theme was the PAP outcomes despite the fact that very limited studies reviewed focused on this dimension. Based on these findings, the initial version of the framework was created (Figure 2).

Figure 2. *PAP framework*



Practices, preferences and attitudes

Assessment practices were at the heart of the framework due to the dominance of studies focusing on them. Results indicated that the assessment practices mostly employed by higher education practitioners were take-home exams, assignments, peer assessments, online peer assessments, self-assessments, team-assessment, portfolio assessments, oral examinations, e-exam, computer-based assessments, and reports. The reviewed studies did not show a major difference between the assessment methods used in traditional and online settings. In other words, the studies highlighted that the assessment practices employed in traditional settings were mostly transferred to the online environment, and the practices were dominated by summative assessment. As importantly, written exams were still the most common assessment method while alternative methods (e.g., portfolio, project, peer assessment) were rarely used, as revealed by the reviewed studies. Moreover, online assessment practices were generally realized in various digital tools and platforms; Moodle, Easy, Kahoot, to name a few.

As for the preferences of both faculty and students, the review results disclosed that exams with multiple-choice questions or take-home exams, assignments, and combinations of different assessment methods (e.g., quiz + exams) were mostly preferred assessment practices. On the other hand, oral exams, group work, short-written assignments, and e-exams were the least preferred ones by the same groups. Taken together, the results emphasized that traditional methods dominate the preferences of key stakeholders.

The attitudes towards assessment methods were the least explored topic in the sampled studies. Very few studies on the attitudes of stakeholders focused on their positive attitudes, whereas there was no study reporting negative ones. Results documented that target groups had positive attitudes towards self-assessment, peer assessment and online peer assessment, and e-exams. Surprisingly, compared to traditional assessment, there was no change in the satisfaction levels of students with online assessment. However, studies consistently emphasized that proper online exam conditions should be created to maintain the high satisfaction of students.

In sum, there seems to be a gap between the perceptions/preferences and real assessment practices of the instructors in higher education institutions. That is to say that individuals ideally prefer formative assessment, but because of certain challenges and concerns, they opt for summative approaches in their real practices. Thus, rather than preferences, the factors to be explained in the subsequent section play more determinative roles in their selection.

In addition to the practices, preferences, and attitudes, the studies also remarked on the benefits and limitations of the assessment methods. Concerning self-assessment, the reviewed studies showed that this method increased the autonomy and motivation of learners, enabled high-quality work and better grades, and was found effective in assessing performance. Similarly, portfolio assessment also advanced learning through empowerment and higher autonomy provided to students. Further, team assessment enhanced intercultural collaboration while ensuring the construction of new knowledge and a better understanding of the content. Also, learning from the mistakes of others was considered the advantage of peer assessment, while greater objectivity and transparency achieved through standardizing the evaluation process was the gain of the rubric. Finally, e-assessment was shown to enable greater partnership, student engagement, and assessment of different cognitive abilities while it could be administered to a large group of learners and ensure greater objectivity.

Despite the fact that the benefits of different assessment methods predominated the reviewed studies, some limitations of them were also mentioned. Specifically, lower peer interaction was highlighted for take-home exams, while lower accuracy in ratings of peers, greater bias, and difficulty in organizing feedback were indicated for peer assessment. At this point, it is noteworthy to indicate that these results reflected a limited number of studies selected and cannot be generalized to the whole literature of assessment.

Factors associated with PAP

The factors that have potentially influence on stakeholders' preferences, practices, and attitudes were grouped under five categories: institution-related, discipline-related, course-related, teacher-related, and student-related.

Firstly, the results revealed that the university type has a likely effect on the assessment practices, meaning that faculty at research universities tend to choose more summative assessment practices than their colleagues in teaching-oriented universities. This finding was associated with excessive publication pressure on academicians and the concern for generating funds, accompanied by lower time and emphasis on teaching. On the other hand, faculty working in teaching-oriented universities may devote more time and energy to teaching and formative assessment practices. In addition, institutional policy partly determined the type of assessment approach used. That is, some studies

pointed out that institutions pushed faculty to utilize summative assessment, including e-exams, while hardly supporting and incentivizing them to make use of contemporary and creative assessment approaches. Some other institutional factors, including human and physical resources, hardware, software, and space requirements, were mentioned in the literature as related factors. At this point, some studies underlined the importance of class size, which dictates the type of questions used in the assessment. More precisely, faculty intend to choose multiple-choice questions in larger classes in terms of student number. Finally, faculty workload is among the factors affecting assessment practices as faculty with heavy workload opt for more summative assessment methods than formative ones.

The second factor was faculty discipline, which may tell the type of assessment utilized in this field. The sampled studies indicated the fact that faculty from social sciences, including humanities, frequently benefit from open-ended questions and e-portfolio more while the ones from the health sciences and mathematics often choose closed-ended or multiple choice questions and electronic tests. All-inclusive, the nature of the discipline cannot be disregarded in assessment as it is one of the core factors affecting the preferred and used assessment practices.

The third factor was closely associated with concerns that should be addressed about the content and the implementation of assessment in the course. The results of the literature review suggested that pre-assessment, during the assessment, and post-assessment periods should be considered and designed carefully since students' assessment-related perceptions, attitudes, and practices could be influenced by misplanning. Some studies underscored the critical need for alignment of the course objectives, content, and materials with the scope of the assessment for take-home exams and e-exams. Additionally, the online platform selected for the assessment and the user-friendliness of its interface were other factors impacting the experiences and perceptions of students for the assessment. For instance, the use of Facebook for evaluation purposes was responded with positive reactions of students, as presented by one of the studies reviewed. Concerning the process of assessment, the degree of familiarity with the assessment method and the extent to which students are informed about the evaluation and scoring emerged as some other critical factors that the instructors should consider. In other words, the results of the review implied that reducing uncertainty about the evaluation process could be a way to lower the adverse reactions of students towards the assessment method and their experiences with it. To accomplish this, one of the studies reviewed underlined the importance of utilizing rubrics. Moreover, provision and quality of feedback were the other factors identified, particularly in relation to the post-evaluation period for take-home exams and online peer assessment. Despite the fact that only very few studies reviewed focused on feedback, its clarity and transparency were considered vital. In addition to all these course-related factors, the year of study of target groups mattered in selecting appropriate assessment methods. Although some studies pointed out the minor change in instructors' assessment practices between first and fourth-grade students, some remarked on the fact that interactive style assessment compared to standard-based assessment cultivated more benefit for students while standard-based assessment practices compelled freshmen more and provided less benefit.

