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His main role in the project focus on the development of methodologies and evaluation tasks. Moreover, he is the secretary of the core review panel of the TeSLA project (head panel).

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Proposal

Title: Enhancement of quality assurance of e-assessment

Abstract (150 words max):

At a time in which different forms of online education provision are growing in popularity, it is important to bring the assessment of these provisions to the same level. The vast majority of higher education institutions offering e-learning still maintain face-to-face assessment since it is still considered the most reliable way to verify students' identity and proctor their behaviour. Nonetheless, online universities are expressing their will to implement e-assessment in order to offer a fully comprehensive online education and traditional universities are increasingly adopting online methods to their habitual procedures. Consequently, quality assurance (QA) should also develop new processes in order to guarantee the confidence in these new forms of learning and assessing. This paper aims at describing the outcomes achieved by the application of a fit-for-purpose assessment methodology in seven European universities piloting an e-assessment system to support learner authentication and work authorship of students (the TeSLA system).

Has this paper previously been published/presented elsewhere? No.

Text of paper (3000 words max):

I. Introduction

It is a fact that e-learning has been growing in popularity over the past few years because of the many benefits associated with it (flexibility, time-saving, accessibility, etc.). However, this provision still has some challenges to overcome, particularly in relation to assessment in order to monitor student progress and demonstrate the extent to which the intended learning outcomes have been achieved [1, 2, 3].

Instructional design is one of the pillars for the teaching and learning process for all types of education (on-campus and off-campus). Nonetheless, special attention should be given to e-learning provision due to innovation and to the rapid advancement of technology. Therefore, the challenge lies in the development of proper pedagogical models, using technologies to support learning and performance. At the same time, it is very important to strengthen the level of academic integrity and trust between the institution and the student community. One way to achieve the aforementioned goals is by means of new methods and technologies to support authorship and the authentication of students performing e-assessment activities [4].

Quality assurance (QA) of traditional learning has developed well-defined procedures in order to assess, accredit and certificate programmes or institutions offering face-to-face provision. However, traditional QA methodologies should pay special attention to e-learning characteristics. One of the relevant element is the e-assessment, as the basis for guaranteeing the achievement of the intended learning outcomes. TeSLA project ("An Adaptive Trust-based e-assessment System for Learning") [5] develop a procedure with special emphasis on e-assessment [6, 7]. The aim of this paper is to present the outcomes achieved by the application of a fit-for-purpose assessment methodology to seven different universities.

II. Methodology

This section aims to present the main elements used in the evaluation of a system using a set of technological instruments to support e-assessment in higher education institutions (HEIs).

II.1. The TeSLA system

The work presented in this paper is developed within the scope of the TeSLA project ("An Adaptive Trust-based e-assessment System for Learning") supported by the European Commission under the Horizon 2020 programme [5]. The TeSLA project aims to create an adaptive trust-based e-assessment system for assuring e-assessment processes in online and blended environments.

With the use of different technologies based on biometric data and documentary analysis, the system aims to provide effective proof of student identity (authentication) and authorship. The technological instruments integrated into one single service to support e-assessment are divided into three main groups depending on their functionality and specific task [8]:

1. **Biometric** instruments are based on the use of mathematical and statistical techniques to guarantee the learner's authentication
   a. Facial verification and recognition
   b. Voice recognition
   c. Keystroke dynamics
2. **Document Analysis** instruments use a qualitative analysis package on written material such as essays, descriptions, the outputs of learning activities, etc.
   a. Pl agiarism tools
   b. Forensic analysis (*also ensures authentication*)
3. **Security Techniques** deploy a security service provided by a layer of communicating systems
   a. Digital signature / Timestamp
   b. Anti-spoofing

Since the research methodology of TeSLA project is based on pilot execution in order to test, evaluate and assure the reliability of the system, the project conducted three different scale pilots in the academic years 2016/17 and 2017/18. In addition, to ensure a correct scalability of the system, it was tested with a growing number of learners from 600 (pilot 1) up to 14,000 learners (pilot 3) in seven European universities with different contexts.

II.2. Pilot universities

Adaptiveness of the TeSLA system should provide a solution to any educational framework and institutions should be able to select technology modules depending on their educational model. Consequently, the universities piloting the TeSLA system have different characteristics, offer different types of provision (face-to-face, distance, online, blended) [1] and use different teaching methodologies regarding the design and assessment of courses.

