Interdisciplinary Description of Complex Systems 13(1), 117-127, 2015

QUALITY OF LESSONS IN TRADITIONAL AND ELECTRONIC TEXTBOOKS

Snežana Laketa[1,*] and Darko Drakulić[2]

[1]Elementary School "Vuk Karadžić"
Vlasenica, Bosnia and Herzegovina

[2]Faculty of Philosophy
Pale, Bosnia and Herzegovina

DOI: 10.7906/indecs.13.1.12
Regular article

Received: 16 September 2014.
Accepted: 4 January 2015.

ABSTRACT

The aim of this study is to verify and assess the quality of lessons in traditional and electronic textbook on general standards of textbooks quality. The method of theoretical analysis and content analysis was used. For the purpose of analyzing the contents of the sample we took teaching unit Measures and measurement from two textbooks: the traditional and the electronic. The electronic textbook, which has been the subject of research, is of quality and meets the standards of textbook quality.

KEY WORDS

traditional textbook, electronic textbook

CLASSIFICATION

JEL: I21, O14
PACS: 01.40.gb

*Corresponding author, η: snezanalaketa9@gmail.com; +387 66 726 472;
Elementary School "Vuk Karadžić", Svetosavska 25, 75 440 Vlasenica, Bosnia and Herzegovina

INTRODUCTION

The textbook is one of the most important sources of knowledge.It contains the most important skills that students should acquire by the prescribed curriculum. Modern education has to include changes in the content of learning and teaching methods. E-learning is now very widely used in different activities of modernization of teaching because it is specifically in relation to other ways of learning (flexibility in the use of learning materials, choice of time for learning, personal responsibility for the dynamics and structure). The development of new technology causes the integration of technology into the teaching process. "Effective integration of technology into the teaching process requires teachers not only to use their knowledge about the use of technology in the learning process, but also to combine and integrate the technological and pedagogical knowledge" [1; p.49]. At the beginning of 2010 the company introduced the Apple iPad device, which marked the beginning of a major expansion of electronic devices called tablets (English: tablet, the Serbian is also called table). Tablets are characterized by a large touch-screens, light weight, relatively low cost, compactness and ease of use. Since the advent of the iPad, tablets experienced a great expansion in all areas of electronic communications, and deservedly occupy a leading role in the educational process. Today most states actively work on introduction of information and communication technology (ICT) in the teaching process, a special emphasis is given to the use of tablets in schools. In addition to the variety of platforms for distance learning, electronic materials (e-materials) and electronic books (e-books) are the basis of electronic education. Does this mean that the time has come to replace traditional teaching and books with electronic? The aim of the research comparing the quality standards of traditional and electronic textbooks is to check and evaluate the quality of lessons in traditional and electronic textbook on general standards of quality textbooks that are defined by Ivić, Pešikan and Antić [2]. The method of theoretical analysis and content analysis was used. The electronic textbook, which has been the subject of research, is of quality and meets the standards of textbook quality which are defined in [2].

THEORETICAL APPROACH TO THE PROBLEM

This part of the work consists of several sub-chapters: Comparison of some issues in terminology, Theoretical consideration of the problem, Classifications of textbooks.

COMPARISON OF SOME ISSUES IN TERMINOLOGY

The textbook is a teaching tool in which "the teaching material is given scientifically and accessible according to the curriculum of each subject" [3; p.1060]. The textbook is one of the most important sources of knowledge. It contains the most important skills that students should acquire by the prescribed curriculum. The lessons in it are logically systematized, that is distributed on the basis of cause-and-effect relationship. Lecture by teachers and text books complement each other.

The concept of textbook can be most completely defined as "each teaching tool or a combination of teaching aids) that contains systematized knowledge in some areas which are didactically configured for a certain level of education and a certain age of students, to have developmental and formative role and participate in the construction of students 'knowledge' " [2; p.24]. Regarding language, the textbooks should be written in a concise, easily accessible and picturesque language. The methodological side of textbooks must be systematically arranged, logically structured into chapters and sections, accompanied by pictorial texts and drawings, and so that the illustrated and textual materials there are organic

unity. Before defining the concept of an electronic textbook, it is necessary to define the concept of e-learning. To the question "What exactly is an e-learning?" D. Webster reported: "Quite simply, e-learning is simply learning that happens on your computer. At the present time, it usually means learning through the Internet, the information provided through the Internet search engine" [4; p.8]. High quality e-learning is, according to D. Webster, characterized by "a high level of interactivity, integration of simulation and animation, multimedia support, integration with classroom learning and the development of hybrid learning systems, being supported by various electronic materials in different formats, being founded on mutual learning of students and tutors, learning management system which is based on the possibilities of the web, etc." [4; p.10].
Keller and Suzuki defined the concept of e-learning in a broad sense, so that it applies to almost any learning environment in which electronic media, such as computers, are used as a component of educational delivery systems [5; p.230].