Lastly, teacher and student-related factors also emerged as the constituents effective in assessment practices. As for teacher-related factors, gender, and teaching experience, and as for student-related factors, gender, learning approach, personality traits, previous experience, work status, and scores seemed to play influential roles in assessment approaches utilized by instructors. Considering gender, the results were inconsistent. For instance, some studies disclosed that students' gender has no relation to the assessment practices, yet, some indicated female students have less positive

attitudes toward peer assessment than males have. Also, consistent with the course-related factors, students having previous experience with online learning systems were documented to have more positive attitudes. Regarding student scores, two groups of findings were present. The first group focused on how students' attitudes, perceptions, and experiences differ with their performance, while the second group explored how achievement-enhancing assessment methods changed the attitudes and experiences for the better. However, of note is the fact that these were the least mentioned factors and seemed to have a minor role in influencing practices, attitudes, and preferences.

PAP Outcomes

Among the listed themes, PAP outcomes were the most negligible results. This dimension of the framework indicated the outcomes of the preferences and practices used and only focused on student-related outcomes. The results showed that the selected assessment practices have a potential impact on students' grades, self-efficacy, engagement level, how they feel, and the approach to be used for learning.

Caveats about online assessment

Even though they were not included in the PAP framework, several studies underlined a radical change in the context where assessment took place after the pandemic started. Thus, some issues of traditional assessment gained utmost importance. For instance, exam dishonesty and security, use of proctoring, use of alternative forms of assessment, time constraints, and infrastructural problems came to the fore and turned to pressing concerns and emerging needs for transparent, fair, and smooth online assessment during the pandemic.

Development of the stakeholder survey

After the development of the initial framework, the partners were asked to provide their opinions on its dimensions and further potential dimensions overlooked in the literature but considered critical in practice. The participants commented on explicitly integrating technology as the precondition for online assessment into the framework, as well as the macro level factors that might be influential in the online assessment practices. Also, as the subsequent step was to develop a questionnaire to collect key stakeholders' feedback and ideas for the betterment of the framework, partners' ideas about possible questions for the questionnaire were also solicited. The next section of the report elaborates on the second stage of framework development with a specific focus on stakeholder survey results.

Stage 2: Stakeholder surveys and creation of the final framework

Methodology

An online survey was administered to stakeholders to update the framework. The survey instrument included demographic and open-ended questions presented in four sections. The first section includes questions about participants' background characteristics (e.g., country, current position, department/unit, years of teaching experience) and their familiarity with online assessment. The second section aims to understand the participants' perceptions and experiences about their own and institutional online assessment practices. Seven open-ended questions were presented asking their opinions regarding (a) the use of written exams as a common assessment method during pre-pandemic and pandemic periods, (b) discrepancy between preferences and practices in terms of assessment approaches, (c) institutional support mechanisms, (d) informal support mechanisms, (e) facilitators of online assessment practices, (f) constraints of online assessment practices, and (g)

disciplinary differences. The third section demands the feedback of participants on the initial assessment framework developed based on the literature review. The final section seeks participants' input on online assessment issues encountered in international contexts.

Data were collected from 27 participants working in four higher education institutions in different countries (Belgium, Germany, Spain, Turkey). Characteristics of the participants are summarized in Table 5. The majority of the participants were faculty members, mainly in the field of social sciences. Most of them (22 out of 27) had teaching experience, ranging from 4 to 32 years, with a mean of 14.36. They rated themselves relatively familiar with the online assessment practices (*M* = 3.85 on a five-point scale).

Table 5: *Characteristics of Stakeholders Participated in the Survey*

Variable	*f*
Country	
Belgium	5
Germany	8
Spain	9
Turkey	5
Position	
Director	1
Professor	6
Associate Professor	6
Assistant Professor	1
Part-time faculty	2
Researcher	7
Educational developer	2
Digital learning expert	1
Department/Unit	
Decision Sciences, Engineering	3
Economics, Business, International Relations	2
Education	7
English	1
Medicine, Public Health	2
Psychology	3
Support unit	9

Findings

Findings are presented under nine questions.

*Question 1: Literature indicates that **written exams** are the most common assessment method used in higher education during pre-pandemic and pandemic periods. Based on your observations and experiences **in your institution**, to what extent do you agree with this conclusion? Explain your answer with your reasons and examples.*

The majority of the stakeholders agreed that exams were the dominant assessment method used in higher education institutions, particularly during the pre-pandemic period. They were more preferred in theoretical courses and used for summative purposes as institutions request proof of students'

performance. They were often also required because a trace of the examination was needed in case of appeal procedures, as reported by a stakeholder in *Belgium*. Some stakeholders mentioned using multiple-choice questions (e.g., in medical schools) as they are easy to implement and grade. However, some were concerned that multiple-choice questions assess only at the knowledge level. In addition to written exams, alternative assessment methods were also reported to be used (e.g., oral exams, portfolio or e-portfolio, task-based assessment, project, group tasks, assignments) but carry less weight than the exams for the final grade. The class size was also a factor considering the fact that grading projects, assignments, etc., take more time for large classes. During and after the pandemic, written exams continued to be used by transforming them into the digital environment. In some, it is even used more. For example, a stakeholder from *Germany* reported that digital exams increased by 87% at their institution during the pandemic. On the other hand, some stakeholders mentioned that high-stakes closed-book exams could not be performed as proctoring tools are not available at their institutions. Changes were also observed during the pandemic. For example, other formats such as open-book exams, exams without time pressure, or oral exams were used more frequently than before in *Germany*. More emphasis was placed on formative assessment, as reported by stakeholders in *Turkey*, *Spain*, and *Germany*.

