EVALUATION OF RESULTS OF MCQ TESTS APPLIED IN ELECTRONIC FORMAT

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Testing of students' knowledge by electronic media is increasingly used by teaches in schools at various educational levels. Three years ago we have introduced electronic testing in our system of teaching practical histology using a dedicated software Articulate Quizmaker 13. This software provides immediate on-screen summative scoring of students' results, but fails in analysis of responses to single questions and in further statistical analysis of question difficulty. Here we report our innovations in collection of test results locally and their difficulty analysis up to the level of a single question.

In order to examine theoretical as well as practical knowledge of histology we use four formats of questions in our tests, namely Multiple Choice, Multiple Response, Drag & Drop and Hot Spot questions. The final test-scoring page informs students about their results showing them the achieved points in a percentage value and a minimum passing score for the given test. The software is able to register all data about each test question in html-formatted results table and, after enabling the Print Results function, the result table can be printed. In its original configuration, the Quizmaker 13 failed to collect and sent these data through the network to any hardware storage for further analysis. Our modification of this examination system required reprogramming of the Quizmaker's 13 report.html file to be able to send result data directly to a web server installed on the teacher's PC. This web server processes the result data into a modified results table, saves the table on teachers' PC for immediate access, and simultaneously it sends the table to a dedicated email address "histexam" located on university servers.

On the "histexam" location, the examination results are categorized by student's name, date of exam, contents of the exam etc. The downloaded result tables of every student are further manually converted to standard xlsx spreadsheet table and further analyzed to calculate values of summary points, net points, easiness index and difficulty index in percentage values. Based on these data, we can evaluate performance of each student, performance of groups of students undergoing the same tests and we can also compare groups of students by their performance. We also evaluate each question in the test to classify it as easy, moderate and difficult one. We presented the evaluation data in the form of columnar graphs where difficulty indices are color coded according to our own classification scale. This evaluation of tests gives us important data on the quality of tests applied but also on the overall preparedness of students for the particular topic. It can also indicate possible cheating activities of students.

Application of electronic tests is a useful tool for teachers and students alike. We consider the regular evaluation of electronic tests as very important follow-up feature of the examination procedure. It reveals improperly formulated questions, incorrect sets of distracters and overall difficulty of examinations. This activity also provides a summative information about classes of students and stimulates students in their preparation for examinations. Our further activities in this field will be directed towards development of a software-based automatic evaluation system.

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