

A Research of Uses Tests of Self-control and Knowledge Control in E. Studies

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Annotation

The student achievements in the virtual learning environment Moodle in research analyzed. The database of personalized Moodle activity records (N=11234) was used for the analysis. According to the research objectives, a derivative database (N=285) was formed. Self-control tests (S=18) and knowledge control tests (K=18) were assessed. 80 students took the tests, of which only 45% took the self-control tests. After the analysis, it was found that taking self-control tests guarantees students a higher evaluation of the control tests. Students whose grades meet the typical achievement level are more likely to take self-tests.

Key words: e. studies, interactivity, self-control test, knowledge control test.

Savikontrolės ir žinių kontrolės testų naudojimo e. studijose tyrimas

Santrauka

Straipsnyje analizuojami studentų pasiekimai Moodle virtualioje mokymosi aplinkoje. Analizei naudota personalizuotų Moodle veiklos įrašų duomenų bazė (N=11234). Tyrimui suformuota išvestinė duomenų bazė (N=285). Vertinta aštuoniolika savikontrolės testų (S=18) ir aštuoniolika žinių kontrolės testų (K=18). Šiuos testus laikė 80 studentų. Savikontrolės testus laikė tik 45 proc. studentų, nes jie neprivalomi. Atlikus analizę nustatyta, kad savikontrolės testų laikymas studentams garantuoja aukštesnį kontrolinių testų įvertinimą. Mokiniai, kurių pažymiai atitinka tipinį pasiekimų lygį, labiau linkę atlikti savikontrolės testus.

Reikšminiai žodžiai: e. studijos, interaktyvumas, savikontrolės testas, žinių kontrolės testas.

Introduction and theoretical backgrounds of the research

The concept of e-learning began to be used in Lithuania around 2000, it includes printed study materials, audio and video recordings, websites, computer simulators, video conferences, multimedia environments, correspondence learning, VMA (Encyclopedic Dictionary of Computing, 2015) and other tools. There are two known types of e. study models: asynchronous and synchronous. The synchronous teaching model is close to traditional studies, where video conferences or other similar means of communication are used, allowing the student and the teacher to communicate immediately. In the asynchronous model possibility of immediate communication is lost (Rutkauskienė et al., 2003). In modern studies, the convergence of these two models is increasingly observed, i.e. asynchronous studies include lectures conducted in real time, according to the scheduled schedule,

video and audio recordings of lectures, consultations, discussions and other activities are often used. There is a noticeable trend that e. for the organization of the study process, open software is increasingly used, which is characterized by greater flexibility, because everyone can contribute to their improvement and development (Dalziel, 2003, Koohang, Harman, 2005, Weller, 2006). One of the most popular virtual learning environment is Moodle, it is used in Lithuanian higher schools and successfully applied in Lithuanian general education schools (Kaklauskas, Kaklauskienė, 2010).

Modern information and communication technologies make it possible to create VMA that develops communication, independence, creativity, critical thinking and information culture. A. Targamadžė, E. Normantas, D. Rutkauskienė, A. Vidžiūnas (Targamadžė, Normantas, Rutkauskienė, Vidžiūnas, 1999), A. Volungevičienė (Volungevičienė, 2008) and other scientists in Lithuania research the issues of e. studies. Modern e. study methodologies allow to convey new material more subtly, to organize studies more flexibly, to create versatile communication opportunities that are not affected by age, education or other social factors (Anderson, 2008, Kaklauskas, Kaklauskienė, 2010, Dagienė, Grigas, 2013). The seven standardized groups must be included in the each virtual learning environment (Encyclopedic dictionary of computing 2015). This groups are further analyzed in the 2011 article by L. Kaklauskas and D. Kaklauskienė (Kaklauskas, Kaklauskienė, 2011). Only surveys uses cases for more interactivity are analyzed in this article.

Interactivity is a key component of e-learning that enables learners to actively engage with course material and receive personalized feedback. Spanish researchers Forment M.A., Guerrero M.J.C. (2011) studied the use of Moodle for mobile studies. A comparative analysis of e-study environments and the tools they use was carried out by Krešimir Fertalj, Hrvoje Jerković and Nikica Hlupić (2006). The conceptual model of the e-study environment was presented by Italian researchers Antonina Dattolo and Flaminia L. Luccio (2009). Spanish researchers Miguel A. Conde, Diego A. Gomez, Alberto Del Pozo, Francisco J. Garcia (2011) assessed the relationship between technology and education. In 2020 Liu and etc. examines the effects of interactivity in e-learning environments on student learning outcomes (Liu, & etc., 2020). Have been analyzed 46 studies and find that interactivity has a positive effect on student learning outcomes, particularly in terms of knowledge acquisition and motivation (Liao, & etc., 2019, Lin, & etc., 2019). These studies suggest that interactivity is an important component of e-learning that can enhance student learning outcomes, particularly in terms of knowledge retention, transfer, acquisition, and motivation. However, more research is needed to fully understand the impact of different types of interactivity on student learning and to develop effective e-learning designs that incorporate interactivity.