Question 2: Studies in the literature revealed ***a discrepancy between the practices and preferences*** *of instructors in terms of assessment approaches. They reported that they prefer assessment approaches that aim to help students learn better and improve their work through feedback (formative assessment). However, in practice, they assess student achievement, knowledge, or skills at the end of an instructional unit in order to give grades (summative assessment). Thus, they mostly rely on graded exams. Based on your observations and experiences, to what extent do you agree with this conclusion? Explain your answer with your reasons and examples.*

Another question asked to stakeholders was their agreement regarding the argument that there is a discrepancy between the practices and preferences of instructors in terms of assessment approaches. In literature, it is argued that instructors prefer formative assessment while they mostly rely on summative assessment. More than half of the stakeholders agreed with this statement. Some stated that using assessment for both formative and summative purposes was essential as their aims differ. On the other hand, there is a long history of using summative assessment in higher education institutions. One stakeholder in *Belgium* stated, “they see the value of formative assessment, but we live in a summative society, with a habit or history of graded exams.” Stakeholders believed that it would take time to “make a shift in the realm of university assessments.” However, particularly with the influence of the pandemic showing its necessity, there is an increasing trend of using formative assessment. As one stakeholder in *Germany* put it, “but it is shifting… more and more exercises are introduced during the semester that counts towards the overall grade. This gives the students more motivation to learn during the semester and not just at the end.” Similarly, stakeholders in *Turkey* emphasized that students learn better when formative approaches are used, “focusing only on grades makes it worse for both sides [students and teachers].”

Despite its benefits, there was an agreement among all stakeholders from partner countries that using assessment for formative purposes requires a lot of time and effort, especially for instructors having a heavy workload and teaching large classes. A stakeholder from *Belgium* highlighted the importance of having support personnel if the formative assessment is utilized. On the contrary, it is reported to be less time-consuming to do a summative assessment. However, this is not the only reason that instructors use summative assessment. Stakeholders, mostly from *Germany* and

Belgium, stated that the institution and/or system require the use of summative assessment rather than formative assessment. For example, a stakeholder in *Belgium* wrote, "Yet again, bottom-line, teachers are forced to conduct summative evaluations." Another one from *Germany* wrote, "you usually do not have the option of choosing the form of assessment yourself; instead, you have to follow the module handbooks. And here, mostly summative formats are anchored." In addition, stakeholders in *Spain* reported that formative assessment results were not valued either by institutions or students. Resultantly, "formative assessments are only used for practice by dedicated teachers," as commented by a stakeholder in *Germany.*

*Question 3: What are the **institutional mechanisms** (e.g., policy, technical support, infrastructure) provided in your institution that facilitate/impair the online assessment process? Please explain your answer.*

Two central necessities for enacting smooth online assessment are available technological resources and support mechanisms. Technological infrastructure was well appreciated by the stakeholders in four countries. In addition, the technological tool mostly cited by the stakeholders in these countries was the virtual platform provided by the institution. Learning management systems (LMS) (such as Blackboard Toledo in *Belgium,* Sakai in *Spain*, and Moodle in *Turkey*) eased the online assessment process. A stakeholder in *Spain* said, "has all that is necessary to facilitate the online assessment process." They mostly use the examination platform embedded in the LMS. For instance, a stakeholder (ES) explained his experience: "I believe that our institution's "tests tool" works more or less well for the online format… it is possible to load a pool of questions and randomize them, in case we do the exam online." However, most complained that these systems lack an effective proctoring solution, "There is, however, no proctoring, so cheating is possible. The absence of proctoring makes online examination not trustable" (from a stakeholder in *Belgium*). One stakeholder in *Belgium* also reported, "There are facilities for the proctored examination in computer rooms (so online as well), but the rooms are small. So large groups cannot do computer-based exams on a single day."

As for the support mechanisms, most stakeholders (except ones in *Belgium*) stated that they have ICT units in their institutions dedicated to providing didactic and technical support to faculty, particularly for facilitating the online assessment process. Some units also offered consultation hours. Stakeholders in *Spain* explained that units provide assistance not only for online assessment practices but for online teaching in general, "When required, they help you in all the topics related to online teaching," "There is the unit that offers advice in virtual and face-to-face teaching and learning methodologies." More than half of the stakeholders mentioned that training was carried out in the institution as well, "there are regular workshops and seminars that give an overview of digital testing and point out possible pitfalls" (DE). Having support personnel was mentioned by only one stakeholder in *Germany.* Monetary support for students was also cited in *Germany.* Nevertheless, they also complained about the lack of funding for support services and digitization. On the other hand, in *Spain*, "new teaching and learning environments were designed and shared with the faculty in order to support the assessment process (e.g., new application to perform online exams, new free software for a wide range of teaching-learning areas, new videoconference tools, support to enhance the collaboration environments, etc.)." Finally, a few respondents (*Belgium, Germany, and Spain*) reported that exam regulations or digitalization strategies were provided in their institutions.

*Question 4: What are other **informal support mechanisms** in your institution for online assessment, if any (e.g., instructor collaboration, knowledge sharing networks)?*

Informal support mechanisms have considerable importance for facilitating the online assessment process. The majority of the stakeholders from all of the countries that participated in the survey reported that knowledge sharing among faculty members (within the same department or research team) was really essential in enhancing the knowledge about online assessment. These sharings were carried out through coordination meetings, seminars, chats, open panels, and/or email groups. In addition, some best practices were also shared through databases. For example, one stakeholder in *Belgium* said, "Some best practices were shared during the pandemic on how to "rescue" the evaluation of a course via online exams." Another stakeholder from *Germany* noted, "they support each other and build up question pools which they share and extend." Another mentioned the Higher Education Forum on Digitalization, "a publicly funded think tank that addresses higher education in the digital age." In addition, a stakeholder from *Spain* wrote, "a new instruction program was established by the institution in order to support the new online resources and online teaching methodologies to be performed during the pandemic." Finally, it is important to note that nearly half of the participants were not aware of the informal support mechanisms in their institutions.

*Question 5: Please list at least three **main facilitators** of the online assessment practices of the instructors. Explain your answer.*

When asked to list at least three factors facilitating online assessment, the participants indicated different sets of factors pertaining to policy, administrative and academic factors, which can be located at the organizational, unit, and individual levels. Developing a policy for online assessment is critical for ensuring organizational support, as a result, for deploying necessary resources for online assessment. One participant from *Belgium* stated the role of policy as "the attention given to the topic by the policy, allowing space, time and money to be invested." As a result, the policy can be perceived as a macro-level facilitator for online assessment. As part of the policy, developing the necessary regulations can be seen as another facilitator for online assessment practices because the regulations lay down the legal base of the online assessment.

