

# TeSLA best practice guidelines

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# TeSLA best practice guidelines

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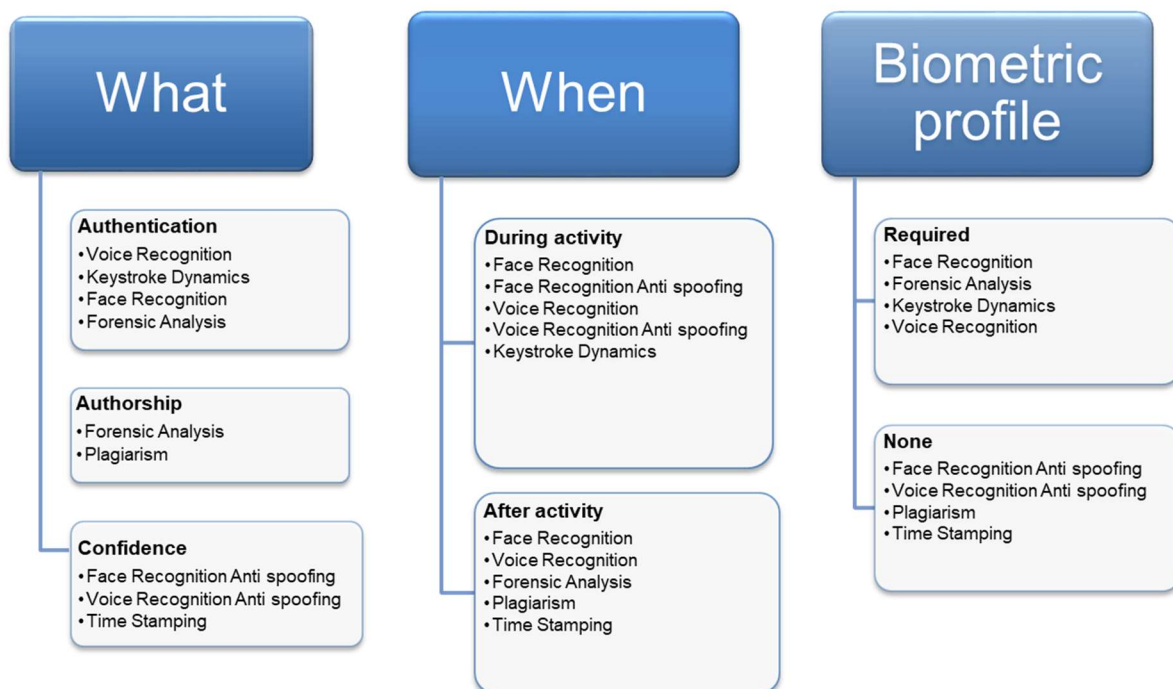
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## 1. Introduction

This document describes best practice regarding deployment of the TeSLA instruments in support of authentication and authorship verification in e-assessments. Figure 1 provides an overview of all TeSLA instruments (What), When they can be deployed (while the student is carrying out an assessment activity and/or afterwards, based on a document or recording the student uploads). This best practice guide focusses on the instruments for authentication and authorship verification. Regarding other instruments (anti spoofing and time stamping) aimed at increasing confidence regarding authentication results, it suffices to say that their use is recommended in combination with the relevant instruments).



Examples provided in this document have been derived from or inspired by pilot implementations at the seven universities involved in the TeSLA project: Open University of Cataluña, Anadolu University, Jyväskylä University, Open University UK, Sofia University, Technical University Sofia, and the Open University in the Netherlands.

## 2. Criteria for best practice

There are at least three criteria that determine 'good' or 'best' practice.

The first and simplest criterion is that *deployment of the instruments must be in line with the minimum requirements of each instrument*, i.e. the assessment activity must prompt a response that ensures the instruments can be effective and provide reliable results. For instance, forensic analysis cannot be applied to short texts. Voice recognition is not suitable

in activities where students have to answer complex questions which may lead to long pauses. See Appendix I for a detailed description of the instrument requirements.

The second criterion is that deployment of the instruments must be *meaningful* to assure effectiveness. For instance, applying face recognition prior to submission of a writing assignment, will help to verify the identity of the student uploading the document, but of course does not guarantee that the uploaded document was actually created by the student; the student might be uploading a document someone else created for him or her.

The third criterion is that TeSLA instruments should be deployed in a way that is *in accordance with the principle of proportionality*. Proportionality is a term used in legal documents regulating the use of personal data (Art.5 of the GDPR). More specifically the principle of proportionality means that collection of personal data is adequate, relevant and *limited to what is necessary in relation to the purposes* for which they are processed ('data minimisation'). Applying this criterion raises, for instance, the question whether any of the TeSLA instruments collecting personal data should be applied at all to formative assessment activities. It also raises the question what limits should be placed on the combined use of instruments, even if this could improve the effectiveness/reliability of the authentication process. This criterion is most difficult to assess, seeing as these kind of questions have no definite answers yet.

Consider, for instance, the example of a diagnostic test a teacher has planned at the start of a course in order to gain a clearer idea of students' prior knowledge. Depending on the type of questions the teacher could apply keystroke dynamics (for short answer questions) or face recognition to verify student identity but is this really necessary? Is there any reason to believe students are likely to let someone else provide answers, when it could only benefit them if the teacher receives an accurate picture? Besides, even if the student would have someone else impersonate him/her – who would suffer from this and what would be the benefits and consequences of detecting this?

