

EVALUATION OF THE STUDENTS KNOWLEDGE WITH USING RAPID E-LEARNING TOOLS

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Abstract: *The process of student knowledge evaluation is one of the key tasks of every college and university professor. Both in traditional learning and in distance learning, software that facilitates and automates this process is used more and more often. With the development of e-learning, the popularity of methodologies and tools for quick creation of materials, known as rapid e-learning, has been increasing. This article presents the characteristics of this group of tools and shows, using selected examples, their usefulness in the process of evaluation of student knowledge.*

Keywords: rapid e-learning, evaluation of knowledge, rapid e-learning tools, tests and activity creation tools, Articulate Studio 2009

INTRODUCTION

Evaluation of student knowledge is one of the key duties of college and university professors. This is a time-consuming and repeatable process as a large part of examination and test materials has to be prepared from scratch at least once a year. This can be facilitated by various information technology tools that automate the editing work. Preparation of resources in such software must be fairly simple so that every teacher can do it by himself. Lack of time and lack of skills needed to use special software are the most common reasons for decisions not to prepare teaching materials in electronic versions (Ren-Kurc, Kowalewski, Roszak, Kołodziejczak 2012: 209-211).

In the authors' opinion, attention should be paid to applications for rapid e-learning as, thanks to their functionality and ease of use, they can become a useful tool for every college or university professors.

1. THE ROLE OF STUDENT KNOWLEDGE EVALUATION

Testing and evaluation of the progress achieved by students are very important both for the teachers, who can see the results of their work and can make corrections, and for the students, who can see the outcomes of their efforts, which motivates them to keep working hard. One of the tenets of the Polish higher education reform of 2011 is that higher education institutions must document the achievement of the assumed educational results (Banachowski, Nowacki 2012: 59-60); consequently, evaluation of student knowledge is very important for schools, too.

Evaluation of student knowledge comprises:

- observation, analysis, and evaluation of learning progress achieved;
- observation and evaluation of the activities related to self-teaching of individual students as well as entire learning groups (exercise groups, lecture groups, etc.);
- feedback from students about educational and development achievements (Bednarek, Lubina 2008: 176).

Verification of teaching effectiveness consist in comparing the students' achievements (knowledge and skills) with the assumed teaching objectives and should be conducted throughout the entire course, academic year or semester.

1.1 Evaluation of student knowledge in distance learning

Evaluation of student knowledge in distance learning plays a special role and is particularly important in the learning process due to the limited nature of contacts between the teachers and the students. New technologies and fast development of new software enable using various methods of evaluation and preparing various diagnostic tools (Heba, Smyrnova-Trybulska 2011: 76-80). Besides the traditional and broadly used test method, other methods are used, such as educational games, quizzes, crosswords and simulations.

The electronic form of the evaluation of the learning process has many *advantages* including:

- a broader scope of knowledge can be tested;
- a larger group of students can be covered by the test process at the same time;
- subjective evaluation is eliminated thanks to the use of a point system;

- the examination sets are individualized, which results in a sense of fair evaluation;
- the results of the evaluation can be obtained quickly, often immediately after the test has been taken (Roszak, Kołodziejczak, Kowalewski, Ren-Kurc 2013: 40);
- the forms of evaluation of student skills are interactive;
- it is possible to easily analyze the outcomes of the learning process thanks to tools, such as those integrated with the e-learning portals;
- it is possible to quickly transform the contents being taught into review material with a self-evaluation component (Roszak, Kołodziejczak, Ren-Kurc, Kowalewski, Bręborowicz 2013: 41-42);
- systematic evaluation is possible without putting an excessive burden on the teacher (this does not include the evaluation process preparation stage).

The *disadvantages* of this evaluation method include:

- the process of preparation of the evaluation using the distance-learning methods is time-consuming;
- the teachers need to have appropriate ICT competences (Ren-Kurc, Kowalewski, Roszak, Kołodziejczak 2012: 201-212);
- the school must have appropriate computer labs or computer equipment with Internet access for the students;
- students can get help from others during examinations taken away from school;
- students can guess the answers (Ren-Kurc, Roszak 2011: 255-257);
- students cannot discuss their doubts or concerns right away, e.g. when they are solving a problem or taking a test;
- the possibility to provide feedback, to include substantiation of the grade, is limited.

