Improving the quality of study assessment

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Abstract
This article concern the problem with accurate evaluation of students and the possibility to improve the quality of assessment tests and learning process itself. The assessment is a part of study and many researchers agree that well-designed and inventive assessment can boost the active learning process. There are enough evidences that motivation of students to study is toughly affected by assessment so improving the quality of assessment tests in virtual learning environment is an urgent and important task nowadays.

Keywords: student assessment, formative, summative and diagnostic assessment, quality of assessment

1. Introduction
Assessment and its associated feedback are essential not only for student learning, but researchers think that it influence on the rest of students’ lives (Race et al., 2005). Students’ academic achievement is ordinarily measured with grade point averages. However, course marks do not reveal qualitative learning results due to the nature of the assessment (Asikainen et al, 2003; Minbashian et al, 2004). The most important factors in studying are self-regulation and motivation and that might prevent the negative effect of inappropriate assessment (Asikainen et al, 2003). Nevertheless, the deep approach to learning has been found to be positively related to quality of exam responses (Minbashian et al, 2004). Moreover, students who applied a deep approach in their studying aimed at understanding the subject matter for themselves despite of the nature of the assessment (Asikainen et al, 2003).

When developing the course in an e-learning environment, assessment takes a significant role. Various activities as solving tests or problems, developing collaborative or individual projects, participating in discussions, etc. aims to evaluate not only students' knowledge but also the learning process itself (IDS, 2002).

In developing the FTT courses and in particular the assessment modules, the teachers' aim is that the assessment area to cover not only knowledge but also skills and competences. We accept the Mödritscher understanding for competence as assimilation of knowledges and competences at a level that is sufficient for their application to a particular job (Mödritscher et al., 2004).

2. Materials and Methods
2.1. Assessment as a part of study
Assessment is all about information for students of their progress to let them to action that will improve their performance (Cheryl, 2005). The assessment is an unbreakable part of study and engine of learning. Moreover, well-designed assessment can boost active learning especially when the assessment delivery is innovative and engaging (Cowen, 2005).

According to Cheryl (2005), learning does not happen incidentally, so teachers carefully need to plan the process of learning:

✓ decide what is going to be learnt in a particular session;
✓ define the learning goals;
Assessment is all about delivering correct information to learners of their progress, which empower the necessary actions that improve their performance. The stages of implementing the process of assessment are as following (Cheryl, 2005):

- explain the learning objectives and feedback opportunities;
- check learner understanding of learning objectives;
- brief learners on what they have to do and what they have to hand in;
- introduce the assessment criteria to learners and check their understanding;
- provide learners with opportunities to apply the assessment criteria to examples of work produced, possibly by a previous cohort, to illustrate standards required and the application of the assessment criteria;
- provide the necessary guidance and support to learners on an individual bases and provide oral feedback;
- provide peer assessment opportunities;
- provide self-assessment opportunities;
- undertake the teacher-led assessment of learners’ work;
- provide written feedback to learners;
- create opportunities for learners to undertake remedial action as consolidation activities.

Based on the evidence that assessment drives learning, institutions, program directors or educators try to adjust assessment with the new learning environments (Segers & Dochy, 2006). The proper and accurate evaluation is very important part of education, because there are enough evidences that learning motivation of students is affected by assessment (Harlen & Crick, 2003; Dochy, 2005). Therefore, improving the quality of assessment test in e-learning environment is an important task nowadays.

2.2. Educational paradigm and study assessment

In the traditional educational paradigm, when are determining the learning objectives and the assessment methods then are determined and the competences that must be learned by the students, how they to be developed and how to be measured the learning outcome.

In order the assessment not only to be a snapshot of the students' training, teachers can use all three types of assessment - diagnostic, formative and summative. Thus, they assess not only the incoming and outgoing level of the students' preparation, but also their development with the help of formative assessment. In order to accomplish its purpose, different strategies can be used in the assessment, depending on the goals aiming for and how to help students learn. In the higher education summative evaluation is needed, because the training in each discipline ends with an assessment of student preparation achieved level. However, if only summative assessment is used the teachers can determine the level of learning curriculum by the students, but only when training is over and can not make the necessary adjustments during the process of learning.

