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RESEARCH ARTICLE

MODEL OF ELECTRONIC ASSESSMENT SYSTEM OUTSIDE OF CLASSTIME IN VOCATIONAL AND PROFESSIONAL EDUCATION - ESSENCE, ADVANTAGES AND CHALLENGES

Iliyan Vassilev
PHD Student Eng. Faculty of Pedagogy, Sofia University - Bulgaria.

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Abstract

This article examines the normative framework related to the assessment of students in VET in Bulgaria, as well as various modern electronic technologies for assessing the knowledge and skills of learners. An extracurricular grading model is presented to automatically grade and log the student's grade in the school e-Journal. A SWOT analysis is made, and the results of a survey among teachers from secondary schools and vocational high schools are presented, which aims to explore their opinion on the effectiveness of such electronic assessment which is not during class time. The results are not strongly connected only with Bulgaria but arepresumably relevant for more broad discourse of the assessment in VET with its characeristics and specifics mentioned in the main part analysis.

Introduction:

Modern man lives in conditions that require high professionalism and considerable intellectual effort to make correct decisions in various life and work situations. This leads to quite high demands on the school as an educational institution. Monitoring student progress is an integral part of the learning process. Proper organization of testing and assessment of students' knowledge and skills plays an important role in the learning process. The verification and assessment of knowledge and skills cannot be an act in itself. They are an integral part of the educational process and contribute to increasing its effectiveness. Checking and evaluating knowledge and skills increases effective control and self-control (feedback). through an electronic grading system outside of school time creates opportunities to grade students' work at any time on a set project activity or other type of task from the teacher to the student.

Main part

By Ordinance **No. 11** [1] of **09/1/2016(**Republic of Bulgaria**),** (art. **1**. para. **1**)"for evaluating the results of the students' training, the state educational standard for evaluating the results of the students' training is determined".

According to Ordinance No. 11the main components of the assessment include "the form of the assessment, the participants in the process, the procedures for preparing the exam materials and conducting the assessment, as well as for documenting and disclosing the results" (Art. 2). The evaluation establishes and measures the results achieved by the training, as well as the level of preparedness of the students for their future realization. These results and grading are done by the teacher and are individual for each student.

Corresponding Author:-Iliyan Vassilev
Address**:-**PHD Student Eng. Faculty of Pedagogy, Sofia University - Bulgaria.

The evaluation of the students is carried out according to Art. 5 "in the learning process; at the end of a grade or stage of a degree and on completion of a degree'. The assessment of students is carried out through ongoing testing, which is carried out in the process of school training and through exams - in the process of training and upon completion of the stage and/or degree of education.

Through the assessment as a result of the test, the achieved competences are determined. The evaluation can be ongoing - showing the degree of achievement of the learning objectives of the training; term assessment - the degree of achievement of learning goals at the end of the academic term of a given academic subject; annual evaluation - the degree of achievement of the student's educational goals at the end of the academic year in a subject. The final assessment is given at the end of the studies at the end of the stage at the end of the first and the second high school stage of secondary education.

Overview of modern available online assessment technologies.
There are currently technologies that can be used to assess students during class:

Microsoft Visual Studio technology
In his article " An Innovative Evaluation System ", Valchev presents the Microsoft Visual Studio technology as a platform that supports various programming languages and various software development technologies Win32, COM, ASP.NET, ADO.NET Entity Framework, Windows Forms, Silverlight and other .NET technologies. (Valchev 2019: 36)

In the examination system, students are presented with a series of questions on specific topics. After entering an access code, the system loads questions and corresponding answers, starting a timer that counts the time since the start of the test. The student is given the opportunity to answer the questions in a non-consecutive order. After the test is finished, the teacher gives a code to calculate the grade and thus each student sees his result. "The data from the exam: names, class, number of the student, the questions together with the answers given by the student and the points together with the grade he received are sent to the teacher's e-mail." (Valchev R. 2019, p. 39)

After conducting the exam, the teacher receives the information from the student's exam in his account by mail:
1. exam start time;
2. exam completion time;
3. an answer the student gave to a particular question;
4. correct answer to the question;
5. number of points for eternal response;
6. number of points for a wrong answer;
7. final grade and others. (Valchev 2019, p. 39)

Results of the application of the technology within three years show that the test passes faster and easier, both for the student and for the teacher.

