



TESTING PRACTICAL SKILLS OF HISTOLOGY STUDENTS IN THE PC-EQUIPPED HISTOLOGY PRACTICAL LAB

D. Černochová, E. Pospíšilová, D. Krajčí, R. Lichnovská

Department of Histology and Embryology, Faculty of Medicine and Dentistry,
Palacký University, Olomouc, Czech Republic

Abstract

We use new and effective methods of examination and testing of student's practical skills. We started with the use of projection of simple slide presentations in MS PowerPoint format on a central screen in the class. These presentations have been setup to advance automatically with one minute timing in order to allow students to write their answers into a prepared answer forms. After the practical laboratory has been equipped with PCs for each student's seat, this method was improved with delivery of testing presentations on student's monitors simultaneously in three different versions. As a further step in developing PC-based testing of identification of histology slides we have used a special software Articulate Quizmaker '09. Because this software shuffles the quiz content randomly onto monitors of examined students, only one version of histology test was necessary to prepare for one practical class. Quizmaker '09 offers the possibility to use a mix of various formats of questions like - MCQ, MRQ, Hot Spot and Drag& Drop. The test can be exported into different application formats for web or LMS. The major benefits of this system are the straightforward and quick use of question packages, immediate and objective evaluation and reporting of results, limitation of lateral student's communication and crosstalk, and a good prevention of leaking questions outside of the examination room. This PC-based method of practical skills testing was well accepted by students and teachers alike.

Key words: histology, practical skills, PC testing

Quizzes and tests in MS PowerPoint format

With the advent of modern didactic methods in histology teaching, we have started to use new and more effective methods of examination and testing of student's practical skills. First, we used projection of simple slide presentations in MS PowerPoint format on a central screen in the class. Most of these questions were picture-based aiming at identification of various structures in tissues and organs. A small portion of questions dealt with simple



theory questions that could be answered in one line of a written text. Compared to the individual examination of students next to their microscopes, this method of collective testing method proved to be advantageous for students as well as for teachers. These pptx presentations have been setup to advance further automatically. All students were given the same quality slides to be identified in one minute per question time. Students had to write their answers into prepared forms that listed all questions and provided blank spaces for answers.

This method had several drawbacks like a necessity of maximal dimming of room lights that interfered with the student's need to write their answers, and a possibility of cross talk of students in crowded benches. Students sitting in the rear benches had been disadvantaged by their difficulty to resolve some details of projected images correctly. After the practical laboratory has been equipped with PCs for each student's seat [1], this method was improved with delivery of testing presentations on student's monitors simultaneously in three different versions for each of the three rows of student's benches in the class. This arrangement reduced the possibility of lateral communication during testing.

Tests prepared with a special quiz-making software

As a further step in developing our PC-based testing of practical identification of histology slides, we have tested several applications especially developed to create examination quizzes and tests, like Quiz Press [2], Multiple Choice Quiz Maker [3], Students MCQ Manager [4], Wandershare Quiz Creator [5] just to list a few of them.

Finally we decided to buy a license of a special software ARTICULATE Quizmaker '09 [6] which has proved to be simple and easy to use by teachers having no programming skills. The user interface of this software is similar to the standard environment of MS Office applications. Since this software has a selective option to shuffle sequences of questions and also to shuffle all distracters in the quiz content randomly on monitors of examined students, only one version of histology test was enough to prepare for one practical class. A time limit for display of each question and a total time allowed for a complete test were settable during test creation.

Quizmaker '09 offers the possibility to use a mix various formats of questions like - MCQ (one correct answer), MRQ (one or more of correct answers), and Drag&Drop format (dragging and aligning several correct options to the same number of statements). For identification of structures in displayed



micrographs a Hot-Spot format of question (clicking with a mouse on a structure in question) proved to be very useful in histology testing. This software provides a possibility to arrange a set of questions into groups according to topics they represent. The images inserted into questions can be labeled with various graphical symbols like arrows, rectangles, alphabetic and numeric symbols and their on screen appearance can be set up easily with the provided timeline for each slide. The color format for each slide can be selected from several slide templates. If necessary, each slide can be synchronized with an acoustic effects and commentaries, which can be used in authoring of formative quizzes.

Prior to exporting tests for PC application the teacher can decide about informations that will be visible to student during examination time. These are: the test title, countdown display of the total examination time, point value of each question and a current student's score as achieved during testing. On completing the test, the software automatically summarizes and displays value of correct answers in percentages and shows a minimum passing limit for that exam. When completely authored, the test can be exported into different application formats for web (for use on a website or a PC-equipped lab), for CD or DVD distribution, for LMS managed classrooms, and it can be also exported into a simple MS Word document for archival documentation.

We use quizzes and tests authored with this software for examination of large groups of students (up to 30 students simultaneously) in our PC-equipped practical lab where students log into an exam mode of the PCs [1]. At this examination mode the USB ports, DVD rewriter drives and e-mail access are deactivated so that students can't copy and save any of the examination questions.

Evaluation of PC-based testing of student's practical knowledge of histology

Major benefits of this system are the straightforward and quick use of question packages, immediate and objective evaluation of student's performance in percentage points and immediate reporting of tests results, limitation of lateral student's communication and crosstalk, and a good prevention of leaking questions outside of the examination room. This format of examination tests is easy to apply in large PC-equipped labs with large groups of students, it also saves the time of examiners as well as economizes stationary and consumables.



As we have been interested in student's evaluation of this new method of testing their knowledge, we have designed an anonymous evaluation questionnaire. The question about student's preference of examination in MCQ format over the classical oral examination was replied positively in 81% of responding students of General Medicine specialization and 94% of responding students of Dentistry specialization. Regular in-course testing of student's theory knowledge and practical identification skills has been considered helpful and motivating to improve their study activities in 86% of responding students of General Medicine specialization and 79% of responding students of Dentistry specialization. This preliminary evaluation results show that computerized in-course examination of theory and practical knowledge has been well accepted by students of our histology classes and teachers alike.

Conclusion

PC-based testing of students knowledge may be used not only as regular in-course assessments in practical sessions, but also as in-group summative examination tool at the end of the teaching semester, and with some modifications it can be a helpful tool to create formative quizzes for student's self testing on the Department of Histology and Embryology website.

References

- [1] KRAJČÍ D. et al., "Histology practical in electronic format of virtual slides". In: Mefanet report 04. Efficient multimedia teaching tools in medical education. D. Schwarz et al (Edts), Masaryk University, Brno, Czech Republic, pp. 60-68, 2011, ISBN 978-80-210-5539-1.
- [2] Softronic, Quiz Press 2.1.4. Available: <http://the-quiz-press.en.softonic.com/>
- [3] TAC-Soft, Multiple Choice Quiz Maker. Available: <http://www.tac-soft.com/multiple-choice-quiz-maker.html>
- [4] Softronic, Students MCQ Manager 1.2.0. Available: <http://students-mcq-manager.en.softonic.com>
- [5] Wandershare Quiz Creator 4.1. Available: <http://www.sameshow.com/>
- [6] ARTICULATE, Quizmaker '09. Available: <http://www.articulate.com/products/studio.php>