The more and more frequent use of e-learning portals in the process of evaluation of student knowledge leads to more effective use of the advantages of the electronic evaluation methods.

This is because educational portals offer various tools for designing problems and tests using multimedia elements. They also provide interactive forms of skill testing and tools for creating extensive descriptive evaluations, as well as simple feedback that gives guidance to students as to their further actions. They make it possible for students to see the progress they have achieved and to monitor it in an ongoing manner. Also, they support team work and exchange of experiences between participants of the learning process. Access to all forms of the students' activity on

the educational portal (logs, notes, comments, forums, etc.) enables the teacher to fully monitor their activity and progress and use this information for performing their comprehensive evaluation. The technical possibilities of testing, evaluation and give feedback (e.g. using e-learning portals) give teachers the opportunity to control the process of teaching and learning.

2. RAPID E-LEARNING

The term *rapid e-learning* refers mostly to quick and optimized methods of preparation of e-learning courses (Kompedium e-Edukacji 2013). The on-line courses elaborated using this technology have the following characteristics:

- their budgets and required preparation time are limited;
- the teams responsible for their preparation are small and most often comprise an expert in a specific field and, possibly, a lecturer, a graphic artist, and a LMS portal expert;
- the courses use ready-made graphics and templates available in the edition tool that was used;
- the structure of the contents is simple and the navigation is intuitive;
- preparation of the course does not require programming skills and integration with an LMS portal is easy to perform.

The quick development of e-learning in the 1990's caused a large demand for training courses and made the organizers aware of the complexity of the process of their creation. Because of the technological problems that occurred and the high costs of creation of courses from scratch, the existing resources were used, e.g. multimedia presentations (Penkowska 2007, Rusek 2011).

After 2000, a series of rapid learning tools were proposed on the market and became popular because of their simplicity and the feeling that anyone could build an e-learning course from a simple PowerPoint presentation (Kołodziejczak 2011). As has been mentioned, the quick development of e-learning had also some economic foundations. Preparation of a traditional course usually takes between ten and twenty months. In contrast the aim of rapid e-learning is to build and roll out content modules within weeks. For example, while one hour of standard e-learning can take 73 to 220 hours to develop, a PowerPoint to e-learning conversion can be estimated to take an average of 33 hours to develop (Time to Develop One Hour of Training, <http://www.astd.org/Publications/Newsletters/Learning-Circuits/Learning-Circuits-Archives/2009/08/Time-to-Develop-One-Hour-of-Training>).

However, courses prepared on the basis of presentations had a fundamental disadvantage: they were limited to passive presentation of knowledge and involved no interaction with students. Rapid e-learning was criticized for breaking the "learning by doing" rule. This is why the most recent tools for course development

are equipped with mechanisms for creating interactive elements, such as tests, quizzes, simulations, etc. Currently, due to the financial situation of universities, rapid e-learning is an important trend in education (Gajewski 2011).

3. CHARACTERISTICS OF RAPID E-LEARNING TOOLS

Now that rapid learning development has become an integral part of the authoring practice worldwide, some authors and consulting companies focus on how to reach the optimal compromise between the economic need for rapid learning and the pedagogical objective of a good instructional design (Rapid E-Learning, <http://www.kineo.com/rapid-elearning/rapid-e-learning.html>).

In the opinion of the authors of this article, tools for developing the educational content in rapid e-learning should have the following characteristics:

- ease of design of contents and their future updates;
- creation of materials mostly on the basis of ready-made templates;
- possibility to simply link existing contents and to insert graphics and multimedia;
- possibility to publish courses in formats complying with the SCORM/AICC standard;
- possibility to handle (save/read) many file formats;
- possibility to connect educational contents with different forms of student activity;
- possibility to systematize and structure knowledge without reducing the attractiveness of the form;
- a simple interface and an intuitive navigation;
- possibility to add tips, feedback, and summaries;
- no need to use programming languages to create materials.

The above list of requirements appears to be self-evident but is not so easy to achieve because, on the one hand, we expect the tools to be simple to work with and intuitive and, on the other hand, we want them to provide the author with a number of functions related to content building and student activity. There are many applications with different functionalities in the market. Most of them are authoring tools that include rapid learning as a feature. These include Articulate Storyline, Articulate Studio, ActivePresenter, Adobe Captivate, Dokeos, and LCDS.