Table 1 highlights the predominant assessment models in each university participating in this study and the habitual combinations [9].

Table 1. Predominant assessment models [9]

UNIVERSITY	COUNTRY	PREDOMINANT ASSESSMENT MODELS			
		Diagnostic	Continuous	Formative	Summative
Anadolu University	Turkey			**x**	○
Sofia University "St. Kliment Ohridski"	Bulgaria	**x**	**x**	**x**	**x**
The Technical University of Sofia	Bulgaria	**x**	● (w/ summative)	● (w/ summative)	**x**
The University of Jyväskylä	Finland	**x**	**x**	**x**	**x**
The Open University	United Kingdom			● (undergraduate curriculum)	**x**
The Open University of Catalonia	Spain	**x** (w/ continuous)	○		● (w/ continuous)
The Open University of the Netherlands	Netherlands			**x**	**x**

○ (predominant) ● (usual combination of assessment models) **x** (typical assessment models)

II.3. Assessment process and methodology

The evaluation of the TeSLA pilots in the seven universities were conducted by external experts grouped into different panels. Evaluations concluded with the elaboration of review reports with three levels of recommendations for improvement: (1) institutional performance and procedures; (2) the TeSLA system; and (3) the assessment methodology (designed fit for purpose and used as the core document in the evaluation). The analysis of these reports provided the main evidence for the elaboration of results presented in this document.

The methodology included eight different standards [6, 7] aligned with the Standards and Guidelines for Quality Assurance in the European Higher Education Area [10]:

1. **Policies, structures, processes and resources for quality assurance of e-assessment**

   The institution has appropriate policies, structures, processes and resources to ensure that e-assessment is timely and fair, and it includes ethical and legal considerations. Besides, the proposal for the e-assessment is aligned with the pedagogical model of the institution and ensures the constant achievement of its objectives.

2. Assessment of learning

E-assessment methods are varied, facilitate pedagogical innovation and determine rigorously the level of achievement of learning outcomes. They are consistent with course activities and resources and adapt to the diversity of learners and educational models.

3. E-assessment system security, capacity and authenticity

The development and implementation of the e-assessment include protective measures that guarantee learner authentication and work authorship. The e-assessment system is secure and fit for purpose.

4. Infrastructure and resources

The institution utilises the appropriate technologies that match the course content in order to enhance and expand learning for all types of students' needs.

5. Student support

Students are aware, have access and use effective and well-resourced support services for counselling, orientation, tutoring and facilitation in order to increase retention and success. Student support covers pedagogical, technological and administrative related needs and is part of institutional policies and strategies.

6. Teaching staff

The teaching staff is skilled and well-supported in relation to technological and pedagogical requirements and e-assessment methods.

7. Learning analytics

The institution has an information management system that enables agile, complete and representative collection of data and indicators derived from all aspects related to e-assessment methodology and authenticity and authorship technologies.

8. Public information

The institution appropriately informs all stakeholders of pedagogical development, the e-assessment method, and resources technology. The institution publishes reliable, complete and up to date information on pedagogical methods and technical support. Students should be made aware of the hardware requirements and learning resources technology and technical support.

III. Results

This section presents the obtained results organised for each e-assessment standard.

1. Policies, structures, processes and resources for quality assurance of e-assessment

In general, all HEIs have QA procedures in place. Yet, when we focus on e-assessment policies we observe different scenarios: from the most restrictive one where national legal framework doesn't permit to perform online exams, to the most flexible one where e-assessment is permitted. Particularly, there remains a number of outstanding issues related to internal and external policies and regulations to be considered and developed by institutions in order to properly adjust to online learning and e-assessment applications. Those cases correspond to traditional universities that have recently included blended and online provisions to their current learning processes.

In those cases where e-assessment is not permitted or e-learning is a new way of delivering courses, HEIs have more room for improvement at a policy level because they have to design new procedures and policies on different elements: e-learning, e-assessment, definition of cheating and plagiarism, ethical and legal issues and security.

Fully online universities are in full compliance with this standard as they were established to offer online learning from the very beginning. Thus, this is evidenced by the fact that policies are adequate and clearly focused through the lens of e-learning. Good practices are observed in these specific HEIs due to the alignment of e-assessment and their pedagogical models.