In the eighties of the twentieth century, P. Honey and A. Mumford studied the problem of the quality of studies (Honey, Mumford, 1992). According to the prepared methodology, students were divided into groups and study materials were prepared accordingly. S. Aboujaoude, A. Heraz and C. Frasson, S. Chaffar, C. Frasson suggested dividing students according to their individual characteristics (Chaffar, Frasson, 2004, Heraz, Frasson, 2008, Aboujaoude, 2011). According to S. Aboujaoude (2011), teaching and communication innovations in the 21st century not only provide many advantages, but also pose many risks, so a detailed analysis is necessary when choosing and applying them. It was established that interactive e. study tools help to achieve better teaching results (Anderson, 2008, Kaklauskas, Kaklauskienė, 2013). When using them, it is recommended to apply modern study methodologies and assess the suitability of VMA tools (Kaklauskas, Kaklauskienė, 2012).

Interactivity is defined as "used to describe a system or computer program that is designed to allow the user to exchange information with it" (Cambridge University Press & Assessment, 2023). Interactive tools suitable for discrete mathematics were evaluated by Iglesias, C. E., Carbajo, A. G., & Rosa, M. S. (1970). Po-An J. Hsieh, Vincent Cho (2011) examined the comparison of e-learning tools from the perspective of the instructor and the student in their article. Bokhari, M. U., Ahmad, S., Alam, S., & Masoodi, F. (2011) examined the technical and some software tools of interactive teaching. Interactive e-assessment tools are described in Saul, C., & Wuttke, H. D. (2012). Petty J. (2013) reviewed the literature analyzing the effectiveness of interactivity.

It should be noted that after reviewing recent scientific works investigating Moodle's interactive

tools, no interactive self-control and test tools research in Moodle environment were found. Properly applied information and communication technologies create e-study environment that fosters communication, independence and critical thinking, as well as information culture. Successful studies are possible only after properly selecting interactivity tools that increase student activity and applying innovative teaching methods to them.

The purpose of the article: to study and evaluate uses of self-control and knowledge control test in Moodle virtual environment.

The model of research

Distance courses created in Moodle virtual learning environments of Šiauliai State College and Vilnius University Šiauliai Academy were used for the research. From these distance learning courses used in learning environments, eight distance courses that use self-monitoring and control tests have been selected. In the courses, students were recommended to take self-control tests in order to better prepare for taking control tests. When selecting self-control tests for analysis, the limitations applied to the tests were evaluated. Only those tests (S=18) where only the time of holding the test and the number of repetitions are limited were selected. All students could take the selected self-control tests (SSTn=80), but takes only 45% (SSTn=36) did. 18 corresponding knowledge control tests (K=18) were selected for analysis. Each student had to take these tests (KSTn=80). 36 tests at all was been analyzed.

For statistical analysis, activity records were exported from each distance course, which were linked to the self-monitoring and control tests of the analyzed courses. For export of activity records are used distance course name and self-control test (S) or knowledge control test (K) used in this courses. The obtained sets of activity records were combined into one database (N=11234). The names of the groups of activity records are used to form the names of the database fields. When importing the activity records into the database, it was necessary to separate the records of self-control and control tests. For this, an additional field of the database - Test type has been inserted. It has only two meanings: self-control and control.

It is known that the Moodle environment captures several types of activity records during a test. These records relate to the student's actions during the test. In the database, this corresponds to the "Event Name" field. "Event Name" field can take some fixed values: "Attempt Viewed", "Attempt Submitted", "Attempt Started", etc. Only value "Attempt Submitted" of "Event Name" field is relevant for the connection research. Removed database entries that did not match this requirement for this reason. 285 records remained in the database (N=285).

The database has been supplemented with a new field "Grade", which unambiguously links the corresponding activity record with the grade received by the student. Self-control and control test grades from test reports are recorded to this field.