Nearpod
Nearpod is another software tool for presentations that allows for the integration of open-ended questions and thus assists in eventual assessment of student performance. The teacher can control the stages of making the presentation or set it up in homework mode to let students work through it at their own pace.

Classkick
Another platform that is suitable for e-grading student work is **Classkick,** a tool to enhance classroom learning by offering more opportunities for student practice and instant feedback. Classkick was created by and for teachers to improve student performance. Classkick essentially enables students to present their knowledge at any time of the day and receive instant feedback.

MimioMobile
The software facilitates collaboration and helps students build their knowledge in the relevant academic discipline. Teachers can share any combination of student work on the screen in front of the class, creating greater collaborative and cooperative learning and gaining a deeper understanding of student understanding. The MimioMobile™ app is compatible with Apple and Android phones and tablets, and

any device with a supported web browser—including Chromebooks, Windows and Mac laptops, Windows Surface tablets, and more. The app performs summative and formative assessment, giving teachers a deeper understanding of what students are learning and what needs more practice.

MimioMobile Team
MimioMobile Team allows up to four scholars to work individually or in groups on a teacher-set assignment. The MimioMobile Team app is an extension of the MimioMobile app designed specifically for the Boxlight ProColorTouch Table, which allows multiple simultaneous MimioStudio activities on one interactive table.

Socratic
Socrative is an app for both fun and effective student engagement in the classroom. It makes it possible to assess their knowledge in real time through pre-prepared questions. Students through the app are actively engaged in fun activities and thus the whole class can be involved in collaborative learning.

The teacher observes how each student answers the test in real time and collects feedback on the lesson. Socrative offers valuable insights and time-saving features so that teachers can better assess the needs of their classrooms.

Electronic platforms where online tests can be easily and quickly created are: Quillionz , Quizlet , Wizer , Quizizz , Kahoot .

Electronic assessment using cloud technologies - Google Forms
Google app**Google Forms**is for creating both survey forms, quizzes and tests and collecting answers. It is part of Google 's cloud applicationfor education -Google Suite forEducation, is free and available to users with Google accounts.

Google Forms offers a standard array of question types and does not set visible onesformat length restrictions. A Google Form can be redesigned andpublished immediately without changing the user's access to the form. Othersattractive product features include:
- ✓ HTML iframe tags for form embedding;
- ✓ Automatic data collection in Google Spreadsheet;
- ✓ Personalization of messagesfor confirmation;
- ✓ Title itof sections and page breaks for multi-part forms;
- ✓ Variety of background topics;
- ✓ No advertising

Other dynamic features of the product are:
- ✓ **iframe** HTML tags for form embedding;
- ✓ Automated algorithm for accumulating data in Google Spreadsheet;
- ✓ Customization of confirmation messages;
- ✓ Section headings and page breaks for multi-part forms;
- ✓ Wide choice of background theme;
- ✓ Lack of advertisements and advertising plug-ins (Kozhuharova 2019:63)

After creating the questions and the possible answers to each one are provided for students to complete.

When creating the test, a fixed rating scale and a key with the correct answers are provided depending on the type of question, which makes it possible to automatically check the system and set the final result total points (Gorov, Aneva S., Tsarev 2018:157)

After they complete the test, I send it back to the teacher and the results can be seen in the answers section. The teacher can check each student's test individually, assign points to those questions that the test did not automatically score, and communicate the score to the students. The app allows tests to be stored in GoogleSheers.

In order for online assessment of students to be effective, it is necessary to design the lesson with clear objectives and guidelines; that the assignments make sense both for the context of the subject and for the learners themselves and that they have a clear idea of what is expected of them. [2]

Online assessment has its advantages, but also disadvantages, which can be grouped as follows:
Technical problems
1. Internet connection.
2. Device Compatibility.
3. Technical failures, software or power supplies.
4. Cyber security.
5. Student ID fraud.