On the other hand, the introduction of TeSLA instruments presents an opportunity for all HEIs to analyse and reflect on policies, structures and resources for QA of e-assessment and to adapt to new national and European regulations (e.g. Regulation (EU) 2016/679 – GPDR). This transition should be supported by the full involvement of QA units.

2. Assessment of learning

The external review identifies good practices in the assessment of learning at online universities as they apply a diversity of assessment methods taking into account a student-centered pedagogical approach with an increased flexibility of learning design and delivery. Moreover, HEIs also increase flexibility offering a more diversified methodology for assessing students with special educational needs and disabilities (SEND students). TeSLA system also enables the possibility to undergo alternative methods of assessment as part of innovative pedagogical methodologies, which would contribute to decreasing students' dropout rate. Analysis of assessment methods applied in the different HEIs participating in the study shows that collaborative assignments are still a challenge as most of the assessable activities are designed to be performed individually. However, in all cases, chosen assessment methods are aligned with learning outcomes.

There are some scenarios where no innovative pedagogical practices or new e-assessment activities are observed. This situation is linked to the need for developing new pedagogical models which entails the upgrade of assessment methods and practices. HEIs should develop an integrated strategy to disseminate e-assessment and teachers and students should play an active role as change agents. In other cases, the review shows that some institutions haven't implemented yet an appealing system.

3. E-assessment system security, capacity and authenticity

All HEIs participating in the study are aware of technical and security implications related to the implementation of a new e-assessment system. Nonetheless, the results of the external review process identify some issues about the security of e-assessment and some areas of improvement that are mainly focused on the implementation of a register of external attacks and technical problems. These corrective actions will contribute to the risk analysis of the further development of a more structured approach to the security of the system.

Despite all HEIs have already addressed academic integrity issues and limit unethical practices, especially plagiarism, the external review identifies a relevant element related to the detection of cheating (authentication and authorship issues) by means of a defined threshold level (what is considered normal behaviour vs suspicious behaviour). Since the teaching staff is responsible for detecting fraud, the definition of such a threshold would help them to identify the students who do not behave correctly during their studies.

A big challenge has been observed as students are not confident enough to share personal data requested by the TeSLA system for the proper functioning of the instruments. Even though the TeSLA system complies with the European GDPR regulations and national legislations on data privacy, it is important to provide students with information and guidance on how the system deals with privacy and security.

4. Infrastructure and resources

Different virtual learning environments (VLE) are used by HEIs participating in the TeSLA pilots in accordance to their own needs. Therefore, the integration of the TeSLA system into each VLE was a big challenge, particularly the ones which are not Moodle-based. Apart from the technical requirements which are necessary to integrate new technologies (e.g. the TeSLA system) into different VLEs, it is

observed that such integration should be supported by other relevant elements. On the basis of the results obtained in the study, it is deemed important to have centralized technical support in place, a ticketing system and available guidance and procedures for technical staff. In addition, all HEIs should collect satisfaction data from students and other key stakeholders on the use of the VLE, since this information would contribute to the continuous improvement of the infrastructure and the system itself.

5. Student support

Student support is one of the most relevant standards within this QA framework. In general, all HEIs participating in this study have well-established and readily support mechanisms to meet all student needs, which include administrative, technical and pedagogical support, in particular with expertise on e-assessment. In some cases, students didn't find the information needed and seek assistance from their teachers as they are able to solve students' issues rapidly. Therefore, HEIs should allocate specific responsibilities to teaching and support staff.

Another key stakeholder to be taken into account by support services are the SEND students. In general, it is observed that HEIs provide appropriate support to SEND students with a wider range of support services and adapted learning resources, provided that students declare themselves as SEND, which is not always the case.

It is also important that institutions revise and redesign the student satisfaction survey (when necessary) in order to include questions about the quality of available support services in order to adapt them accordingly.

6. Teaching staff

The composition of the teaching staff in each institution is varied (different roles with different responsibilities). Thus, HEIs should guarantee the development of teacher competence from different perspectives: teaching staff should be trained on the innovation of the pedagogical practices which includes e-assessment, and they should also receive technical training. In order to achieve these objectives, HEIs should design and implement a continuous professional development plan and offer immersive training opportunities to improve teaching skills. Besides, a support system for teaching staff should be always available.

In the framework of the TeSLA instruments, teaching staff should be provided with updated information and guidelines to interpret the results of the newly implemented system as well as guidelines and well-defined procedures to deal with the academic integrity.