Discussion of research results

The distribution graph of the research results (Fig. 1) shows that there is a relationship between the results of control tests and self-control tests. The correlation coefficient of self-control test results and knowledge control tests results was calculated, for evaluation of relationship. The obtained value of 0.37914 indicates that the relationship between knowledge control tests and self-control tests is weak. It can be said that such a relationship shows that taking the self-control test affects the result of the control test (only 45% of students considered self-control tests).

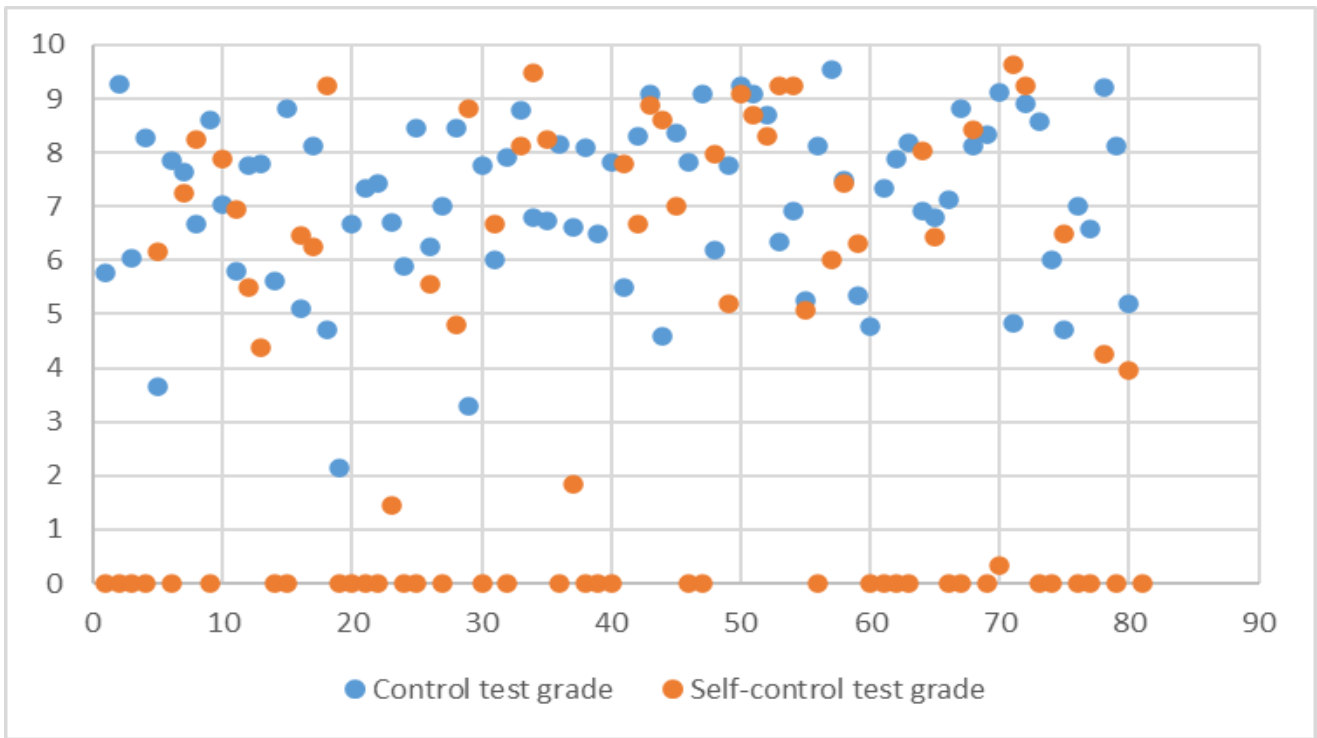


Fig. 1. Distribution of research results

For a more detailed evaluation, the database records were broken down according to the grades of the students who took the test. The obtained set is divided into two subsets: grades of self-control and control tests. A graph is drawn by the obtained calculation results. Embedded trend lines. Trend lines show that the more frequently have self-control test the better scores in knowledge control tests increase. Need to mark that students who don't take the self-control tests get lower grades.