Each of the aforementioned programs enables preparing tests and other student activities. Thus, they can be a useful tool for evaluation of students knowledge.

4. EXAMPLES OF RAPID E-LEARNING TOOLS

This chapter contains a review of selected applications for building materials for revising and testing student knowledge using rapid e-learning tools. The choice of the software is subjective and based on the experiences of the authors of the article gained during the 9 years of their work in the field of academic distance learning at three universities in Poznań.

4.1 Learning Content Development System

Learning Content Development System (<http://www.microsoft.com/learning/en/us/lclds-tool.aspx>) is an editor of e-learning materials that, in the opinion of the authors of this article, deserves particular attention. Three of its functionalities are unique compared to other freeware software: a large number of templates for creating educational contents, a broad base of interactive elements, and an integrated tool for creating test preparation books based on the existing course edition.

The LCDS editor stands out from the many similar tools thanks to the large number (24) of different templates for creating educational content (see Figure 1), to include 14 for systematizing and checking student knowledge. These are:

1. *Interact (Adventure Activity*, Drag and Drop, Interactive Job Aid, Slider, Sequence Activity),*
2. *Watch (Animation*, Demonstration*, Media with Key Points, Click Table Animation),*
3. *Play (Sort Game*, Tile Game*, Card Flip*), and*
4. *Try (Simulation, Lab Scenario/Offline).*

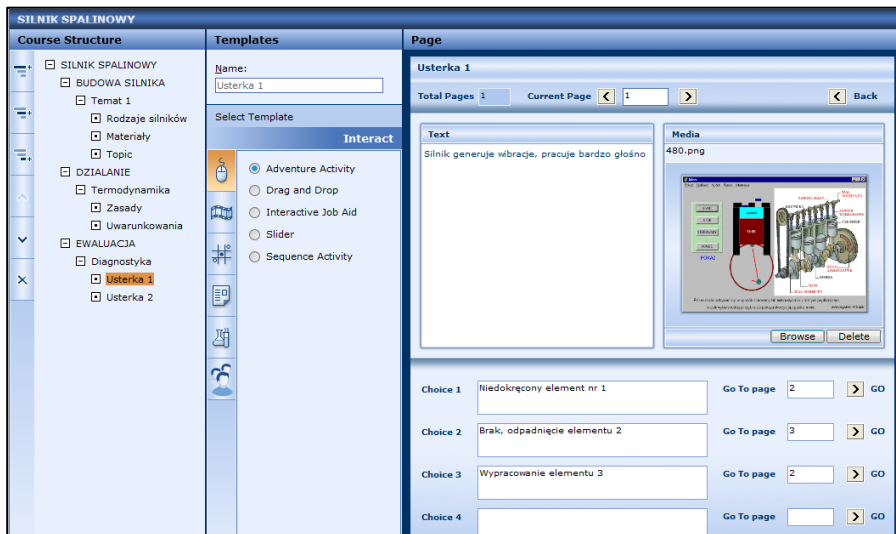


Figure 1. Adventure Activity in LCDS

Source: Own elaboration

The templates marked with the asterisk (*) can be used for building review materials based on the course materials.

Their arrangement according to the student activity criterion greatly facilitates their selection in accordance with the principles of development of materials intended for distance learning. Materials prepared in the LCDS editor can be saved in the publication version that is ready for posting on an LMS portal or outside of distance learning portals – in resources stored on WWW servers. The materials can be exported from the editor in the following formats: RTF files (for local reading or for printing), SCORM 1.2 packets, single SCO packets for aggregation in different SCORM units, Media Map (a CSV file), term indices, and Topic Thumbnails (a kind of topic lists).

Self-tests taking into account different context of knowledge being taught are very important to the learning process. The LCDS editor has a functionality that is unique in educational content authoring tools, namely a special module named “LCDS Learning Snack” for preparing test preparation modules based on the existing course edition. Review materials and self-tests can be prepared in this editor in two ways: by choosing the key nodes from the course in the LCDS or by building the review content based on a course from another tool (Roszak, Kołodziejczak, Ren-Kurc, Kowalewski, Bręborowicz 2013).

