

COMPUTER ADMINISTERED EXAM An evaluation

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Abstract

Design criteria for computer administered exams are discussed and the results of an evaluation of 2 consecutive network delivered computer administered exams are given. The future development of this application of networks in an educational setting is discussed.

Introduction

From the early days of computers in educational environment, the idea of computer managed exams has been explored (1). Originally it concerned mainly online evaluation of OMR (optical mark reading) forms. With the advent of affordable multiuser systems the exam could also be administered through a terminal. The last few years this type of exams occurs mainly on a network of microcomputers connected to a fileserver. The advantages of this type of exam have been discussed extensively but never the claimed potential increase of student throughput has been demonstrated, maybe because the unflexible university system has problems to incorporate a flexible exam system.

At the University of Amsterdam a computer administered exam system has been developed in the broader framework of computer assisted instruction (CAI). It appeared to be rather natural to have the students of largely CAI based courses take their formal exam through a computer too.

Description of the exam procedure

About 10 days before the formal exam a testexam becomes available on the 250 station computer network of the faculty of Psychology. The testexam is self-explanatory, no paper instruction is available. Students are stimulated to take this 'limited number of items' exam in order to get acquainted with the idea and also to use the final questionasking hour, about a week before the exam, to pose questions on this specific mode of exam. The testexam is replaced by the passwordprotected real exam on the exam day. The password is communicated to all students simultaneously and when the first item appears the students are instructed on a general strategy how to take multiple choice exams under time constraints. At the end of the examination period the students get a computer administered questionnaire

on the quality of different aspects of the course. The session ends with the formal calculation of the final grade. If the student failed he/she is communicated the day and hour of the oral exam (dyslectic students don't have to participate in this computer exam to get an oral).

Description of the program.

The program consists of 3 parts. The logon module boots automatically at startup (fig.1). It checks the name entered by the student as being one of the students that did the course (and especially did the CAI modules). A list of these students has been automatically made by the reservation system which was run at the very beginning of the course to distribute computer hours

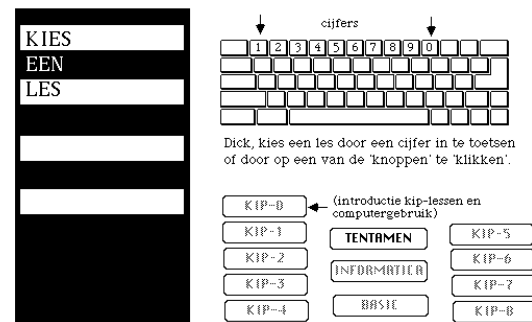


Fig.1 The launchpad

over the student (4). The second part is called the 'launchpad' and asks the student what module he/she wants to take (fig.1). The CAI modules are disabled at examtime and taking the exam is essentially the only possibility. The third module is the exam module. Each 4 alternative-item is presented separately. On the bottom of the screen is the itemnumber selection area (fig.2).

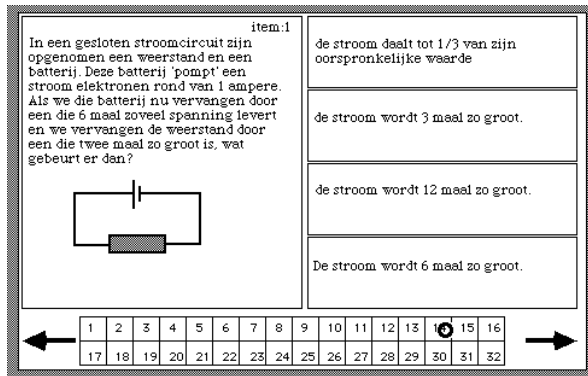


Fig.2 The cursor changes into an circle over the itemselection area

The student can skip items by clicking on the rightarrow, can randomly access items by clicking on the relevant itemnumber, or can go to the preceding item by clicking on the left arrow. If a student has answered an item a little dot appears at the relevant item in the item-number selection area. If the student accesses an item that has been answered before the alternative chosen is indicated by a larger black rectangle. This choice remains active unless explicitly another alternative has been selected.(fig.3)

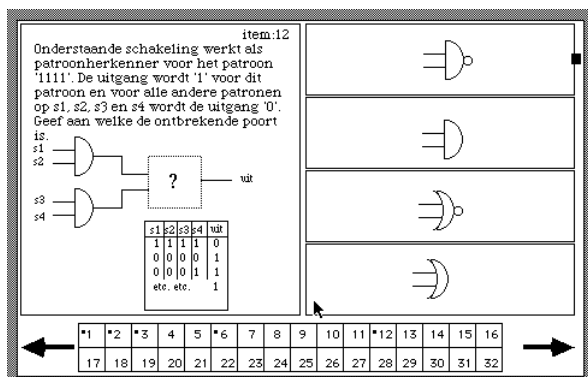


Fig.3 Answers has been given to items 1,2,3,6 and 12

Student has randomly accessed item 12 and can observe that item 1 has been marked

When the student has answered the last item he/she might proceed with the education-evaluation questionnaire or return to item 1 in order to check his/her responses. The questionnaire has an open as well as a 4 point scale question on all aspects of the course including the computer administered exam.

The results of the exam (and the questionnaire) are stored on an item by item basis on the file-server in order to perform an item analysis.

Evaluation

In 1990 and in 1991 student were asked to rate their satisfaction with the computer administered exam on a 4 point scale. The results are given in table I.

	mean comp. exam	sd comp. exam	mean all
1990	2.71	0.83	3.14
1991	3.19	0.75	3.26

Table I :satisfaction scores

The increase in satisfaction with the computer administered examination of 0.48 can not be explained completely by the general increase of the appreciation of 0.12. The change in appreciation might be due to problems in the first exam caused by missing fonts on some student disks thus making a few items difficult to read or it might be due to the introduction of a computerized test exam in the second year. About half of the qualitative responses concerned the form of the exam the other half concerned the contents. In 1990 most remarks were negative, one directly complaining about the readability. In 1991 there was only one negative remark on the form of the exam. There was virtually no relation between the appreciation and the mark that the students received (1990: r=-0.189 ; 1991: r=-0.069).

Conclusions

The current small scale pilot elicits the question if this type of exam could be introduced on a larger scale. This question is difficult to answer because the positive response of the students is not easily generalizable to a common population. The current course did extensively use CAI as an educational medium. Therefore the students could hardly be considered as naive users. Also the subjectmatter dealt with computer related items like computer controlled psychological experimentation.

Also the infrastructural aspects, like the number of stations and identity control might be more problematic with large scale introduction of this type of exam.

If however items can be drawn from a very large pool (2) and items are generative then exams can be constructed on an individual basis and the exam can be extended over a larger period, relaxing the infrastructural demands. Such an approach will also relax the fear of failure students. This approach is applied currently for the testexam in the CAI based course of statistics (3), followed each year by about 250 students. A study advice generator is an integrated part of the exam module. However the real exam for which each year new items are constructed is still delivered on paper. It is quite impossible to handle so many students in a period of a few hours. We are however investigating if new, increased bandwidth, communication channels to student's homes and electronic identity control might be used to

implement a continuous available exam. This would enable extreme bright students to go much faster while the slower students will also benefit because they themselves might determine at which point they are ready to take the exam thus avoiding unnecessary waiting times. It should be remarked that the potential increase in efficiency potentially produced by continuously available exams is negatively influenced by the so-called modularization which takes place at the Dutch universities.

References.

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