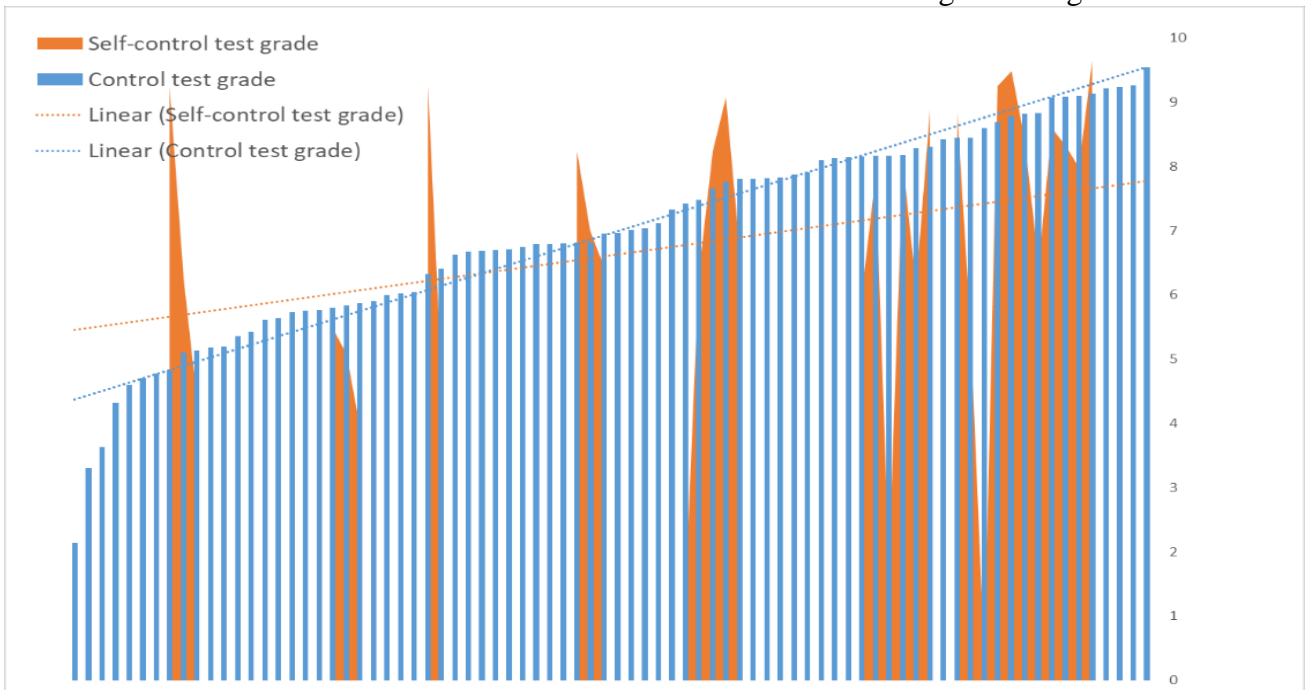


Fig. 2. Comparison of self-control and knowledge control tests

In order to analyze the data according to the level of achievement, an evaluation results filter has been applied in the database. The first subset corresponded to the threshold level of ratings. The students episodically taking a self-control tests does not get a better grades from tests for knowledge control, shows research results (Fig. 3). It should be noted that this is indicated by the trend lines drawn on the graph.