Providing systematic organizational support was indicated as another facilitating factor for online assessment by the participants. One of the participants stated the importance of support with the following statements, "Didactic and technical support: Without support, many people find it difficult to start online testing because they lack experience" (DE). The statements of the participants suggested that organizational support takes several different forms: "encouragement to take the assessment in the vision of the program regarding blended and online education" (BE), "educational support for online assessment" (DE), "didactic and technical support" (DE), "training on how to conduct online exams" (DE), "support in the implementation of exams" (DE), and "teaching assistant support" (TR). The call of the participants for these support mechanisms indicated that they attribute the primary role in building the necessary infrastructures of online assessment to their universities. These support mechanisms could be seen as the basis of effective online assessment, and only after providing this support individual academics might initiate and accomplish the online assessment.

Third, the most frequently stated facilitative mechanism for online assessment emerged as the technical infrastructures of the institutions. Tools and mechanisms working online are indicated as the major facilitators for the participants in their online assessment practices. In different institutions, these tools were called by different names, such as virtual campus, or Learning Management Systems (LMS). These tools cover online tutorials, podcasts, specific online courses, or MOOCs. Although organizational support was very important for an effective online assessment, the universities' technical infrastructure played a critical role in facilitating online assessment.

Participants from all four countries underlined the importance of infrastructure in facilitating online assessment. One of the participants from *Spain* stated that "a wide range of different tools and resources that offer new, creative, and useful ways to perform assessment practices." The participants indicated these as safe, reliable, and efficient tools in online assessment. One participant commented on "better competence-oriented assessment due to extended technical possibilities (e.g., live programming)" (DE).

These tools, which form the technical infrastructures for online assessment, served several functions, according to participants. They allowed "the integration of multimedia resources in the tests" (ES) or "work with multiple apps" (TR), and facilitate recording. One of the participants stated, "furthermore, electronic assessment increases the possibilities of a written exam as one can add high-resolution photographs, video or audio snippets" (DE). A similar comment was advanced by a participant from *Turkey*, "learning management system integrates various ways of assessment, instructional videos/guides on how to use these alternatives, sharing networks" (TR). According to one participant, asking various types of questions enabled assessment of not only the knowledge but also other skills and competencies. One participant from *Spain* stated, "it is an opportunity to focus the assessment on the learning of competencies (and not so much on the learning of memoiristic concepts). For example, questions that interrelate concepts with clear evaluation rubrics, assumptions for reflection in particular cases applying one theory or another, 'open-book' exams where you have to apply what can be consulted without having to learn it." The technical infrastructure eased the job of the instructors in online assessment. According to one of the participants from *Germany*, technical infrastructures did not only contribute to the objectivity of assessment but also eased the job of the instructor, "instructors appreciate the advantages of electronic assessment like increased objectivity and automatic correction/marking." According to the participants from *Belgium*, the technical infrastructures facilitated realizing several advantages of online assessment, such as "...the developing of high-quality question databases", "the incorporating oral examination," and "enabling proctoring."

In addition to these support mechanisms, several different characteristics of the academics were indicated as facilitative factors in the online assessment. One participant stated the role of commitment of the academics to their job, professionalism, and affection towards teaching as a facilitative factor in online assessment: "having friendly and good relations with students: I believe that having good relations and feeling the students supported in all ways during online teaching have made them more mature regarding the assessment of their work. They have appreciated my efforts and in turn, with few exceptions, have not resorted to plagiarism to get high grades" (TR). One of the participants indicated the role of experience in an effective online assessment, "prior experience was indicated as another facilitator for online assessment: "I would say that those teachers who are more accustomed to using technology in their subjects, not just in terms of online assessment, tend to have a greater predisposition to take this kind of evaluative practices" (ES).

Question 6: Please list at least three ***constraints*** *encountered during the online assessment process. Explain your answer.*

Despite the presence of facilitators, the participants indicated several constraints for online assessment. These constraints are located at meso and micro (faculty, students) levels; they can be related to security concerns and/or technical infrastructure.

The first constraint was related to meso-level factors. According to the participants, limited resources were an important factor limiting the effectiveness of the online assessment. The participants stated that preparing online exams is a costly practice and the institutions may not have these resources. Another institutional limitation was related to the infrastructure for online assessment. Inadequate exam space was indicated as a constraint for online exams: “lack of on-campus infrastructure. There aren't (big) enough exam rooms that make it possible to assess large groups of students online” (BE).

Another set of constraints was related to academic honesty in online assessment. Reliability of the students and authentication were major concerns in online assessment among the participants. One of the participants stated: “The main issue can be related to academic dishonesty. Sometimes it is difficult to verify the identity of the students. Our institution uses special browsers to ensure that students do not visit other Internet sources during the exams. In addition, in some cases, students are required to turn on their cameras as well to verify their identity” (TR). Similarly, another participant from *Spain* indicated parallel concerns, “Control whether the activities intended to be individual, have actually been done individually; online, control whether the assignments/projects intended to be done in groups were actually done in groups, and not only by some of them.” The participants stated that advancing proctoring tools in response to reliability and honesty issues were also a problem as the proctoring options were also limited. In addition to academic honesty concerns, data protection and maintaining privacy were indicated as the other security issues in online assessment. Basically, measures against academic dishonesty may lead to violation of privacy; as one of the participants stated, “This is a solution; however, it may also lead to other issues such as the difficulty of maintaining the privacy of students. Students' IP addresses are also tracked” (TR).

Another set of constraints was related to the attitudes of academic staff members. One participant indicated that online assessment caused grade inflation; “Instructor being over-tolerant: I might have given higher grades than usual, especially at the beginning. I think I have shown too much sympathy with students and their hardships” (TR). Another participant stated that the academics might have “prejudices about online exams,” and they do not want to engage in online exams (DE). On the other hand, the participants suggested that online assessment is more appropriate for formative assessment purposes (TR). The difficulty of standardization across different faculty in online assessment was another problem. One participant stated that “on occasions, I have observed inconsistency between the way professors teach and the way they assess” (ES).