4.2 Articulate Studio 2009

Articulate Studio 2009 (<http://www.articulate.com/products/studio.php>) is a package of educational materials authoring software based on Power Point which comprises:

- Articulate Quizmaker – a tool for preparation of tests;
- Articulate Engage – a tool for preparation of interactive slide shows;
- Articulate Presenter – the main tool that combines elements from the other software of the Articulate Studio package;
- Video Encoder – a tool for converting films saved in popular video formats (avi, mpeg, etc.) into Flash files.

For many years, Articulate Studio 2009 has been one of the leading rapid e-learning tools. After installation, Articulate Studio 2009 becomes fully integrated with PowerPoint, with the *Articulate* tab appearing on the Power Point ribbon. Two programs from this package, namely Articulate Quizmaker and Articulate Engage, are particularly useful in the process of evaluation of student knowledge.

Articulate Quizmaker is the part of Articulate Studio 2009 with an intuitive and easy to use interface (see Figure 2).

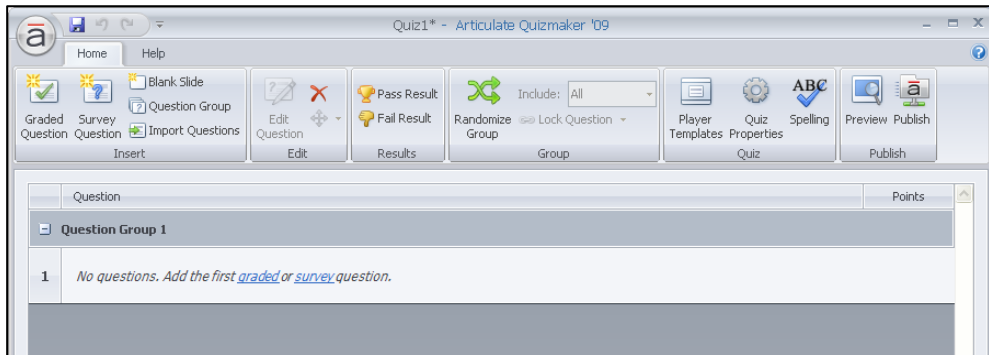


Figure 2. Quizmaker window for graded quiz

Source: Own elaboration

The program enables creating tests and surveys. In the case of tests, each answer is assigned a certain value and is evaluated. Survey questions are not assigned any values and the answers given by students are not evaluated. This application offers various types of test questions, starting from single- and multiple-choice questions, true/false questions, questions where the answers are to be matched (Matching Drag and Drop, Matching Drop Down, Word Bank), and questions where the answers must be put in a proper order (Sequence Drag and Drop), through tests with questions that require calculation and questions with active places (Hot Spot). In total, there are 11 different types of interfaces for developing test questions (Shank, Bircher 2009: 313-334).

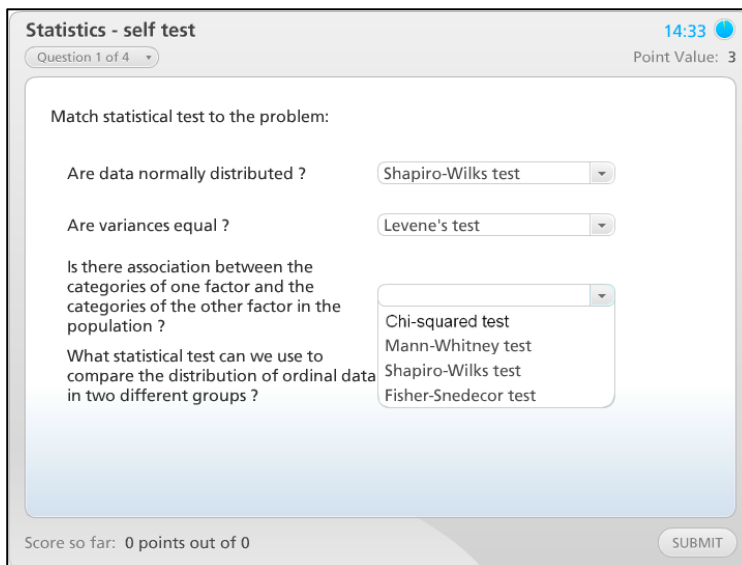


Figure 3. Matching Drop Down question

Source: Own elaboration

Survey questions are prepared based on 9 available templates: Likert scale questions, selection of one or many options, providing short or long answers, arranging statements in a certain order, and providing answers in the form of numbers (see Figure 4).

