

FROM WRITTEN TESTS TO E-EXAMINATION – ORGANISATIONAL AND DIDACTICAL IMPLICATIONS OF COMPUTER BASED EXAMINATIONS

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The presentation will give a previous report of an ongoing project, which aims to create a central e-learning service for online-assessments at the University of Bremen. Partners in the project are the Centre for Multimedia in Higher Education (ZMML, www.zmml.uni-bremen.de), the faculty of business sciences (www.wiwi.uni-bremen.de) and the small software company LPLUS GmbH (<http://www.lplus.de>). The ZMML is also responsible for the scientific evaluation of e-assessments performed by different institutions for vocational training and continued education in Bremen. However, here we will focus on the evaluation results of nearly 3000 on-screen examinations of students in economics, which have been organised in winter 2004/2005 and summer 2005. The project asks for the organisational, economical and didactical implications of the transition from classical written tests to fully online and automatically scored e-assessments.

The expected advantages of this, for universities quite new type of examination are numerous.

- Students may like the immediate feedback on examination results, allowing a much more effective time management and giving planning reliability for their studies.
- The marking of examinations is fair and free of errors.
- The preparation for the exam might be easier and more effective, if a subset of the questions is used for self-assessments, e.g. in a learning-management-system.
- Teachers may benefit from the tremendous reduction of time needed for the correction and administration of examinations, especially in courses with several hundred students.
- The question database can be developed collaboratively with experts from other Universities (see <http://www.echemtest.net/> as an example).
- Using the computer as a creative medium, e.g. by including simulations, video clips or adaptive questions, widens the authors didactical possibilities compared to paper and pencil.
- Following the examination, the results stored in a database can easily be used for a statistical analysis revealing the strengths and weaknesses of the actual student population comparing different parts of the examination. The results may contribute to adapt and enhance the teaching from course to course.
- An appropriate interface between assessment and administration tools like HIS-POS or FlexKnow, used in many universities for planning examination events, subscription of candidates, management of examination regulations and administration of results, could be used to exchange lists of participants and results and would make life easier for administration staff.

Thus, brave new world? When introducing e-assessment at a university a number of fears are rising among teachers:

- E-assessments are often interpreted as pure multiple-choice tests, only suitable for the repetition of factual knowledge but not to address higher cognitive levels like understanding, synthesis, analysis or judgement.
- The quality of examinations constricted to closed, automatically valued questions is often seen as a didactical step backwards and as being not worthy for an academic level of education.

QUALITY ASSESSMENT, MEASUREMENT AND EVALUATION OF E-LEARNING

- An insufficient computer literacy of the candidates or differences in computer performance may become an unintended part of the exam.
- There may be a higher risk of (e-)cheating, e.g. by “hacking” the database with question items, a risk of total loss of examination data or a lower security of sensitive personal data.
- Many teachers are discouraged by the time consumption caused by the initial development of numerous questions with well-tested scoring parameters, subject to a laborious quality assurance.
- The typical IT-infrastructure at German universities is characterised by several but spacial distributed, small PC-pools with heterogenous equipment and often decentral administration. Organising on-screen examinations in several small rooms with several hundred participants may result in an enormous organisational, technical and administrative effort compensating the economisation effects mentioned above.

The evaluation study reveals a high acceptance among the students. In each of the 3 different exams over 75% of the students rated the design of the examination as “good” or “very good”. More than 90% rated the assessment player as “good” or “very good”. Especially the easy handling and the immediate feedback on the result of the examination was seen as very positive. None of the supervisors of the examinations could observe serious problems with the handling of the assessment player, thus it is very unlikely, that differences in computer literacy had an influence on the examination results. Negative comments address mainly network problems, i.e. the low bandwidth in one room, and the design and comprehensibility of questions.

The examinations had to be carry out in seven rooms, distributed all over the campus and different in number of computer places (11 to 24), IT-equipment and climatic conditions. In deed, asked for a possibly disturbing atmosphere in their examination room, we found some significant differences between rating of the student populations. However, it is not yet clear if the obviously disturbing factors within this room (no window/natural light, no air condition, noisy) had an influence on the results of the respective candidates. The new web based version of the assessment tool was rated by the students as good as the former client-intranet server version, but offered a number of organisational advantages for e-assessments in heterogenous IT-environments. The presentation will also give a first model for a cost benefit analysis, showing the influence of parameters like number of rooms, duration of examination, time formerly needed for marking and number of examination seasons with the same catalogue of questions.

The project evaluation and the subsequent discussion between teachers, technical staff and organisers led as to the following conclusions:

- In basic courses of economy with several hundred students each, e-assessments are a very useful addition to other examination formats. A loss in the quality of teaching and testing can be minimized, if e-assessment will focus on courses, or parts of courses, dealing with basic knowledge. The higher the investment into a didactical motivated authoring, taking into account the expanded possibilities of computers for interactivity, the more e-assessments will be appropriate in courses even for advanced students.
- We discovered no problems with the acceptance of students, but the discussion among teachers is still controversial. If e-assessments are integrated within the entire teaching and learning process, i.e. by using the same questions for different purposes like placement-test, self-assessments, intermediate tests and final examinations, e-assessments can contribute to an enhanced quality of teaching.
- The economisation effect of e-assessments is directly correlated to the size of the PC-pools, therefore for a campus wide e-assessment service of the ZMML it will be indispensable to build up a professional managed assessment centre with

approximately 120 places. The high investment of the teaching staff into the authoring of questions and the emerging need for a collaborative, inter-institutional development of question catalogues must be answered by a standard compliant further development of the assessment tool.

Finally, the author will venture to give some future prospects, how the establishment of e-assessment and test centers may contribute to the flexibilisation and change of the examination practice at universities.