E-learning is a revolutionary turning point in the education system. "The development and maintenance of effective e-learning can be even more challenging in the era of great technological progress" [6; p.253]. The fact is that the "modern web Technologies use communication, collaborative opportunities that are easily accessible and very popular among the younger generations, so that they can become a substitute to current methods of teaching and learning" [6; p.310]. And in some cases, e-learning can be more effective than of the traditional and confirm the following results: "E- learning of word studying proved to be more effective than traditional teaching. Based on the measurement of achievement of the participants it was concluded that there was no statistically significant difference between the two groups (t = –3672, df = 36, p = 0,001) in favor of electronic teaching, which was confirmed by the test that was given two months later" [8; p.61].

The electronic textbook is not an electronic (scanned) form of traditional textbooks. "While there is no universally accepted definition of e-books, the electronic textbook implies a digital document that contains elements of classic books (text and images), and interactive elements such as audio/video recordings, various tests, simulations, and learning games and applets" [7; p.311]. Interactive elements at the rate of interactivity can be divided into three groups:

- elements with low interactivity – audio and video files, simple animations and simulations. These elements have only two controls – start and stop playback,
- elements with an average rate of interactivity – basic tests: yes / no tests, multiple choice tests and additions. Users of these elements have the ability to input answers, check the input and the ability to display correct answers, and
- elements with a high level of interactivity – advanced animations and simulations (in which the user can actively participate), advanced test (connecting, testing and correcting arrangement), applets and various learning games. In these elements, the user can dynamically change the look, content, input and output data as well as to get feedback depending on the activity.

It should be noted that "there is no ideal textbook, so that we should be constantly engaged, theoretically and practically, in creating better textbooks. This is achieved by a team work of creative professionals with different professions" [9; p.441].

THEORETICAL CONSIDERATION OF THE PROBLEM

It is necessary that the textbook "with its content and didactic apparatus supports the construction (design) of knowledge of the learner" [2; p.24]. The tutorial is not only for the

transmission of knowledge, but the structure of knowledge, "a process of active construction of stable and usable knowledge, and to the student's own effort, his thinking and actions" [2; p.25]. In addition to this important feature of quality textbooks, another feature is the content of the textbook adoption process, which is just as important as the content.

The content of textbooks should didactically be designed to ensure that the basic structure of knowledge is accepted by the person to whom this textbook is intended to establish communication with him. The textbook should be directed (focused, centered) on the students "to his developmental level of prior knowledge, motivation for learning, social and cultural background, value system" [2; p.26]. It is necessary that in the textbook there are illustrations – paintings, drawings, schemes, which are in necessary logical connection with textually processed curriculum. In Germany there is a system PROBITON (PRO program, BI images, TON tone), where using a computer in the electronic classroom combines text, still and moving images and sound.

Successful teaching with technology is a multidimensional process that "requires an understanding of the representation and formulation facilities of technology use, pedagogical techniques that use technologies in constructive ways to teach content; knowledge about what makes the content difficult or easy to learn and how technology can help; knowledge of students' prior knowledge and theory, epistemology, and understanding how technology should be used to build on existing knowledge and to develop new" [10; p.98]. The students in the DEL (Distance e-Learners) classes achieved similar, and sometimes better results than traditional courses, confirming results 324 complete surveys in the Canadian province of New Faundlend and Labrador. The problem is that students fail to complete their courses usually because of technical difficulties as a result of insufficient development of technical skills and lack of understanding of the issues "37,5 % of the students did DEL courses in high school completely, while the majority of students 62,5 % did not" [11; p.85].

