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Responsible Research and Innovation with data science: a novel approach to evaluate trust of the European TeSLA system.

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Responsible Research and Innovation (RRI) is an approach coined by the European Commission which implies that researchers, end-user and technologists interact during the whole process of research and innovation to better align both its process and outcomes with the needs, expectations and values of society (EC, [2016](#)). Through RRI, innovators and society share their views on the ethical acceptability, sustainability and societal desirability to develop trust and become mutually responsive to each other (Von Schomberg, [2011](#)).

This work presents a novel approach **RRI supported by data science** to measure and evaluate trust during the development of the innovative technology “TeSLA”.

The EU-funded *Adaptive Trust-based e-Assessment System for Learning (TeSLA)* (<http://tesla-project.eu>) was developed to check student authentication and authorship through a combination of various instruments, such as: facial recognition, voice recognition, keystroke analysis, anti-plagiarism and forensic analysis.

Through mixed methods, three case-studies analysed small, medium and large data sets co-produced at the beginning, during and at the end of the TeSLA project in seven Institutions from 6 European countries.

These studies draw primarily on pre- and post-intervention questionnaires completed by a total of 4,058 students, including 330 with special needs, 54 teaching staff from 7 course coordinators, 7 technical professionals and 7 institutional leaders from seven universities.

The findings suggest a broadly positive acceptance of and trust in e-authentication for online assessments by both women and men, with neither group finding the e-authentication tools experienced to be either particularly onerous or stressful.

More than 70% considered that examination results will be trusted and that the essay's authorship can be verified. Only 5% to 19% of students faced technical problems in all institutions. Various teaching staff were satisfied with the system and highlight the importance of having technical issues faster and satisfactory solved. Technical teams recommended sufficient capacity including cloud solution and training. Course coordinators found that e-authentication enabled new types of assessments and opportunities to reduce academic malpractice. Institutional leaders who would be willing to adopt an e-authentication system expect user-friendly and usable system with guidelines for interpreting results.

Five features related to a “trust” emerged during the medium-study which were confirmed during the large-study:

1. **The system will not fail or be compromised:** participants who faced technical problems were *concerned with the* time spent longer than expected.
2. **Data will be kept safely and privately:** participants would like to be more informed about data security, privacy and safety.
3. **No adverse impact on assessment experience:** participants' concerns were whether the system does not recognise their identity and authenticity.
4. **The system will not affect performance:** participants need alternatives about instruments, which must be used adapted to their abilities or special needs.
5. **The system will ensure fairness:** participants highlight that systems should deal with diversity and ensure equity by supporting everyone with what they need to be successful.

The set of studies revealed that the RRI with data science approach was vital to examine the perceptions and needs of distinctive users as well to evaluate and increase trust of the European TeSLA system.

References

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Von Schomberg, R. (2011). Prospects for technology assessment in a framework of responsible research and Innovation (pp. 39–61). Wiesbaden, Germany: Springer.