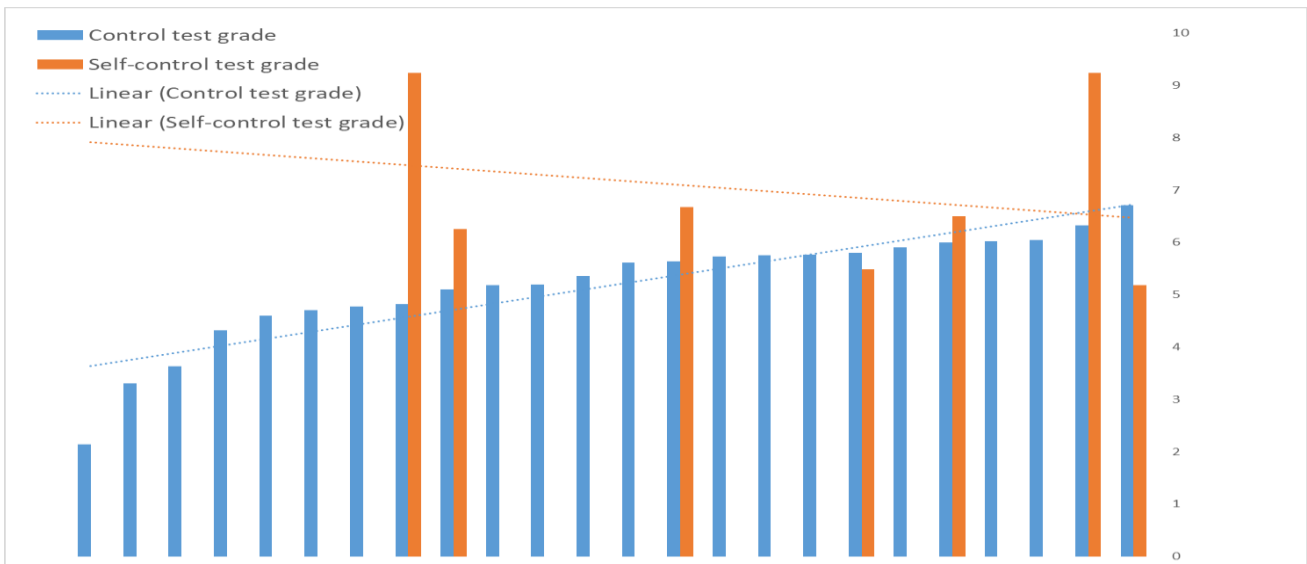


Fig. 3. Comparison of self-control and knowledge control tests: threshold level of achievement

The second subset included students whose test scores corresponded to a typical level of achievement. In Fig. 4, we can see that frequent taking of self-control tests affects the evaluations of control tests. This is also confirmed by the trend line graph. A third subset corresponding to excellent ratings was not analyzed due to the small number of records.

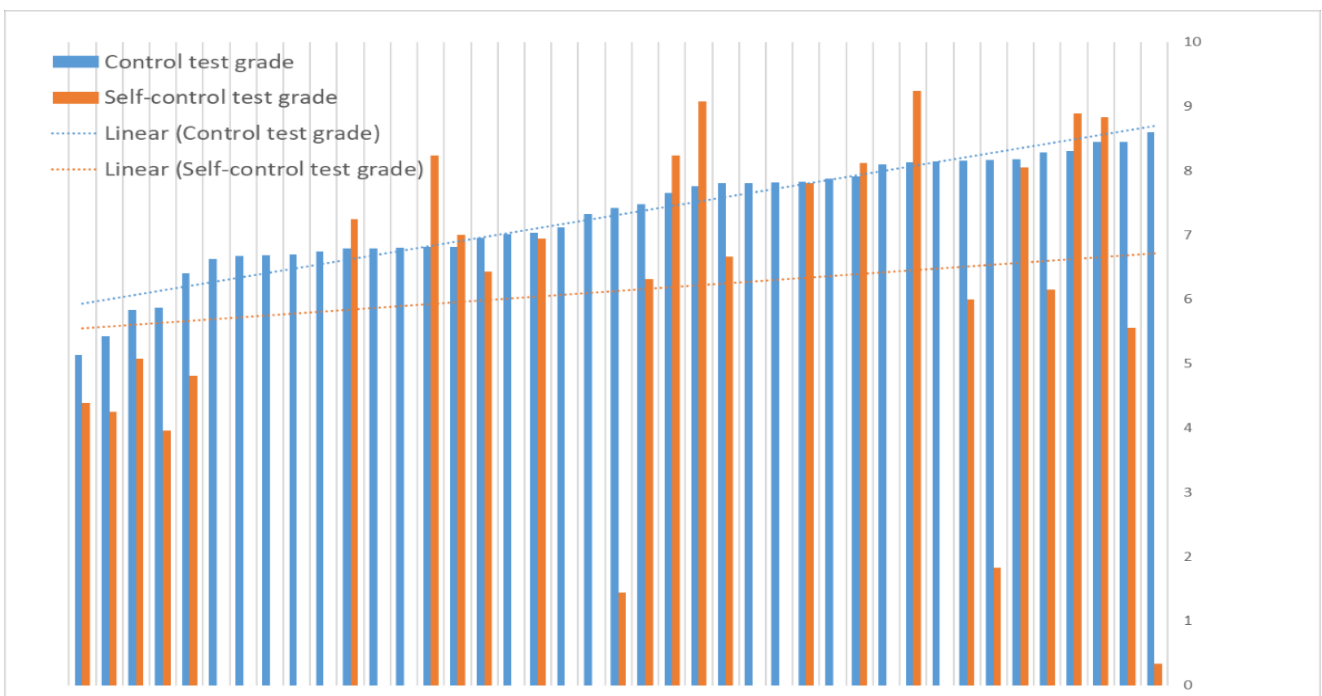


Fig. 4. Comparison of self-control and knowledge control tests: typical level of achievement

Summarizing the obtained research results, it can be said that taking self-control tests for students ensures a better assessment of control tests.

Conclusions

1. Based on the results of the research, it can be said that taking self-control tests guarantees students a higher assessment of control tests;
2. Analysis of subsets of the database by achievement level showed that students whose grades correspond to the typical level of achievement are more likely to take self-monitoring tests.

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