Or consider an assessment activity, in which students must deliver a short video (2 min) synthesizing main arguments in a debate. The teacher may submit the video for face and voice recognition. In this case the question would be: why not just voice recognition?

### 3. Examples of good practice

#### Example 1 – Voice recognition

Context	Online course English conversation skills
Assessment activity	As part of the final assessment students have to create a 5 min. audio recording in which they describe things they see while taking a virtual tour of Buckingham Palace.
TeSLA instruments	Voice recognition
Rationale	<ul style="list-style-type: none"> <li>- A baseline registration of the student's voice was made prior to or upon enrolment of the course</li> <li>- The activity is part of the final assessment resulting in course credits: identity verification is needed to assure reliability of the e-assessment.</li> </ul>

	<ul style="list-style-type: none"> <li>- Students have less concerns regarding registration of their voice compared to video recording of their face</li> <li>- The audio recording can be used both for evaluation of the response by the assessor and for authentication by means of the voice recognition instrument</li> </ul>
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### Example 2 – Voice recognition

Context	Online course Organisational Psychology
Assessment activity	In order to assess students' understanding of the main theoretical concepts in the domain as well as their relations, the teacher has designed an assessment activity in which students need to create a concept map. In order to enhance the reliability of this assessment activity students must capture the process of creation using screen capture software and explain their reasoning by means of a voice over.
TeSLA instruments	Voice recognition
Rationale	<ul style="list-style-type: none"> <li>- Course enrolment requires a baseline registration of the student's voice</li> <li>- The assessor uses the annotated screen capture to assess the result as well as verify student identity through voice recognition.</li> <li>- Here activity design (voice annotated screen capture explaining the creation process) and technology (TeSLA voice recognition) work together to enhance authenticity and reliability of the assessment.</li> </ul>

### Example 3 – Face recognition

Context	Assessment of debating skills
Assessment activity	Following an exchange of arguments in an online forum, students need to perform a summative assessment activity demonstrating their debating skills. Drawing on the previous discussion students have to build their own argument including possible objections by an opponent. They present their case in a recorded video.
TeSLA instruments	Face recognition
Rationale	<ul style="list-style-type: none"> <li>- A baseline registration of the student's face was made prior to or upon enrolment of the course</li> <li>- The video is used for assessment purposes as well as authentication purposes</li> </ul>

#### Example 4 – Plagiarism detection

Context	Educational Research Methods course
Assessment activity	A first, formative, assessment activity in this course involves formulation of a research problem and research questions, including arguing the theoretical and/or practical relevance of the research problem. Students are encouraged to discuss the task with each other, but should come up with their own individual answers.
TeSLA instruments	Plagiarism detection software
Rationale	<ul style="list-style-type: none"> <li>- Though a formative assessment task, it is an obligatory task as it is considered a crucial learning experience for students to give this task serious effort.</li> <li>- By chance the teacher has discovered there is a lively exchange of assignments submitted for this activity in previous years.</li> <li>- The teacher deploys plagiarism detection software and informs students of this in order to discourage plagiarism and to enable detection of plagiarism.</li> </ul>

#### Example 5 – Keystroke dynamics & plagiarism detection software

Context	Online course International Law
Assessment activity	The summative online assessment activity follows a case-based methodology where several cases are presented to students to immerse them into professional situations. The students must select one case and provide a solution to this case in a short written answer. The activity is open at a set date and time and with a limited duration.
TeSLA instruments	Keystroke dynamics & plagiarism detection software
Rationale	<ul style="list-style-type: none"> <li>- Course enrolment required a baseline registration of student's typing style.</li> <li>- Students provide the solution/text by typing it directly in an online textfield, allowing identity verification through keystroke dynamics.</li> <li>- Time constraints enhance reliability of the assessment as this makes it less likely students have time to collaborate</li> <li>- Reliability of the assessment is further enhanced by submitting the text to plagiarism detection software.</li> <li>- Plagiarism detection does not require collection of personal data and will therefore not constitute a possible violation of the criterion of proportionality.</li> </ul>

## Example 6 – Forensic analysis

Context	Bachelor thesis
Assessment activity	Students have to write a thesis to demonstrate integration of knowledge, skills and attitudes acquired during the first years of the educational program.
TeSLA instruments	Forensic analysis & plagiarism detection
Rationale	<ul style="list-style-type: none"><li>- Enrolment required a baseline registration of the student's writing style</li><li>- The assessment activity involves a sufficient amount of text to warrant deployment of forensic analysis.</li></ul>

## References

Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC. Retrieved from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN>



## Appendix I - Instrument requirements

Instrument	Baseline measurement <sup>1</sup>	Requirements for further deployment during assessment
Face recognition	Yes – 10 sec. video recording following specific instructions see enrolment activity for detailed instructions	Video registration of the face through the webcam. No minimum duration.
Voice recognition	Yes – three sessions for speech recordings see enrolment activity instructions for details	Voice recording. Speech sample(s) of at least 10 seconds required for authentication.
Keystroke dynamics	Yes – student answers three general questions typing answers amounting to a minimal of 125 keystrokes directly into a text field	Samples of 125 keystrokes each are automatically submitted for evaluation
Forensic analysis	Student writes text amounting to 1000 words	File format: plain text, docx, pdf. Text size: 1000 words
Plagiarism detection	No	

<sup>1</sup> To guarantee authenticity of the baseline measurements they should be performed under supervision and following identity verification based on an ID the student brings along.