The game stands out as a special activity that contributes to the development of children's thinking. It entails a replacement of one concept to another, ie symbolic function. In the game, the child is head over himself; the game belongs, by Leo Vygotsky in the area of the next development. Available in the textbooks must be exposed in an interesting way, so that their adoption does not represent the student boredom, monotony, indifference.

The use of digital textbooks in elementary school classrooms helps students to concentrate during problem solving. "One reason digital textbooks may improve cognitive and thinking mechanisms is that their interactive nature makes them more intersting to the studenst. Our results support expectation that the use of digital textbooks will have positive effects on student learning by increasing student interest in the curriculum" [12; p.240].

The process of finding solutions in the electronic textbook that is the subject of our analysis is clearly shown in Figure 1. It shows didactic game which helps the student calculate the value of numerical expressions containing parentheses.

$$12 - (4 \cdot 0{,}5 + 1{,}6) = 8{,}4$$

$$12 - (4 \cdot 0{,}5) + 1{,}6 = 11{,}6$$

Figure 1. The process of finding solutions.

CLASSIFICATIONS OF TEXTBOOKS

In this section we present a way to classify traditional and electronic textbooks. It is important to point out that the textbook is the source of knowledge in which the teaching material is presented in a scientific, but also in intelligible way according to the curriculum.

Classifications of traditional textbooks

Kobola classifies books as follows: comprehensive, differentiated, programmed. Comprehensive (synthetic, integral) textbook "encompasses the whole curriculum content for each subject and grade" [13; p.196]. It includes all components of the teaching process: preparing for a new topic, the lectures topics, practice, repetition and verification. Differentiated (branched, split) textbook on certain criteria (by subject, areas) divides learning contents into several separate small volumes, and includes a handout for students' self-training. Programmed textbook brings teaching content very gradually (in small articles or steps), strongly activates the students in learning and provides feedback on the adequacy of the student's activities. "So the highest level of didactic design is implemented in a programmed textbook" [13; p.196].

The same author mentions the emergence of multimedia textbooks, which not only serve to teach the complete knowledge, but by multimedia techniques (picture, word, movement, music) penetrate deeper into the consciousness: "Simultaneously excites many sensory areas, which guarantees a broader and deeper engagement of students, excites, strengthens and deepens the feelings and interests, mimicking the inductive logic of cognitive way, and thus more strongly activated by students and achieves integration of all his mental functions" [13; p.197]. And they are all foundations of successful teaching and learning.

Classification of electronic textbooks

Electronic textbook in the broad sense includes any electronic material that can be used as a teaching tool. Such materials differ in the degree of interactivity that is contained in them and it is necessary to make a more detailed classification of electronic textbooks.

The first electronic textbooks were electronic version of the classic (printed) book. They had the same elements as the classic textbooks – just text and images. These books have a practical advantage over the classical textbooks (mobility, distribution, search, edit mistakes ...) but there is no didactic advantage of these textbooks. Present-day electronic textbooks are much more than just an electronic image of classic textbooks. They contain lots of interactive material that cannot be integrated into the classical books – audio/video recordings, various interactive tests, quizzes and learning games.

Many electronic textbooks erroneously identified with an electronic version of the classic textbook, and therefore (UN) reasonable exercise challenge to their quality and the advantages over conventional textbooks. Therefore, it is necessary to carry out an accurate classification of the electronic books and correctly identify each of the types.

As noted above, the technical and didactic poorest electronic textbooks contain only text and images and such books are called digitized textbooks (**d-textbooks**). Content rich, interactive textbooks are called rich textbooks (**b-textbooks**) and they all except the D-textbooks contain additional audio recordings and interactive questions. Meaningful richest electronic textbooks are interactive textbooks (**i-textbooks**) that contain all the elements of b-books with elements of high rates of interactivity – learning games, dynamic structures, interactive examination of the possibility of recording responses, analysis of the performance and linking material. Technological advantages of interactive textbooks in relation to other is the complete suitability of content Human-Computer Interaction as well as platform independence of eContent