Quality of the assessment caused by:
1. Types of questions.
2. Standardization.

Environmental factors:
1. Distraction.
2. Psychological impact.
3. Stress and anxiety.

Conceptual model of electronic assessment system outside the curriculum time - essence advantages challenges

Some of the above-mentioned disadvantages can be overcome by creating an electronic grading system in extracurricular time. A logical question is: „In this new future system, what can be integrated differently from the above-mentioned already existing ones? “

The model of the proposed system, at any time the student can log in and take a test with the camera on (or with the camera on periodically blinkingmode, this is already a matter of a technical solution of the program). This test is from a database-bank and the grade that the student will have from the test will be **automatically** entered in an electronic diary. It is precisely in this that the novelty lies **and does not exist in the listed systems -** this automaticity, the assessment from the test is automatically imported into the electronic diary.

The plus here is that in this way in technical and professional training disciplines, where there are requirements for more assessment and [according to **art . 12. para.** 2. " three current examinations in subjects studied according to the school curriculum for more than two hours a week "[1]] and the testing itself to be qualitative will take a long time.

Example : classes in electrical engineering , professional general technical and industry training, on an exam question : " make a circuit of an amplifier " the student will take 20-25 minutes of the class to make it and explain how it works , and this is only one question, it will is there time for second and third; and for testing a second and a third student, possibly , and for new material ? The class is usually made up of 28 students, and each must have three or four marks, that is 84 or 116 marks in total. With the presence of such an electronic system outside of school hours and the direct evaluation and entry of grades into the electronic diary, the student will be able to take the exam twice, which will significantly ease the testing activities, and the time allocated for them

And I think that's why the student can make his own electronic circuit by testing himself, for as much time as he wants, at whatever time he wants, and then to go over other questions and to see his knowledge in its entirety! This guarantees an assessment that will be objective, and the student will be evaluated holistically, because he can take the test for a longer time without being limited totime, it will be in a calm environment, there will be noto be ashamed of classmates, etc.

Another feature and a new article for this model concerns the issue of the bank's withdrawal from issues. For correctness and to reduce the risk of subjectivity, a group of experts, possibly financed by the Ministry of Education and Culture, should develop a bank of questions, andit should be extremely rich, as well as a system for automatic entry to the electronic diary should be developed. This will require an additional investment of funds and time, and this is a slight minus.

With the existence of such a system, the student will be able to "self-examine", for example, twice if he needs four timed assessments, that is, 50% of the examinations will be in such an electronic version. With the existence of such

a system, a greater number of examinations will be possible, which can be carried out at the student's own will, and with more grades, it is clear that the term and annual grades will be much more real and better indicator of student success.

