Controlled Evaluation of a Computer Based Atlas of Histopathology

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INTRODUCTION

Is computer-based pathology instruction better or equivalent to the use of textbooks or printed atlases? Due to the increasing usage of computers for medical instruction, the evaluation of different didactic media and methods is necessary. Commonly, computer-based training (CBT) modules have been evaluated by means of peer review or user questionnaires. These methods, however, suffer from limited reliability and validity since the outcome of the didactic process is not directly measured. We have evaluated a CBT program using the methods of a randomized controlled trial. The CBT program under evaluation was MICROPAT, an atlas of histopathology, developed by the authors and designed especially to support medical students during the course of pathology in the 3rd year. MICROPAT is a hypermedia application with more than 1300 images and describing texts[1].

METHODS

Fig. 1 illustrates the study design. 72 voluntary 3rd year medical students had been recruited for the study. They were randomly assigned to four groups. Under supervision they were given 50 min. each for the study of two different subjects (prostatic and mamma diseases), with the aid of common text books and the MICROPAT program, respectively. Book and computer preparation took place in two different rooms. After the preparation the students had to examine six unknown microscopic slides. Their diagnoses were fixed in a questionnaire. Students had to score the diagnoses by a scale ranging from 1 ”uncertain” to 3 ”absolutely certain”. In addition, they had to answer 17 questions concerning the program’s design and their previous experience with computers.

RESULTS

1. Comparing the outcome only, 36.1% yielded a better result with MICROPAT, 25.0% with books, and in 38.9% the outcome was the same. This result was, however, not significant for $\alpha = 0.05$.
2. Taking the certainty score into account, the numbers were 58.3%, 31.9% and 9.7%, respectively (significant for $\alpha = 0.05$). A considerable bias was found in the sense that students’ self-assessment varied with the use of computers. This meant, that the certainty scores for false diagnoses were higher in the computer groups, too.
3. Students that rated themselves familiar with computers showed better results in both, book and computer learning.
4. Lack of ”computer literacy” had no influence on the relative outcome of computer learning vs. book learning.

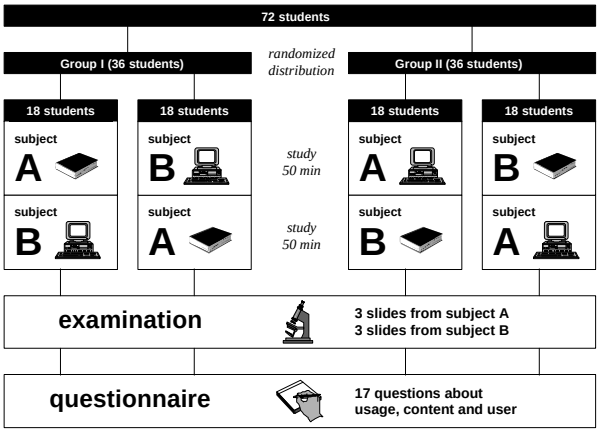

Fig. 1: Cross-over Design for Comparing Two Didactic Scenarios: Books vs. Computers.

CONCLUSION

It could be shown that learning efficiency of the use of MICROPAT was at least equivalent to the use of text books for preparing the pathology exam. MICROPAT was user-friendly enough not to affect the outcome of students with less computer experience.
We consider the cross-over design suitable for comparing different didactic methodologies and suggest its use especially for the assessment of computer-based methods.

[1] A demo version of MICROPAT is available at http://www.imbi.uni-freiburg.de/medinf/re_cbhpe.htm