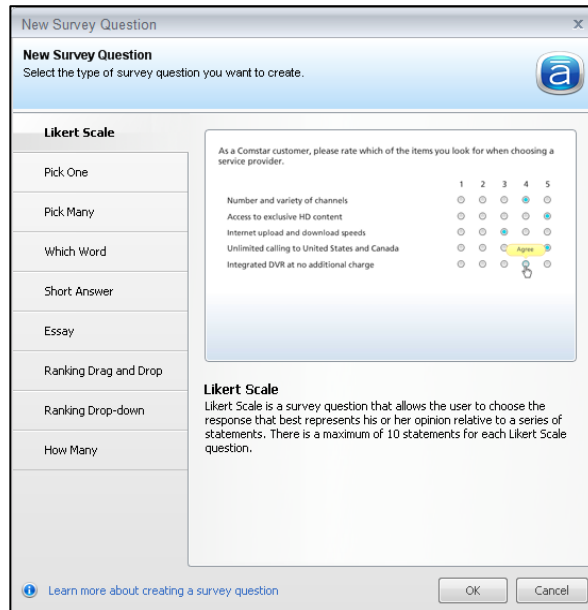


Figure 4. New Survey Question dialog box

Source: Own elaboration

The software enables importing ready-made questions, in the form of a file, a group of questions, or a single question, from other quizzes prepared in the Quizmaker software. The application enables:

- grouping questions by topic;
- defining the random order and the number of question in a topic-related group;
- branching of the test so that students get different questions depending on their answers to the previous question;
- adding a time limit for completion of the test.

Once the test is finished, it can be published in the Flash format and made available locally in a default browser through a LMS portal or the Articulate Online website. Moreover, the test can be saved on a CD or as a Word document.

The software enables adding feedback comments to each question in a test or a survey, returns the final results of tests in the form of summaries, and enables reviewing the answers given by students (see Figure 5, 6).