Communication and interaction with the students were suggested as the other issues in the online assessment. One participant stated that “no possibility to know your students. Less accessibility to the students, the communication is always mediated by computers, tablets, screens,... I also think it would be interesting that in the tool where students upload their assignments, it would be possible to interact dynamically to give feedback (as in the Google drive tools). As we have it in our platform, we have to download the documents sent by the students and upload it again to the platform, with the comments generated in Microsoft Word, for example” (ES). Despite the fact that interaction with the students was technically possible, it was not very effective in online assessment. For example, non-verbal communication and feedback could never be possible in online teaching.

Still another factor constraining the effectiveness of online assessment was related to the motivational status of the students. One of the participants stated, “disinterest of the students: absent/inattentive during online connections, not very active in the use and exploitation of resources, etc.” (ES). Students’ lack of motivation makes the job of the instructor even more difficult in online assessment.

The knowledge gap of online assessment on the part of both students and instructors could be stated as another constraint for effective online assessment. The participants from different countries advanced several statements, which depict the knowledge gap of the instructors and students. “Digital (il)literacy” (BE), and “limited technical knowledge” (DE), “know-how gap” (DE) were some of these statements. One participant stated, “People do not have the appropriate know-how and do not know the support structures of the university” (DE). These statements about the knowledge gap of the instructors on online assessment indicated a triadic constraint in online assessment, (1) knowledge and skill gap in on the use of technical infrastructure, (2) knowledge gap on measurement and evaluation in general, and (3) lack of awareness about the availability of the tools.

The final, the major, set of constraints was related to the technical limitations. These were related to (un)availability of the digital tools and resources for online assessment or ineffective use of these tools and resources. “Having the right tools” was one dimension of the problem (BE), while “the complexity of the tools” was another dimension of the problem (DE). One participant stated: “Testing with third-party applications [and] LMS-bound technically complex (lack of interfaces), digital drawing (graphics) in assessments technically complex and the (automated) evaluation during drawing not exact enough; collaborative assessment hard to handle digital” (DE). That the digital tools and infrastructures were not “user friendly” was a commonly stated constraint by the participants. Frequent system failure (DE), connection problems (BE), and problems in technical implementations (TR) were commonly stated concerns about the technical infrastructure, which made online assessment mechanisms quite “unreliable” (TR). One participant indicated the technical limitations with the following statement: “Students encountering technical problems during a quiz: I had to make quite a few exceptions. Some students could not upload their work on time and instead, have sent me an email with their work attached, which created a problem of consistency” (TR).

Finally, time was indicated as another constraint for effective online assessment for several different reasons. Online tests demanded time to develop (ES), to conduct the test (ES; BE), and to correct written (essay) exams (TR). However, it is important to note that these constraints are not specifically limited to the online assessment per se but can possibly be related to any assessment practice.

*Question 7: Have you observed any **disciplinary differences in assessment practices** in your institution? If yes, please explain these differences.*

When asked whether they observed disciplinary differences in online assessment, ten participants responded negatively. However, some of the participants stated that different disciplines lend themselves to certain types of exams and assessment approaches. Hard sciences were more associated with standardized exams, which commonly cover close-ended questions while social sciences were characterized by open-ended questions. One participant stated, “Yes, we social science departments have relied more on written exams, as usual, but I think in natural sciences and engineering, they have also used oral exams” (TR). It is important to state that this disciplinary difference in exam types might be evident before the Covid-19 pandemic. One participant stated, “in the Faculty of Education where I work, there are many different disciplinary differences that require different assessment practices. This was evident before the pandemic and, thus, during the

pandemic. For instance, Psychology subjects usually tend to assess the students by performing written exams; on the other hand, didactic subjects implement a wider range of assessment practices: oral expositions, practices, resolution of problems, etc." (ES). Another participant advanced a different perspective on disciplinary differences in online assessment, "The disciplines are completely different; at the Tech faculty, it is mainly factual knowledge and the reproduction of knowledge that is relevant, whereas at the other faculties, the focus is more on transfer knowledge" (DE)."

Question 8: Are there any other points that you want to ***comment on this framework****? (Are there any aspects that you would like to refine? Any aspects missing?)*

The participants were asked to give feedback on the developed online assessment framework. Ten of the participants stated that the framework, which was developed on the basis of the literature review, was complete in itself. However, several participants suggested additions or modifications to different parts of the framework. One participant suggested simplification: "From an ecological perspective, I think that this assessment framework could be more simplified, in three sides of a triangle: context, necessities, and competencies, putting on the center, not the assessment method, otherwise the student" (ES). Some other participants suggested adding an organizational, policy, and legal dimension to the model. For example, one of the participants stated, "I think that it is of particular importance that one's own scope for choosing the form of assessment is very limited. The choice is made in terms of the educational policy when the curricula and module handbooks are drawn up" (DE). Several other participants indicated that there is a need for a technology dimension. Finally, one participant stated the need for covering situational factors in the framework, "Maybe situation related can be added or a similar term because it is important in which condition we are applying the assessment. If it is a crisis like Covid we have to think about many other variables like tech issues, health issues, family issues etc." (TR).

Question 9: When you think of online ***assessment in an international context*** *(where a foreign student is studying remotely at your institution and therefore also needs to be evaluated remotely), which concern(s) should be considered in implementing online assessment? Please explain your answer.*

When asked about online assessment in an international context, the participants stated similar concerns as in their responses to the constraints of online assessment. This pattern of responses suggests that they do not perceive online assessment in an international context as quite different from online assessment in a national context. Indeed, four of the participants stated that there is no difference between online assessment in international and national contexts. One participant stated: "I guess everything we do to Turkish students would apply to foreign students. I have had students from Azerbaijan who followed my classes online from their country or Turkish students who were abroad due to their family's jobs. All students got equal treatment. Unless there is a particular situation of concern (political, health-related, etc.) in that country, the online assessment would be no different than what we do for non-foreign students" (TR). Another participant from *Germany* indicated the same perspective "Whether a student is examined from home in Germany or from another country makes no difference to me. Remote is remote. The number of kilometers makes no difference" (DE). Still another participant implied that online teaching facilitated virtual mobility "online environment makes it even easier for the students to take the exam from a remote distance. It also makes it easier for me to evaluate him/her" (TR).