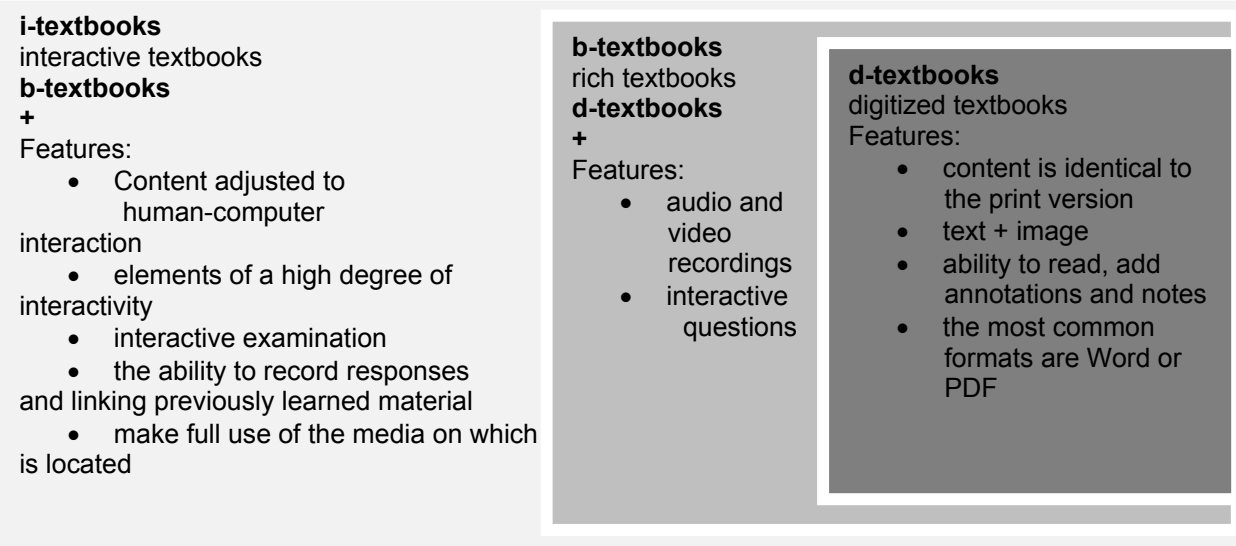

Figure 2. Classification of electronic textbooks.

which allows their presentation on all devices, from personal computers, to mobile computers and from tablets to smart phones.

RESEARCH METHODOLOGY

The problem from which we started in this research is *whether the electronic textbook that is the subject of our analysis meets the standards of quality for textbooks*?

Subject of studies are the quality standards of traditional and electronic of textbooks based on certain standards of textbooks which were defined in [2].

The aim of this study is to compare the quality of lessons in traditional and electronic textbook on general standards of quality of textbooks that are defined by [2]. We selected the following standards:
V1. Lesson (thematic unit, a unit of study and exercise) as a functional unit.
V2. Coherence in the presentation of the content lessons (good logical organization of ideas).
V3. Clarity and uniformity of visual graphic design lessons.

Based on the extracted standards of quality of textbooks, we have defined the objectives of our research for both sample surveys: traditional and e-textbooks:
1) to estimate achievement of expected goals and outcomes using lessons (thematic units, units of learning and practicing) as a functional unit,
2) to estimate coherence in the presentation of the lessons content (good logical organization of ideas),
3) to estimate clarity and uniformity of visual graphic lessons design.

Based on this set of tasks, we proposed the following hypotheses:
H1. Achievement of expected goals and outcomes using lessons (thematic unit, a unit of study and exercise) as a functional whole is greater in electronic textbook.
H2. There is no difference in the assessment of coherence in the presentation of the lessons content (good logical organization of ideas).
H3. Clarity and uniformity of visual graphic lessons design, is greater in electronic textbook.

The method that we used in our study is the method of theoretical analysis and content analysis of textbooks. For the purpose of analyzing the contents of the sample we took the teaching of topics Measures and measurement of two textbooks: the traditional and electronic. Teaching lessons in a traditional textbook which is official textbook for

Mathematics for 4 grade, by Dusan Lipovac, can be found on page 21 and 22 [14; pp.21-22]. This electronic book is created in the framework of a bilateral project between the University of Maribodu – Faculty of Sciences and University of East Sarajevo – Faculty of Philosophy called "Interactive learning of mathematics in the Republic of Srpska".

RESEARCH RESULTS AND DISCUSSION

Standards which are initial in our analysis are standards – V group; Quality lessons standards [2].