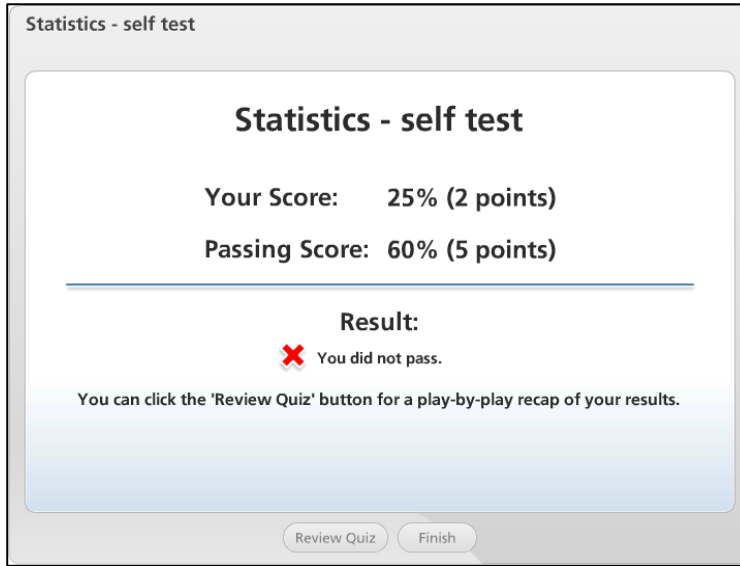


Figure 5. Pass result slide

Source: Own elaboration

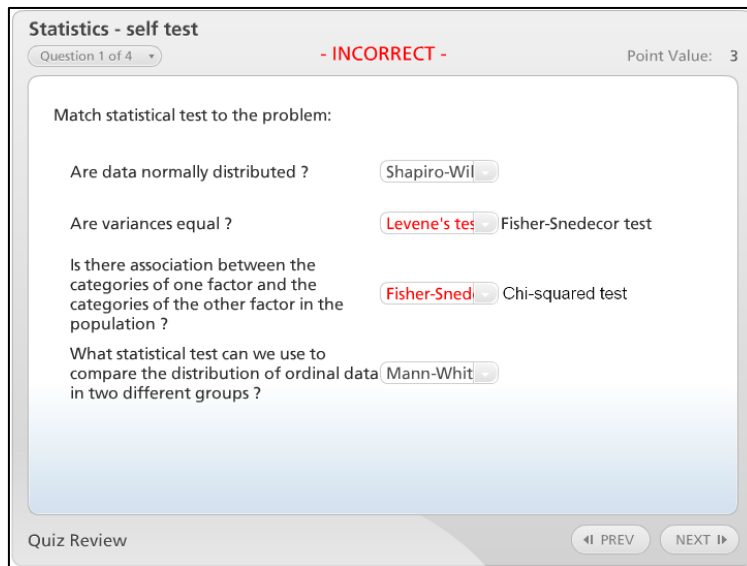


Figure 6. Quiz review with feedback comments

Source: Own elaboration

Articulate Studio also includes Articulate Engage – a tool for creating interactive elements for e-learning courses. The software provides 10 different forms of student activities that can be used in self-tests or review materials (see Figure 7). In the

opinion of the authors, the particularly useful activities are (Shank, Bircher 2009: 610-624):

- FAQ – a collection of clickable questions; viewers click a question to display the answer;
- Process – describe the steps or phases of a linear procedure or process;
- Tabs – describe a set of items that are related in some way, such as a series of concepts, members in a group or differences among objects;
- Timeline – provides a visual way for viewers to move through a timeline of chronological events;
- Glossary – a collection of clickable terms displayed alphabetically.

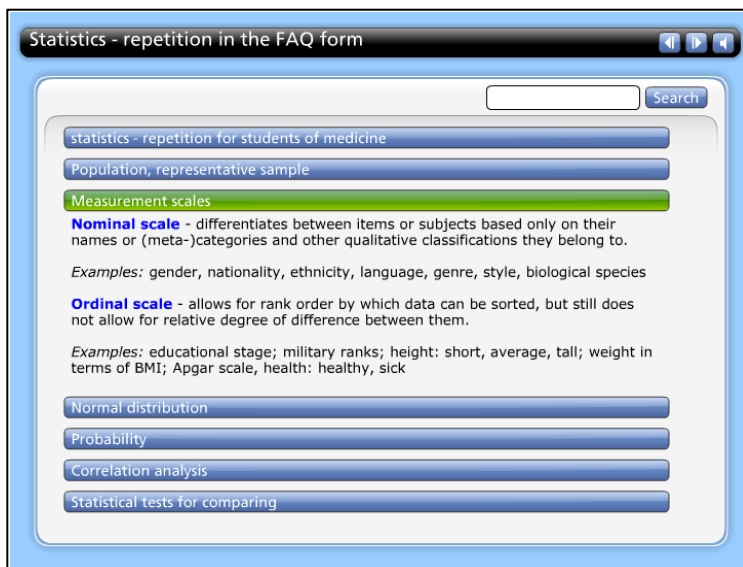


Figure 7. Revision material in the FAQs form

Source: Own elaboration

Even though Articulate Studio 2009 is commercial software, it is very popular thanks to the fact that it combines extensive functionalities in the area of content creation with a simple interface and an easy process of publication both in local resources and on LMS portals.

CONCLUSION

The development of information technologies enables partial automation and simplification of the process of testing and evaluating the progress achieved by students. However, it also requires teachers to improve their ICT skills. This is why, in the opinion of the authors of this article, of note are the opportunities provided in

this area by rapid e-learning tools. A simple, intuitive software interface, numerous content templates, support of multimedia, and a simple process of course publication are the basic features of such software.

Information on the key criteria for selection of rapid e-learning authoring tools and a comparison of their capabilities can be found at <http://www.kineo.com/rapid-elearning/five-key-considerations.html>.