As stated above, the participants indicated similar constraints for online assessment in both national and international contexts. Accessibility of the students emerged as a concern for online assessment in an international context as well. Being able to access the internet and connect to the teaching platforms was a major concern, as in the case of national-level online teaching. As one of the participants stated, “Accessibility to the virtual campus and its resources, structuring the subjects in a pedagogical and attractive way” (ES) is a concern for online teaching in an international context. Another common concern regarding online assessment in an international context was related to academic honesty. Concerns about honesty were one of the most frequently stated concerns in the responses of the participants. One participant from *Spain* stated “the risk for contract cheating: it should be considered how great the risk is and how the assessment can be adapted to minimize the risks (e.g., authentic assessment, individualized assignments…). Proctoring software can be a solution but is certainly not the only one” (ES). As a result, the participants urged taking measures to ensure data protection and security of the exams, and increase the reliability of online assessments. Tutoring (DE), data protection (DE), and security were stated as concerns for online assessment in an international context as well. Lack of interaction with students in an international context was another challenge, as in the case of online assessment in a national context. One participant from *Spain* stated “However, I personally believe it is just as important to have great cohesion with the classmates, to feel comfortable with the other students... That is very difficult to achieve online, I would say. If learning is online, measures to integrate the international students in the class dynamics should be taken into account (e.g., making sure they engage in other activities after class)”. Aligning the assessment method with the rest of the course was also a question raised with regard to online assessment. One participant from *Belgium* stated, “Is the assessment method aligned with the rest of the course?”.

Despite the strong tendency to perceive online assessment in international and national contexts similarly, the participants stated some special sensitivity towards international students. First equity has emerged as a unique concern in online assessment. The participants indicated their concerns for the fairness of online assessment in terms of both tools and procedures. Possessing the technical tools, technical infrastructures, and facilities in their home countries were perceived as essential for a fair online assessment. One of the participants from *Belgium* raised the following question “Does the student have the right facilities that meet exam standards (e.g., good internet connection. If you are just reading/watching online in a course, it is not so terrible if the connection is lost, but in an exam it is)?”. Another participant from *Turkey* indicated the same concern for the availability of technical tools for international students. In other words, as stated in the general constraining factors for online assessment above, the online assessment tools and capabilities of these tools played an important role in assessment in an international context. One participant from *Turkey* highlighted the importance of checking the availability and compatibility of the tools available to international students.” In addition to equity concerns in having access to technological resources, cultural differences was indicated as another concern. One of the participants stated “Similarly to the non-international students, the online assessment raises concerns about the reliability and fairness of the online assessment and about if we have really evaluated what the student has learned. Sometimes, differences in the culture, as well as the institution programs, also provide some obstacles to the online assessment process” (ES). Another participant from *Spain* indicated the role of cultural difference in an effective online assessment, “I would say that the cultural issue is important, in many countries evaluation is not equally understood as a matter of each country’s own tradition.” Although it is not an easy task to resolve the issue of cultural differences in online assessment, two of the participants suggested “multilingualism” as a remedy for removing the impact of cultural differences in online assessment.

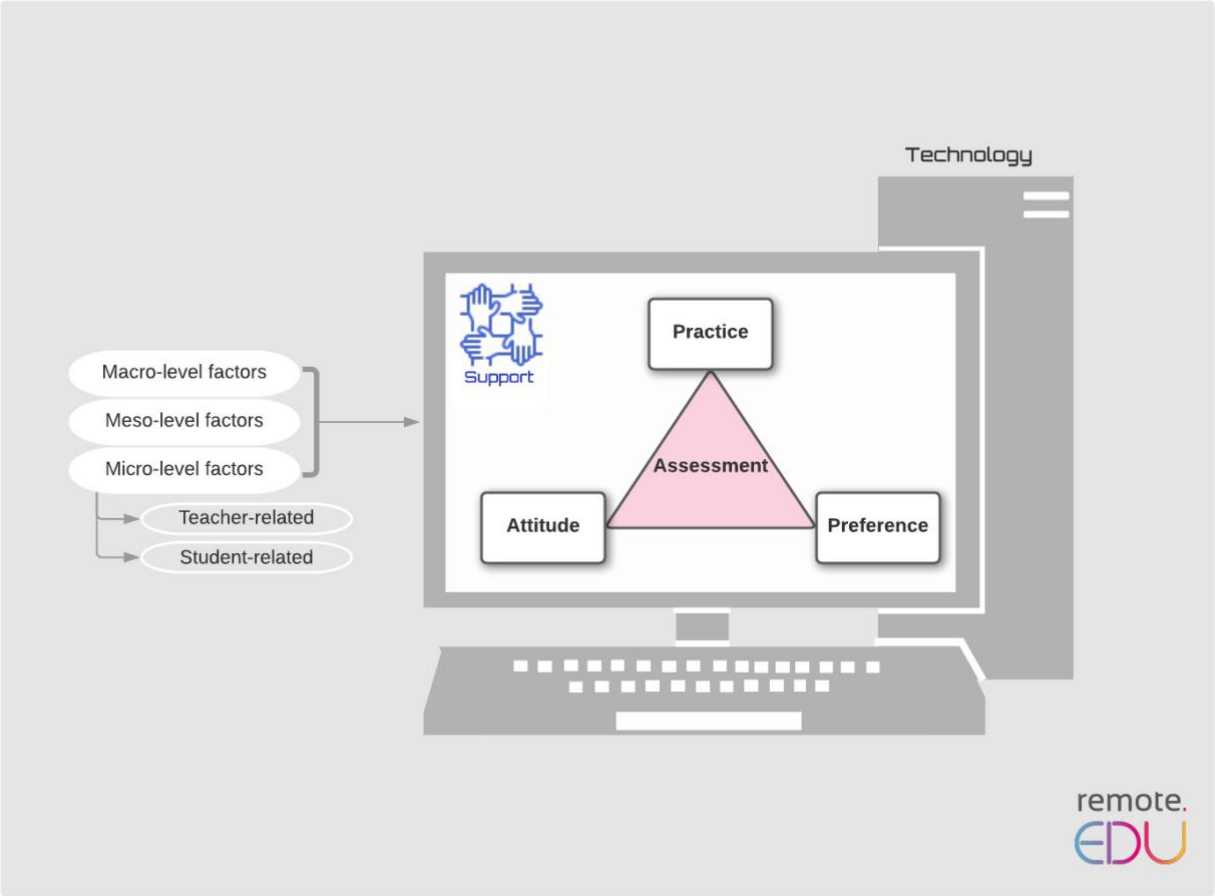
The fourth special concern in relation to online assessment in an international context was related to time zone differences. Particularly, in synchronous exams, time zone differences were a challenge for international students and faculty. One of the participants stated this challenge with the following words, “Time needed to handle online exams versus Class size: I teach classes up to 500 students. With 5 students abroad, I risk spending as much time with these 5 students than with the 495 others (Pareto-rule)” (BE).

