Conduction of Exams: Analogous vs. Digital

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1. SUMMARY

Digital examinations and paper-based, analogous examinations differ in substantial aspects, concerning both the formalities and the preparation, conduction and grading of the exam. As with digital exams, often security issues are mentioned as reasons against them. This paper focuses on the conduction of the exam and points out why digital exams cannot only provide a similar notion of security and practicality as analogous exams, but how digital exams can exceed the analogous variants of exams. For the course of the paper, exams for programming courses in a computer science study course as well as a math course will serve as an example to illustrate certain points.

2. ABSTRACT

The process of a written (i.e., non-oral) examination is structured in three phases, the preparation, the exam itself, and afterwards the grading. The notable differences between digital exams and analogous exams exist in particular for the conduction of the exam and somewhat for the grading phase, dependent solely whether the students' works exist on paper sheets or in digital form.

Considering security, preparation takes place in an (digital) environment that students do not have access to and is generally accepted as sufficiently secure. The grading phase, too, exists in a closed environment. Therefore, these steps do not have to be considered more or less than for analogous exams. However, the conduction of the exam has to, because it is the phase where students interact with the exam environment and thus can deliberately influence the life cycle of the exam have new possibilities at hand in comparison to analogous exams. These new possibilities do not only affect the way students can solve the assignments, but can theoretically affect the way students can cheat during the conduction of the exam (Dawson, 2015).

However, the digital conduction of the exam enhances the anti-cheat measures that examiners can apply as well. Therefore, if reasonable counter measures are applied, we claim that digital exams are not less secure than analogous exams. If anything, we argue that digital exams can provide a more secure and reliable conduction of exams than the analogous counterpart. These counter measures, however, require some prerequisites regarding the (digital) infrastructure available at the institute of higher education.

Another important enhancement provided by digital exams is of a more practical nature. During the conduction of the exam several situations can occur, which require the examiner to interact with the examinees. Examples are, in paper bases exams, if students require more paper to write on, or want to ask questions, or when the examiner has to make an announcement. These situations can be significantly improved with digital exams, since communication can take place digitally, and physical limitations of analogous exams simply do not exist anymore.

In essence, we claim that the security of a digital exam can be held at least at a level that at least is not inferior to the security of a paper-based exam by appropriate counter measures and cheating detection techniques. In consequence, we can make use of the unquestioned advantages of digital

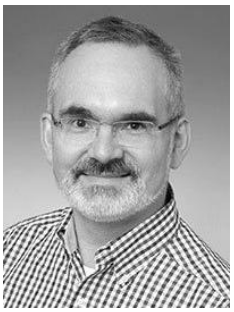
exams without drawbacks in security and thus reliability that are often mentioned as counter-arguments.

3. REFERENCES

Dawson, P. (2015). Five ways to hack and cheat with bring-your-own-device electronic examinations. *British Journal of Educational Technology, 47(4)*, doi: 10.1111/ bjet.12246

4. AUTHORS' BIOGRAPHIES

Bastian Küppers, M.Sc. is research associate at the IT Center of RWTH Aachen University. His research focusses on e-Learning and e-Assessment technologies. He received his M.Sc. cum laude in Artificial Intelligence from Maastricht University in 2012. Since 2010 he works at IT Center as a software developer and later as a teacher for parallel programming, robotics and other topics in computer science.



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