It can be said that formative assessment is often a successful strategy as the emphasis is placed not only on the knowledge acquired by trainees but also on the learning path and students' omissions in the discipline. According to Panadero et al., (2018) the periodic assessments during learning, known as formative assessments (FA), are connected to self-regulated learning (SRL) and influence on the quality of learning. Exactly the formative assessment enhances the efficiency of student learning through to timely feedback and the teachers improve their e-learning teaching by identifying the strengths and weaknesses of the materials offered during the course. We can emphasize, however, that formative assessment focuses the attention of teachers and students on what still needs to be learned instead of what has already been learned. Thus, students have enough opportunities and their interest in the information needed to fill the gaps in their knowledge during their studies increases. It is too much to say that only the use of formative assessment is a win-win strategy, as various types of assessment can be used at different stages of training. Unfortunately, in most disciplines, not enough attention is paid to diagnostic assessment.
3. Discussion and Results

E-assessment covers activities that use digital technologies to design, measure, store, transfer and analyse data related to learner knowledge. The e-assessment not only improves the validity and credibility of the assessment system but also encourages student learning. Through a well-organized formative assessment with appropriate requiring resources, not only reproductive knowledge, but also demonstration of understanding and reasoning, with timely feedback the student learning can be stimulate and thus to increase the effectiveness of learning process. By e-assessment the personalization of learning enhances as it enables learners to check their knowledge of particular parts of the curriculum, to identify their gaps, and to build an individual educational path. In addition, the different combination of evaluation methods also contributes to the development of a better, objective self-assessment.

The approaches to use different assessment methods in e-environment, type and formulation of questions and tasks are determined by the lecturer, taking into account the objectives set, the specificity of the module or course, the reliability and objectivity of the assessment, the competencies to be assessed and the level of their learning, etc.

The report discusses the application of e-assessment at Trakia e-University based on Moodle (http://edu.uni-sz.bg), on the subjects of Program Languages and Systems in Automation (with C++ programming), Object Oriented Programming in Java and Multimedia for web based e-learning systems. Final assessment of the students is done according to the following point system - maximum number of points 100, of which 50 are obtained in the following way:

- a total of 10 for items 1, 2, 3 and 4;
- course assignment - 15;
- semester test at least 50% - from the test at least 10 points (i.e. Average 3);
- the exam task at least 15 points (i.e. Average 3).

Table 1: Study Assessment scores

| Participation on the lectures, exercises and task implementation | Scores |
|---------------------------------------------------------------|--------|
| 1. Lectures participation                                    | 10     |
| 2. Exercises participation                                   | 10     |
| 3. Assignment 1 during the semester – one task with computer program with teaching assessment | 6      |
| 4. Assignment 2 during the semester - one task with computer program with teaching assessment | 9      |
| 5. Assignment 3 – three tasks with computer programs with peer assessment | 15     |
| 6. Final quiz                                                 | 20     |
| 7. Final task on the exam                                     | 30     |

The final score for the semester grade is obtained by the following scale:
- from 50 to 62 points - Average (3);
- from 63 to 75 points - Good (4);
- from 76 to 88 points - Very good (5);
- over 88 - Excellent (6).

In the Faculty of Technique and Technology of Thracian University different forms of assessment can be applied, which can be divided into several groups:
- for collaborative work - Assignment, Workshop, Glossary;
- for individual work - Quiz and formfor Feedback.

The first 5 refer to Formative assessment, and the following to the Summative assessment.

**Assignment** – the evaluation of this activity is given by the lecturer. During the semester the students receive an individual assignment with three programming tasks (different for each student) that cover all topics of the learning programme. By the end of semester, they must submit 6 files to a specified maximum volume: the code of each task and a screenshot with the result after the compilation. The teacher grades their work and returns a written commentary on the performance each studenntask, paying particular attention to the deficiencies and what needs to be done.
Removal of defects must take place within a certain timeframe. The teacher can use Feedback comments in which make assessment in score points (50 to 100 depending on the degree of achievement or in marks from 3.00 to 6.00). If a plug-in is used, annotate PDF can be created and saved. Upon expiry of deadline, students present to the lecturer or to the students their programs with which they have completed their tasks and demonstrate the results of their performance. In this way, each student expands his/her knowledge on the already solved tasks of his colleagues and has the opportunity to comment on the presented solution and to offer a more efficient algorithm or method. This enables students to analyse the work of their colleagues’ “peers’ work”, to apply peer assessment, to offer and protect alternatives, to develop critical thinking and skills for assessment and self-assessment.

**Workshop** - Students learning Multimedia for web based e-learning systems get an individual job that is different for each one. They work in a web-based environment and create multimedia applications. Everyone has the opportunity to learn about the work of their colleague. There is an opportunity for students to see or not see the job they are going to review. For a greater objectivity and appreciation, it is preferable for students not to know whose work they are analysing and evaluating. During the assessment, the works are presented, questions are asked by students and lecturers, and each student evaluates their colleagues from the group with marks. When the final assessment of assignment is establishing, the teacher takes into account his/her mark-based on the degree of accomplished requirements; the total average grade of the students; as well as answers to questions during the defence, and also presentation skills of the students. This achieves a double effect - it develops and evaluates not only the programming competencies, but also the social competences to raise and defend themes and their back with arguments.