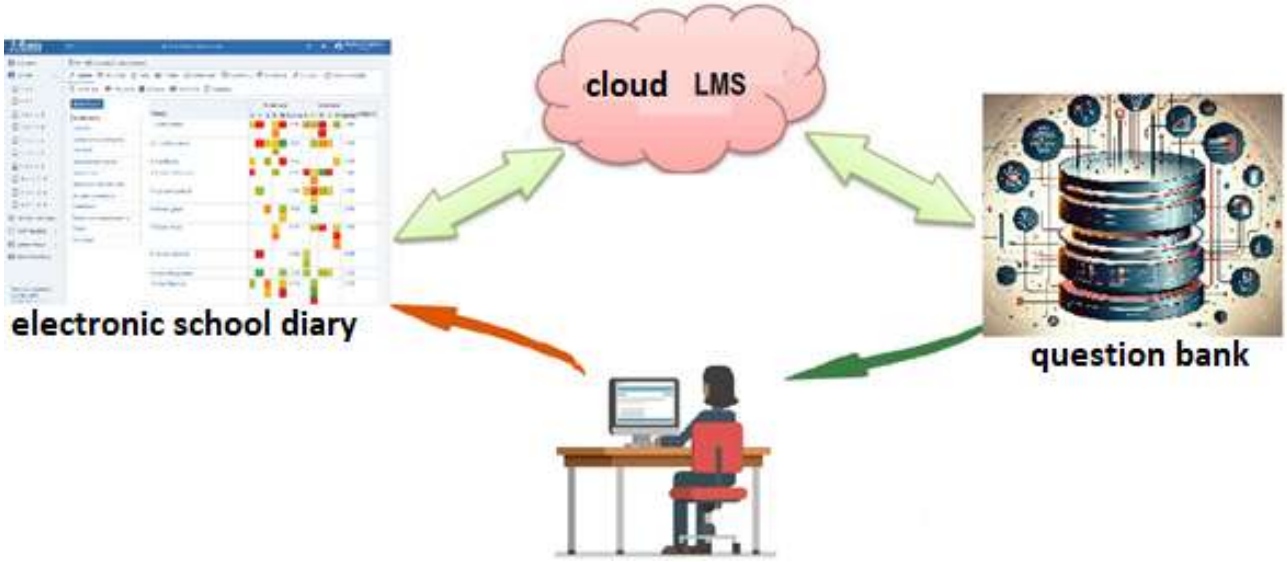

Fig.1: -Schematic representation of a conceptual model for an online out-of-school assessment system.

For technical disciplines, such a system would provide enough real time to create projects and schemes, with which to adequately assess the skills of students and pupils.

The creation of such a system would facilitate the assessment process in terms of time and appropriateness of the assessment, which includes assessment not only of knowledge, but also of skills of the assessee.

Such decisions are also not without drawbacks. However, its strengths and weaknesses can be very carefully weighed and, if the benefits outweigh them, it can be implemented as a new evaluation method. As an analysis tool, SWOT analysis offers an opportunity to focus on the positive and negative aspects of the model.

SWOT analysis of an e-grading system in extracurricular time

STRENGTHS	**WEAKNESSES**
• Freedom of choice for filling time • More time for the learning process in class • Increasing interest in the examination process • Increasing students' knowledge and skills • Increasing success by enabling students to demonstrate not only knowledge but also skills • Distance assessments are "created" online via the Internet. This significantly reduces the need for physical and mental work of the teacher. Teachers will be unloaded. • Allow all students working on the test to be observed at the same time. • Overcoming subjectivity in testing from disparate effects as well as concerns from other students.	• Challenges in technology uptake. • Infrastructural barriers - lack of an evaluation system. • Need for resources from both the school organization and the students. • Need to develop tests according to the standards of the Ministry of Education and Culture
OPPORTUNITIES	**THREATS**
• It can be implemented as an optional, but not mandatory, method to completely replace the standard oral exam in class.	• Cyber risks for an online exam include cyber threats from "stealth" applications and virtual machines.

Survey and Analysis Results:

In addition to the identified strengths of the method, a survey was conducted to establish the attitude of teachers towards the method of online assessment in the classroom. In the period 10-20 January 2024, a survey was conducted among teachers from secondary schools and vocational high schools. 80 teachers took part, in table 1. basic data on respondents are presented.

Table 1:-*Respondent data*.

	Number	%
Total number of persons examined	80	
gender		
men	15	19%
women	65	81%
Age		
Up to 25 years	5	6%
From 26 to 35 years	15	19%
From 36 to 45 years	17	21%
From 46 to 55 years	20	25%
Over 55	23	29%
Education		
Bachelor's degree	37	46%
Master's degree	43	54%
Secondary school	30	37%
Vocational high schools	50	63%
Teaching experience		
Up to 1 year	5	6%
From 5 to 10 years	18	22%
From 10 to 15 years	15	19%
From 16 to 25 years	12	15%
Over 25 years	30	37%
Owned by PKS	57	71%
Possession of an additional qualification	59	74%

The purpose of the study is to investigate the opinion of educators about electronic assessment of students through an online survey.

Results of the conducted research are presented in the following graphs in figures 2 to 9, respectively for questions 1 to 8.

Question 1: Which of the following electronic testing and evaluation technologies are you familiar with?