V1. LESSON (THEMATIC UNIT, A UNIT OF STUDY AND EXERCISE) AS A FUNCTIONAL UNIT

Under the standard V1. the authors imply that "every lesson in the book has its totality and all its structural components that contribute to the achievement of the general objectives (outcomes, learning outcomes) and for which he entered into the program of the case" [2; p.64]. The lesson must have its purpose, that clearly shows the student what to learn and what achievement to accomplish. Structural components of the lesson, according to Ivan Ivic and Jelena Pesic, must contribute to the achievement of objectives (outcomes), and we separated them in Table 1. We made assessment of the achievement of expected goals and outcomes using lessons (thematic units, units of learning and practicing) as a functional unit on the basis of answers:
5 – totally agree with your statement,
4 – mostly agree,
3 – undecided,
2 – tend to disagree,
1 – strongly disagree with your assertion.

Based on the evaluations in Table 1 we concluded that the electronic textbook lesson has higher quality than the traditional textbook lessons on the following standards: Lesson allows assessment and self-assessment of progress in learning. Lesson in electronic textbook contains tasks that can be handled several times and can get quick feedback on performance. Quick feedback, and possible experience success motivate students, which is also one of the listed standards. Lesson in electronic textbook requires practicing skills, techniques and procedures more than a lesson in traditional textbook because besides mathematics knowledge, the knowledge of ICT is required, and the active participation of students is

Table 1. Structural components of the lesson.

Structural components of the lesson Measures and Measurement	Lesson in traditional textbook	Lesson in electronic textbook
Lesson transmits basic knowledge and skills.	5	5
Knowledge is adequately represented in the lesson.	4	5
Manner of explaining and designing the curriculum is systematic and functional.	3	5
The content of the lesson encourages student activities.	3	5
The lesson requires the practice of skills, techniques and procedures.	3	5
The lesson allows trying out thinking patterns.	3	3
Lesson stimulates and maintains the motivation to learn.	2	5
The lesson allows assessment and self-assessment of progress in learning.	2	5

needed which is one of the existing standards. The traditional textbook has only four tasks and combined lessons of measure, measurement, millimeters and kilometers on a single page. The electronic textbook has specific sites and specific tasks designed for each term, so that the way of explaining and designing the curriculum is systematic and functional. Hypothesis H1 Achievement of expected goals and outcomes using lessons (thematic units, units of learning and exercise) as a functional whole is greater in electronic textbook is confirmed.

V2. TO ESTIMATE COHERENCE IN THE PRESENTATION OF THE LESSONS CONTENT (GOOD LOGICAL ORGANIZATION OF IDEAS)

This standard predicts that a lesson must have a clear and coherent structure exhibiting a given content, properly marked linguistic and graphical means.

Comparing lesson in traditional and electronic textbooks we conclude that the logical organization of ideas is better accomplished in electronic textbook, because the concepts and ideas clearly and logically follow and form the backbone, and on this basis we conclude that the hypothesis H2. There is no difference in the assessment of coherence in the presentation of the content lessons (good logical organization of ideas), has not been confirmed. All concepts of measure, measurement, millimeters, and kilometers are clearly separate, yet linked into a single unit (Figure 3). The course and development issues arising from such an organization is clear and logical, especially because the appropriate language and graphic resources are highlighted.

V3. ESTIMATE CLARITY AND UNIFORMITY OF VISUAL GRAPHIC DESIGN LESSONS

The structure of the lessons should be spatial and visual-graphic labeled in a clear manner and consistently implemented throughout the entire book. Lesson in a traditional textbook is displayed in a simple manner. In contrast to this, the lesson of the electronic textbook is rich with images, animations, interactive questions and tasks with feedback, and didactic games

Figure 3. The coherence of content.