The results from the review show that some institutions need to include procedures for the evaluation of teaching staff satisfaction.

7. Learning analytics

All HEIs agree on the potentiality and value of having an information management system (IMS) in place. Such IMS is collectively seen as an important element for the effective management of the e-assessment methodology. Moreover, the data collected and properly analysed can be used for the improvement of the grading system as well as for a better development of current material and for the preparation of new material; in short, for the improvement of the learning process. For this purpose, it is essential that HEIs clearly define the process around the use and analysis of personal data in order not to limit the capacity to build trust in the system. Although all HEIs collect student performance data, only a very few are applying learning analytics to monitor and improve teaching processes as well as the students' learning experience.

HEIs participating in this study lack or need to enhance an IMS for the systematic collection of data related to the QA of e-assessment. In addition, institutional strategies for widening the learning analytics approach with the establishment or the modification of systems to collect, analyse and use data should be accompanied by the corresponding regulations and policies.

8. Public information

Generally, all HEIs have well-established systems (mainly institutional websites) to inform all stakeholders and information available is considered to be accurate. In some cases, due to the big amount of information available, websites are not very student-oriented and easy to navigate, hence they should be more user-friendly and information should be structured based on the needs and requirements of users.

Most of the websites include main regulations concerning e-learning. Nonetheless, in HEIs where e-assessment is not a regular practice, there is no clear evidence of public information regarding e-assessment. As a consequence, institutions should update the system to reflect changes in new ways of assessment and should be transparent on how new technologies assessment ensure fair and correct results. In addition, detailed information on the software and hardware requirements for the correct use of the VLE and the e-assessment resources should also be in place.

IV. Conclusions

The results obtained from the external reviews and the analysis of the assessment methodology applied in the piloting phase of the TeSLA project are not judgemental but a remarkable opportunity to advance quality assurance of new e-assessment systems to support authentication and authorship in higher education. Although this study reflects the current state of HEIs and QA processes towards the implementation of e-assessment, it is undoubtedly that further development is needed from HEIs and QA agencies.

Depending on the background and origins of institutions (on-campus vs off-campus) and taking into consideration European and national regulations, resources and efforts to meet QA requirements on e-assessment may vary. For instance, if the legal framework does not permit the use of e-assessment in certain contexts, institutions would have to go through revision process of several aspects such as the pedagogical and assessment model, policies and regulations, etc.

Finally, it could be said that fully online universities comply with most of the QA element defined from the e-assessment point of view, while traditional universities offering new blended programmes should pay attention to new elements within their context (i.e. pedagogical model, VLE, student's and teacher's support, etc.).

V. Acknowledgements

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VI. References

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[5] TeSLA project "An Adaptive Trust-based e-assessment System for Learning", Number 688520. 2016-2018. H2020-ICT-2015/H2020-ICT-2015. http://tesla-project.eu/ (Accessed: 13 July 2018).

[6] WP4 – Deliverable 4.4 – *Metaevaluation report of the draft e-assessment framework in light of pilots 1* [Confidential, only for TeSLA consortium]

[7] Huertas, E.; Roca R.; Ranne P.; Gourdin A.; Moehren J. (2017). *External evaluation of e-assessment – a conceptual design of elements to be considered.* Available at: http://www.eua.be/Libraries/EQAF-2017/p21_huertas_roca_moehren_ranne_gourdin.pdf (Accessed: 13 July 2018).

[8] WP5 – Deliverable 5.1 – *Complete descriptions and technical specification of all instruments.* [Confidential, only for TeSLA consortium]

[9] WP2 – Deliverable 2.5 – *Report describing the teaching and learning process (including educational special needs)* [Confidential, only for TeSLA consortium]

[10] *Standards and Guidelines for Quality Assurance in the European Higher Education Area* (ESG). (2015). Brussels, Belgium

Discussion questions:

- What are the main challenges that HEIs would face when introducing e-assessment to their usual procedures?
- To what extent new methods of assessment impact the quality assurance of learning?
- How does the legal framework affect the development of new pedagogical methods and the corresponding quality assurance procedures?

Please submit your proposal by sending this form, in Word format, by 24 July 2018 to QAForum@eua.eu. The file should be named using the last names of the authors, e.g. Smith_Jones.doc. Please do not send a hard copy or a PDF file.