The statements of the participants indicated the importance of taking necessary precautions against the special challenges faced by international students in online assessment. Delivering training and guidance to international students about the tools and the process of online assessment was indicated as a measure to deal with these challenges. One of the participants from *Turkey* stated, “Sometimes, off-campus remote access requires additional programs to be installed prior to the exam. I think international students need to be informed about such necessities and if possible, they can take a short mock exam or some type of orientation via an introductory tutorial video or informative step-by-step guideline document.” The second measure for a more effective online assessment was related to the well-being of the students. The participants suggested that the students need to be supported for their psychosocial well-being. These can be accomplished with specific technological tools enabling “videoconferencing” (ES). Another participant from *Belgium* indicated a similar recommendation, “The well-being of students and how to make sure they experience enough support, receive transparent communication, and feel enough connection.” Giving feedback to the students was another way to deal with special challenges associated with teaching in an international context. One participant from *Spain* stated the need to develop a friendly approach for the assessment of the students, “The means to be used in the evaluation must be "friendly". That is, easy to use and technically good. At the evaluation level, it must allow an objective evaluation of both the competencies and the theoretical knowledge and must guarantee the authenticity of the authorship of the evaluations carried out by the students.” Another way that was recommended for facilitating online assessment in an international context was to assess the skills and attitudes, not only the knowledge. One of the participants stated, “Prepare evaluation systems that allow assessing not only knowledge but also skills and attitudes (perhaps a face-to-face session is needed)” (ES). Some of the participants indicated the need for a new didactic for online assessment in an international context. One participant from *Germany* stated, “online exams require new didactic assessment concepts; Ensure support for examinees during the examination, provide access to the technical infrastructure (exam platform) in advance for testing/exercising; a fail-safe, the technical infrastructure is necessary.” According to the participants, learning method differences was a challenge that must be addressed in online assessment, “First of all I consider it is very important to take into account the fact that learning methodologies are similar to the way the assessment is. For example, sometimes a professor uses the flipped classroom methodology, but a multiple-choice test at the end of the semester” (ES).

Final Framework for Online Assessment

The initial framework for online assessment has been refined and finalized based on the partners’ feedback and the stakeholder survey results acquired. The ultimate framework is depicted in Figure 3.

Figure 3: *Final Framework for Online Assessment*



Similar to the initial framework, in the final framework, online assessment-related practices, attitudes, and preferences lie at the center, too, but there are some necessities to be addressed for smooth online assessment. Different from the first framework, these necessities were added to the final framework based on the feedback taken from the partners and stakeholders in each partner institution, as presented in the previous section. These necessities cover technological infrastructure and resources as well as the presence of formal and informal support mechanisms. If addressed properly, the online assessment process can be eased for both instructors and students, while the constraints limiting instructors in selecting diverse assessment methods could be removed. This issue gains particular importance for assessment in the international context, meaning that instructors make sure that international students have access to the technological devices and resources needed for online assessment and should be aware of the resources and support mechanisms provided by the institutions.

Regarding the factors influencing online assessment-related practices, attitudes, and preferences, a new classification was made, which was based on the blend of the literature review results and the input from all stakeholders and partners. The initial framework included institution, discipline, course, teacher, and student-related factors. However, when the framework was presented to the partners, the discussion held in the meeting indicated that not only the institutional policies and assessment culture but also national policies were effective in shaping assessment practices. The results of the stakeholder surveys also confirmed this argument. Several participants from each partner country indicated that they have limited autonomy in selecting the online assessment method they like because of the policies and regulations framed by their institutions and sometimes by the states.

Therefore, factors not only at the institution or practice level but also at the macro level were found to act on the online assessment practices of instructors. Based on these findings, influential factors were categorized as macro, meso, and micro-level factors. Macro-level factors refer to the dominant national assessment culture and regulations concerning assessment practices. Meso-level factors, however, entail institutional culture, policies, nature of the discipline, and class size. Lastly, micro-level factors are closely linked to the experiences of the practitioners and students. Teachers' digital, cultural, pedagogical, and assessment-related knowledge and competencies and the misconceptions they have were the factors that diminish the variety of online assessment methods or impair the effectiveness of the methods used. Moreover, the heavy workload of faculty and inadequate teaching experience caused them to utilize more feasible summative methods rather than more costly formative methods or failure in translating their knowledge into assessment practices, respectively. Similar to teachers, student-related factors also focused on the digital competencies and infrastructural needs of students. Compared to the initial version of the framework, the ultimate framework emphasized the knowledge, capabilities, and needs of key stakeholders rather than demographic characteristics as influential factors playing a role in assessment practices.

As in the initial framework, the results of the stakeholder surveys underlined the importance of exam dishonesty, authentication, fairness of evaluation, and familiarity of students with online assessment practices (i.e., mock exam implementations) as further considerations for online assessment. Similarly, for online assessment in the international context, time-zone differences, cultural differences, cultural sensitivity, and the dominant national assessment culture embraced by international students should be paid attention to by practitioners.

Taken together, this framework indicated that factors that affect the practices of online assessment are interconnected and should be considered as a whole rather than fragmented entities. Furthermore, situational and contextual factors should be analyzed and considered closely while designing online assessment as they may play either constraining or enabling roles in the process. In Table 6, the factors shown to be linked to the online assessment are presented in a more detailed way.