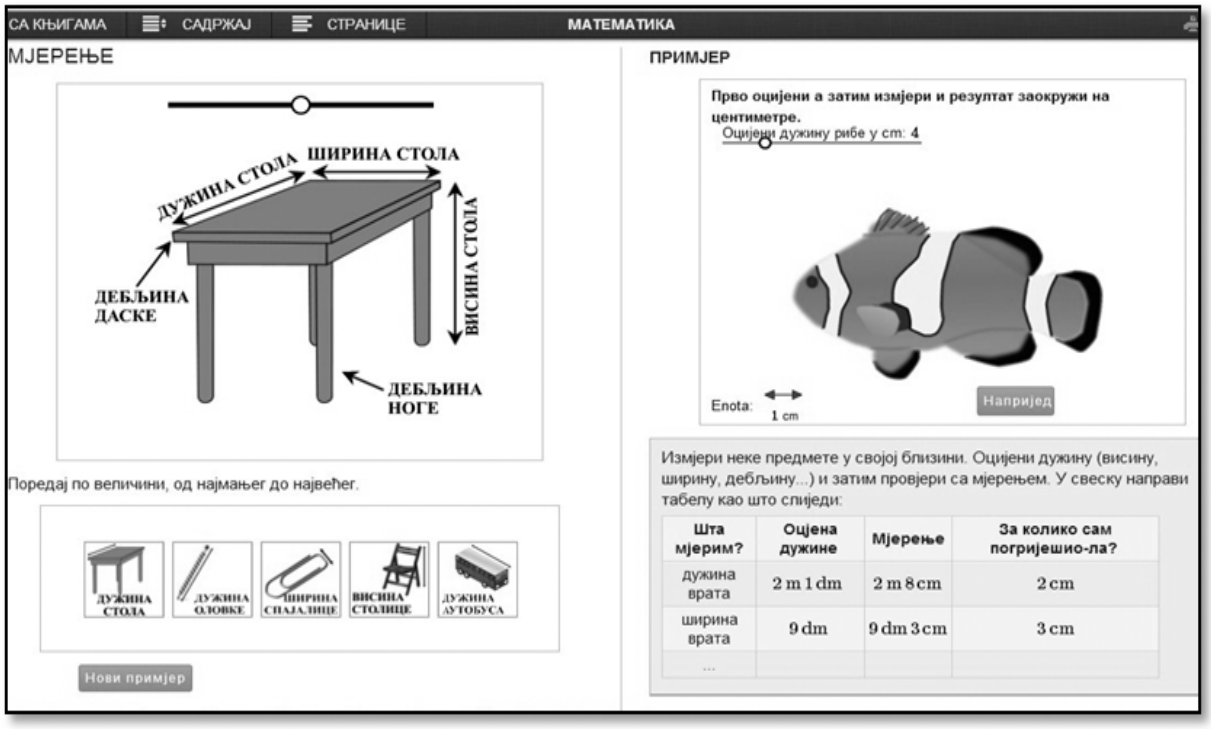

Figure 4. Clarity and uniformity of graphic design.

(Figure 4). We conclude that the clarity and uniformity of visual and graphic design of the lessons are greater in electronic textbook and thereby hypothesis H3 is confirmed.

The very appearance of site greatly affects the motivation to read and learn, "Structural wealth and good organization can contribute the preference to study from the textbook, since it break the monotony of text and highlights ideas from different angles" [2; p.70].

CONCLUSIONS

Basic concepts associated with the notion of a textbook are discussed in the theoretical part of this paper, as well as the traditional textbook, electronic textbook, e-learning, content of textbooks, then the classification of traditional and electronic textbooks.

The electronic textbooks, which is the subject of our research has fully integrated all the proposed guidelines (scope and content of the measures and measurement issues, expected outcomes and guidelines for teachers) that are designed by the Curriculum[1] of the Republic of Srpska for school year 2013/2014.

In the second part of the research results of theoretical analysis of traditional and electronic textbooks are provided. Examining the quality standards of traditional and electronic books the following was determined:

- that the achievement of expected goals and outcomes using lessons (thematic unit, a unit of study and exercise) as a functional whole is greater in electronic textbook,
- that there is no difference in the assessment of coherence in the presentation of the lessons content (good logical organization of ideas),
- that the visibility and uniformity of visual graphic lessons design, is greater in electronic textbook.

The electronic textbook, which has been the subject of research, is of quality and meets the standards of textbook quality as defined in [2].

It is necessary to provide each student with the requirements of the educational process to experience success in learning, because success is a great motivating factor. Electronic textbook of mathematics, which is the subject of our analysis and assessment meets the basic prerequisites for success and fostering love for mathematics.

REMARK

[1]available at http://www.rpz-rs.org/sajt/doc/file/web_portal/05/5.2/Nastavni%20plan%20i%20program%20za%20osnovnu%20skolu.pdf, accessed 23rd November, 2014.