REFERENCES

- Articulate Studio '09, available at <http://www.articulate.com/products/studio.php>, (accessed on 27 July 2013)
- Banachowski, L., Nowacki, J., 2012: *Improving process of teaching students by means of methods and tools of knowledge management and e-learning*. EduAction. Electronical Education Magazine, Vol. 4 No. 2, 2012, pp.49-60. ISSN 2081-870X [In Polish]
- Bednarek, J., Lubina, E., 2008: *Distance learning. Fundamentals of didactics*. Polish Scientific Publishers PWN, Warsaw, 2008, pp.176, ISBN: 978-83-01-15471-4 [In Polish]
- Create online courses and Silverlight Learning Snacks with LCDS, Available at <http://www.microsoft.com/learning/en/us/lclds-tool.aspx>, (accessed on 20 July 2013)
- Gajewski, R.R., 2011: *Social software and streaming transmissions in creating open educational resources*. Methodology and evaluation of e-learning, Sc. ed.: Ochnio, L., Orłowski, A., Publishing House of SGGW, Warsaw, 2011, pp.43-45, ISBN: 978-83-7583-276-1 [In Polish]
- Heba, A., Smyrnova-Trybulska, E., 2011: *Proprietary theoretical and methodological computer-oriented system for the development of mathematical competence of students*. Use of E-learning in the Developing of the Key Competence, Sc. ed.: Smyrnova-Trybulska, E., Studio Noa, Katowice-Cieszyn, 2011, pp.65-93, ISBN: 978-83-60071-39-7
- Kołodziejczak, B., 2011: *PowerPoint as a tool for e-learning*. E-mentor, No. 5 (42), 2011, pp.51-55, ISSN: 1731-6758 [In Polish]
- Kołodziejczak, B., Roszak, M., *Rapid e-learning in biostatistics*, available at http://www.stat.gov.pl/pts/kongres2012/dok/streszczenia_referatow.pdf, (accessed on 1 July 2013)
- Compendium of e-Education, available at <http://www.czn.uj.edu.pl/kompendium/?q=node/512>, (accessed on 20 July 2013) [In Polish]
- Penkowska, G., 2007: *Polish e-learning from the experts' point of view – part 2*. E-mentor, No. 4 (21), 2007, pp.34-38. ISSN 1731-6758 [In Polish]

- Rapid E-Learning, Available at <http://www.kineo.com/rapid-elearning/rapid-e-learning.html>, (accessed on 19 July 2013)
- Ren-Kurc, A., Kowalewski, W., Roszak, M., Kołodziejczak, B., 2012: *Building Digital Content for E-Learning. Information and Communication Technologies (ICT) Competence*. E-Learning for Societal Needs, Sc. ed.: Smyrnova-Trybulska, E., Studio Noa, Katowice-Cieszyn, 2012, pp.201-212, ISBNa; 978-83-60071-59-5
- Ren-Kurc, A., Roszak, M., 2011: *Evaluation of the teaching process. The organization of test exams and survey*. Information Technology in The Teacher's Workshop, The new educational challenges, Sc. ed.: Migdałek, J., Stolińska, A., Academic Publishing House of the Pedagogical University of Cracow, Cracow, 2011, pp.255-257. ISBN 978-83-7271-649-1 [In Polish]
- Rozzak, M., Kołodziejczak, B., Kowalewski, W., Ren-Kurc, A., 2013: *Standard Question and Test Interoperability (QTI) – the evaluation of student's knowledge*. E-mentor, No. 2 (49), 2013, pp.35-40. ISSN 1731-6758 [In Polish]
- Rozzak, M., Kołodziejczak, B., Ren-Kurc, A., Kowalewski, W., Bręborowicz, A., 2013: *Repetitions and summaries in distance learning materials. Learning Content Development System (LCDS)*. E-mentor, No. 1 (48), 2013, pp.40-46. ISSN 1731-6758 [In Polish]
- Rusek, M., 2011: *Methods for rapid development of courses for higher education*. Technologies and e-learning tools, Sc. ed.: Ochnio, L., Orłowski, A., Publishing House of SGGW, Warsaw, 2011, pp.142-149. ISBN 978-83-7583-277-8 [In Polish]
- Shank, P., Bircher, J., 2009: *Essential Articulate Studio '09*. Wordware Publishing, Inc., Sudbury, 2009. ISBN 978-1-59822-058-2
- Time to Develop One Hour of Training, available at <http://www.astd.org/Publications/Newsletters/Learning-Circuits/Learning-Circuits-Archives/2009/08/Time-to-Develop-One-Hour-of-Training>, (accessed on 19 July 2013)