**Glossary** - a collaborative activity. Students are required to prepare in the glossary the concepts assigned by lecturers, as well as those related to their course and are missing in the glossary. Each student can make comments in the glossary; teacher has to approve final version, however all students that have taken part will be evaluate. The collective students work on dictionary creation is a prerequisite, for both enriching the knowledge and for acquiring new concepts, as well as for increasing the activity and improving the quality of their assessment and their active participation in the educational activity. This activity is applied in all disciplines according to developed standards for creation and validation of e-courses in Thracian e-University.

**Quiz** - this is one of the most used evaluation activities. When creating the tests, the questions are grouped into categories that correspond to the subjects in the curriculum of the discipline. When setting the test, a random number of questions from each category are casually selected. Particular attention is paid to the statistical analysis after the test. The goal is to analyse the results after the first run. The report Quiz structure analysis contains the following information in tabular form (fig.1, the way of their calculation is known and described in the Moodle documentation).

| Q# | Question name | Attempts | Facility index | Standard deviation | Intended weight | Effective weight | Discrimination Index | Discrimination efficiency |
|----|---------------|----------|----------------|--------------------|-----------------|-------------------|-----------------------|--------------------------|
| 1  | Случай (СРФ Тема 1 и подкатегория) | 59 | 62.49% | 45.81% | 3.33% | 4.00% | 26.27% | 31.29% |
| 2  | Случай (СРФ Тема 1 и подкатегория) | 59 | 54.41% | 50.44% | 3.33% | 4.43% | 29.62% | 35.28% |
| 3  | Случай (СРФ Тема 1 и подкатегория) | 59 | 55.79% | 45.08% | 3.33% | 2.13% | 11.93% | 13.02% |
| 4  | Случай (СРФ Тема 1 и подкатегория) | 59 | 67.50% | 48.11% | 3.33% | 2.86% | 5.68% | 7.03% |
| 5  | Случай (СРФ Тема 1 и подкатегория) | 59 | 56.64% | 47.19% | 3.33% | 3.48% | 15.44% | 17.69% |

*Figure 1. Quiz structure analysis*
Q#- shows the question number, question type icon, preview and edit icons;  
Question name- a link to the detailed analysis of this question;  
Attempts- shows how many students attempted this question;  
Facility Index- the percentage of students that answered the question correctly;  
Standard Deviation- information about how much variation there was in the scores for this question;  
Random guess score- the score that student would get by guessing randomly;  
Intended/Effective weight- intended weight is simply what you set up when editing the quiz. If question 1 is worth 3 points out of a total of 10 for the quiz, the intended weight is 30%. The effective weight is an attempt to estimate, from the results, how much of the actual variation was due to this question. So, ideally the effective weights should be close to the intended weights;  
Discrimination index- this is the correlation between the score for this question and the score for the whole quiz. That is, for a good question, you hope that the students who score highly on this question are also the same students who score highly on the whole quiz. Higher numbers are better;  
Discriminative efficiency- another measure that is similar to Discrimination index;  
✓ random questions are used, there is one row in the table for the random question, followed by further rows, one for each real question that was selected in place of this random question;  
✓ quiz questions are randomized for each quiz, the quiz module determines a default position.  
Moodle's structural analysis- for test questions necessarily analyses those who have a Discrimination index and Discriminative efficiency less than 15%. The approach in this case is as follows:  
1. the material dealing with these questions is discussed with the students and given additional information on the topics if necessary;  
2. the students are offered opportunities to formulate two or more questions on this material to replace existing ones.  
The next test run is reassessed to verify the effect of the changes. The goal is always to increase the quality of the assessment of the learning process and the end result of this learning course that students have studied.  
Feedback- in the end of each course with summative assessment students have to give written feedback also.  

Conclusion  
Enhance the quality of student assessment is an essential task nowadays. In the course of the students' training it is necessary to make preliminary analysis and development of the e-environment assessment system based on the educational paradigm, the pre-set learning objectives and the strategies for their achievement. The positive experience of the e-assessment system has shown that it is effective and stimulating for the students to apply the forms for evaluation of collective work and peer evaluation. To achieve evaluation quality, it is advisable to use the three types of assessment - diagnostic, formative and summative. Formative assessment increases the effectiveness of student learning by identifying strengths and weaknesses during the course.

In the future, it is envisaged to develop and improve the e-assessment system, complemented by a diagnostic evaluation at the start and completion of each of the courses. The statistical reports of the tests and courses will be further analysed in order to enhance their quality and comprehensiveness not only in terms of knowledge but also of students' competencies.

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