REFERENCES

[1] Kabakçi Yurdakul, I.: *An Evaluative Case Study on Professional Competency of Preservice Information Technology Teachers*.
The Turkish Online Journal of Educational Technology **10**(3), 33-53, 2011,
http://www.tojet.net/volumes/v10i3.pdf,

[2] Ivić, I.; Pešikan, A. and Antić, S.: *Guide to a good tutorial: General standards of quality textbooks*. In Serbian.
Platoneum, Beograd, 2008,

[3] Franković, D.; Pregrad, Z. and Šimleša, P.: *Encyclopedic Dictionary of Pedagogy*. In Croatian.
Matica Hrvatska, Zagreb, 1963,

[4] Webster, D.: *Learning about e-learning*.
Knowledge Presenter, 2008,
http://www.knowledgepresenter.com/kpuniversity/v7/whitepapers/lal.pdf,

[5] Keller, J.M. and Suzuki, K.: *Learner motivation and E-learning design: a multinationally validated process*.
Journal of Educational Media **29**(3), 229-239, 2004,
http://www.gsis.kumamoto-u.ac.jp/ksuzuku/resume/journals/2004a.pdf,

[6] Rampai, N. and Sopeerak, S.: *The Development Model of Knowledge Management via Web-Based Learning to Enhance Pre-Service Teacher's Competency*.
The Turkish Online Journal of Educational Technology **10**(3), 249-254, 2011,
http://www.tojet.net/volumes/v10i3.pdf,

[7] Laketa, S. and Drakulić, D.: *Electronic Textbook in Mathematics*. In Serbian.
Obrazovna tehnolgija 3, Beograd, 2013,

[8] Kiliçkaya, F. and Krajka, J.: *Comparative Usefulness of Online and Traditional Vocabulary Learning*.
The Turkish Online Journal of Educational Technology **9**(1), 55-63, 2010,
http://www.tojet.net/volumes/v9i2.pdf,

[9] Vasilijevic, D.; Bojovic, Ž. and Laketa, N.: *Electronic Textbookand its Methodical Values*.
In Aytekin, İ., ed.: *Proceedings of the 11th International Educational Technology Conference*.
Vol. I. Istanbul University, Istanbul, pp.437-443, 2011,

[10] Şahin, I.: *Development of Survey of Technological Pedagogical and Content Knowledge (TPACK)*.
The Turkish Online Journal of Educational Technology **10**(1), 97-105, 2011,
http://www.tojet.net/volumes/v10i1.pdf,

[11] Kirby, D. and Sharpe, D.: *High School Students in the New Learning Environment: A Profile of Distance e-Learners*.
The Turkish Online Journal of Educational Technology **9**(1), 83-88, 2010,
http://www.tojet.net/volumes/v9i1.pdf,

[12] Seomun, G. et al.: *Comparing Brain Activation between Students who Use Digital Textbooks and Those who Use Conventional Paper Textbooks*.
The New Educational Review **32**(2), 234-242, 2013,
http://www.educationalrev.us.edu.pl/vol/tner_2_2013.pdf,

[13] Kobola, A.: *Improving reading in elementary school*. In Croatian. Školska knjiga, Zagreb, 1977,
[14] Lipovac, D.: *Mathematics for 4th Grade of Elementary School*. In Serbian. Zavod za udžbenike i nastavna sredstva, Sarajevo, 2013, http://eudzbenici.rs.ba/example/mat/index.html.

KVALITETA SADRŽAJA TRADICIONALNOG I ELEKTRONIČKOG UDŽBENIKA

S. Laketa[1] i D. Drakulić[2]

[1]Osnovna škola "Vuk Karadžić"
Vlasenica, Bosna i Hercegovina

[2]Filozofski fakultet
Pale, Bosna i Hercegovina

SAŽETAK

Cilj ovog istraživanja je verifikacija i procjena kvalitete sadržaja tradicionalnog i elektroničkog udžbenika uobičajene razine kvalitete. Korištene su metode teorijske analize i analize sadržaja. Jedinica analize sadržaja bila je nastavna jedinica "Mjerne veličine i mjerenje" iz dva udžbenika: tradicionalnog i elektroničkog. Razmatrani elektronički udžbenik jednake je kvalitete kao i tradicionalni udžbenik.

KLJUČNE RIJEČI

tradicionalni udžbenik, elektronički udžbenik