Table 6: *Dominant Factors Related to Online Assessment*

Macro-level factors	• Situational factors (e.g., Covid-19) • Legal codes and regulations • National assessment culture
Meso-level factors	• Institutional policies • Type of university (research vs. teaching oriented) • Institutional culture • Nature of the discipline • Class size
Micro-level factors	• Teacher-related factors ❖ Teacher competencies (i.e., digital, cultural, pedagogical, & assessment) ❖ Workload ❖ Teaching experience • Student-related factors ❖ Digital competencies ❖ Infrastructural needs and resources

Concluding remarks

This report is based on a broad review of the literature and survey on stakeholder perspective on the process and components of online assessment. In stage one, papers published in peer-review journals in English, Dutch, Spanish, Turkish and German were reviewed. An analysis of 89 peer reviewed journals indicated that remote assessment has perceptions, attitudes, and practices' dimensions. Besides, the studies suggest that factors related to institutions, discipline, course, teacher and student's dimensions play a role in online assessment. Moreover, the studies suggest that take-home exams, assignments, peer assessments, online peer assessments, self-assessments, team-assessment, portfolio assessments, oral examinations, e-exam, computer-based assessments, and reports are the most common online assessment practices. It is important to note that traditional assessment methods and online assessment methods are aligned to a great extent. In other words, in terms of assessment methods there is no difference between online and in-presence settings. The results of the review show that written exams were still the most common assessment method, while alternative methods (e.g., portfolio, project, peer assessment) were rarely used. Moreover, the multiplicity of media for online assessment practices is a major contribution to higher education organizations. In that sense, for effective implementation of online assessment, training of the academics on online assessment methods and providing them with necessary technological infrastructures are essential.

The results of the review suggest that certain factors push to prioritize certain types of assessment. Exams with multiple-choice questions or take-home exams, assignments, and combinations of different assessment methods (e.g., quiz + exams) were mostly preferred assessment practices. The results documented that the target groups had positive attitudes towards self-assessment, peer assessment and online peer assessment, and e-exams. However, the studies did not report changes in the satisfaction level of the students in online assessment. Another major suggestion of the literature review is that individuals ideally prefer formative assessment, but because of certain challenges and concerns, they opt for summative approaches in their actual practices.

In the second stage of the IO1 a survey on stakeholders' (academics and academic leaders) perspectives, both on the framework and on online assessment, was conducted. The survey results suggest that exams are the most common assessment method in all four institutions. The academics perceive exams as the most reliable evidence about student performance. However, diverse academics in different institutions indicated their concerns about the use of different versions of written exams. For example, multiple choice exams may not be appropriate for assessment of knowledge but may not be suitable to assess evaluation, analysis or synthesis skills. Evidently, different factors such as grade level, class size, preparation, and availability of support are important determinants of choice of exams by the academics.

Although the stakeholders find value in formative assessment, summative assessment is a wider practice. The strongest factor giving way to summative assessment is related to the culture or value system of the universities. However, the responses of the stakeholders suggest that the pandemic has an impact on changing the dominance of summative assessment. It is important to state that formative assessment is more demanding in terms of time and effort and the academics definitely need support for effective implementation of formative assessment.

As part of the formal support structures the presence of an institutional policy for online assessment and enactment of the policy at institutional, unit and individual levels is critical for online assessment. Based on the broad policy for online assessment, institutional and individual level support mechanisms and tools are indicated a key lever of quality for online assessment. Availability of technological infrastructures is very critical for successful implementation of online assessment. LMS is perceived as a key component of technological infrastructure for online teaching as well as online assessment. Various technological tools are expected to be flexible enough to facilitate various assessment practices and be compatible with LMS. However, security is a major concern in online assessment, and it has been indicated as a key weakness of the current technological infrastructures for online assessment.

Although the stakeholders indicated the presence of formal support mechanism in their institutions, informal support mechanisms are commonly indicated as a source of knowledge sharing and skill building mechanisms on online assessment in all four countries. This result highlights the limitation of formal assessment mechanisms and the need for providing a space for informal interaction both within and outside the university to build academics' online assessment skills. Institutional support for organizing and attending meetings, seminars, chats, open panels, and/or email groups has potential for positive return in improving academics' online assessment skills.

Both the review of the literature and the survey have two major outcomes. The first outcome is highlighting the need of creating a climate of online assessment. Based on the review and survey

results, we captured several pillars of such a climate. The first pillar of effective online assessment is to develop an overarching policy for online and remote teaching and positioning online assessment in this policy. The second pillar of the climate of online assessment is systematical organizational level support, which covers both didactic aspects and technical aspects. These support mechanisms could be seen as the basis of effective online assessment, and only after providing this support, individual academics might initiate and accomplish the implementation of online assessment. The third pillar of effective online assessment is related to the technical infrastructures of the institutions. As stated above, these infrastructures are expected to be flexible to accommodate different applications, be user-friendly and continuously updated by the institution. The final pillar of an effective online assessment climate that has emerged is productive organizational behavior. Academics' commitment to their job, professionalism, and affection towards teaching are some of the elements of the productive organizational behavior in universities.

Online assessment has a potential to be a very critical dimension of virtual mobility. Stakeholders' appraisal of assessment in an international context suggests that, in essence, is not different from a national context. In other words, for the stakeholders whether the students are examined from a home context or another country context makes no difference. However, it is important to state that these comments are related to the exam procedures and the content of the exam. There are always discrepancies between national and international students in the access to technology. As a result, accessibility to necessary infrastructures and technological tools is very critical for online assessment in international context. In that sense, international students may demand a different level of sensitivity for the institutions. Equity, well-being of the students, compatibility of the systems, cultural pluralism, are raised as issues in assessment in international context.

The second outcome of IO1 is the development of a framework for online assessment, derived from the results of the literature review. The survey enabled the evaluation and finalization of the framework. The stakeholders suggest that the PAP framework is complete in itself in depicting the practice of online assessment. According to the framework, the universities need to consider several different factors operating at macro-, meso-, and micro-levels. At the macro level, legal bases and national assessment cultures need to be decoded. At the meso-level institutional policy, institutional culture, nature of the discipline, class-size and the basic mission of the university are critical factors for effective online assessment. Both macro- and micro level factors are meta level factors lying the ground for implementation at the classroom level. In other words, macro- and meso- level factors ensure the context for effective online assessment. Teachers' knowledge and skills, commitment, and workload as well as the students' digital skills and their access to online tools and resources, are critical as factors in accomplishing effective online assessment.