The results of the research show that the electronic platforms that all the surveyed persons know are Google Forms,Quizlet , Wizer , Quizizz , Kahoot . It is noteworthy that teachers aged up to 25 and up to 35 know technologies such as Microsoft Visual Studio , Nearpod **,** Classkick , MimioMobile , Socrative**.**

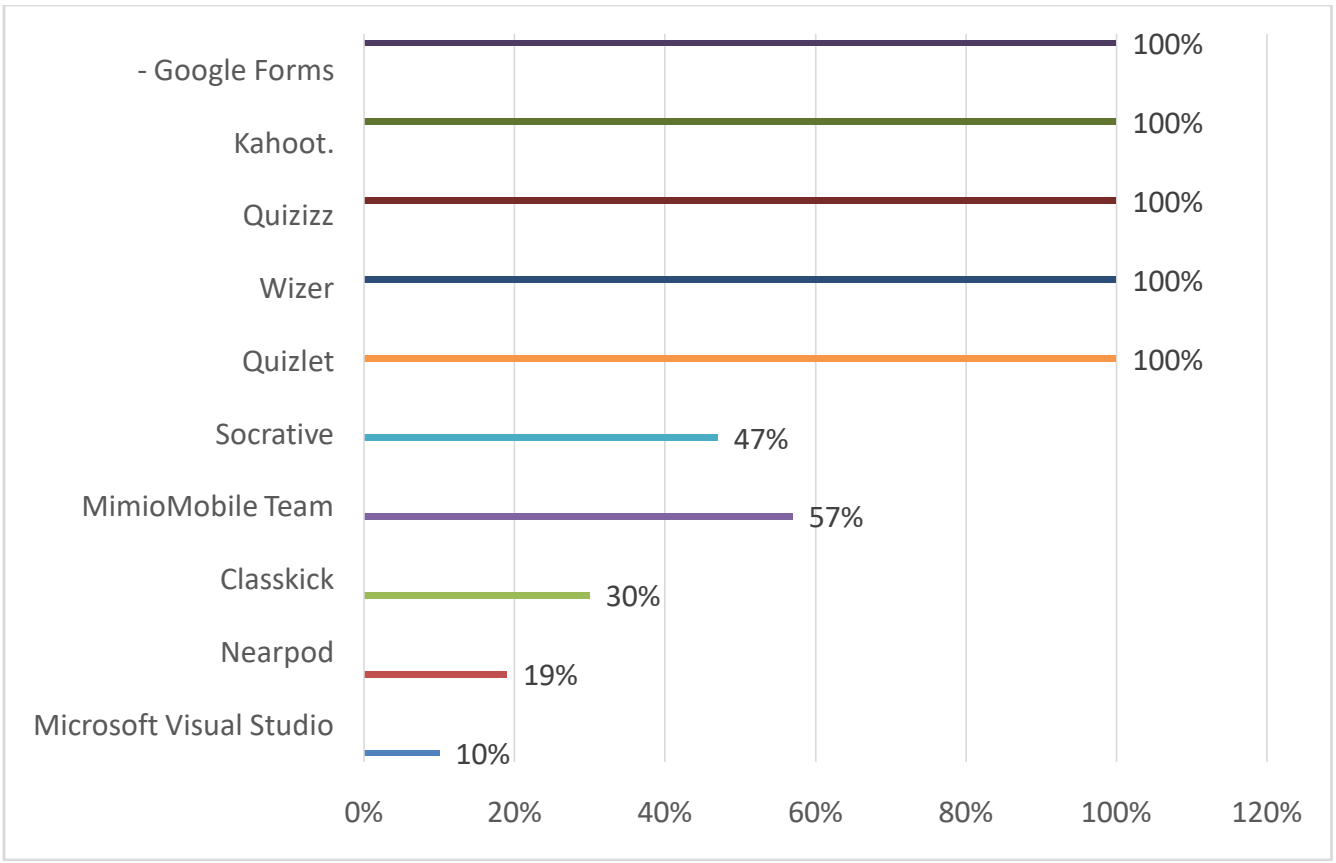

Fig.2:-

Question 2: Do you use electronic platforms to assess students?

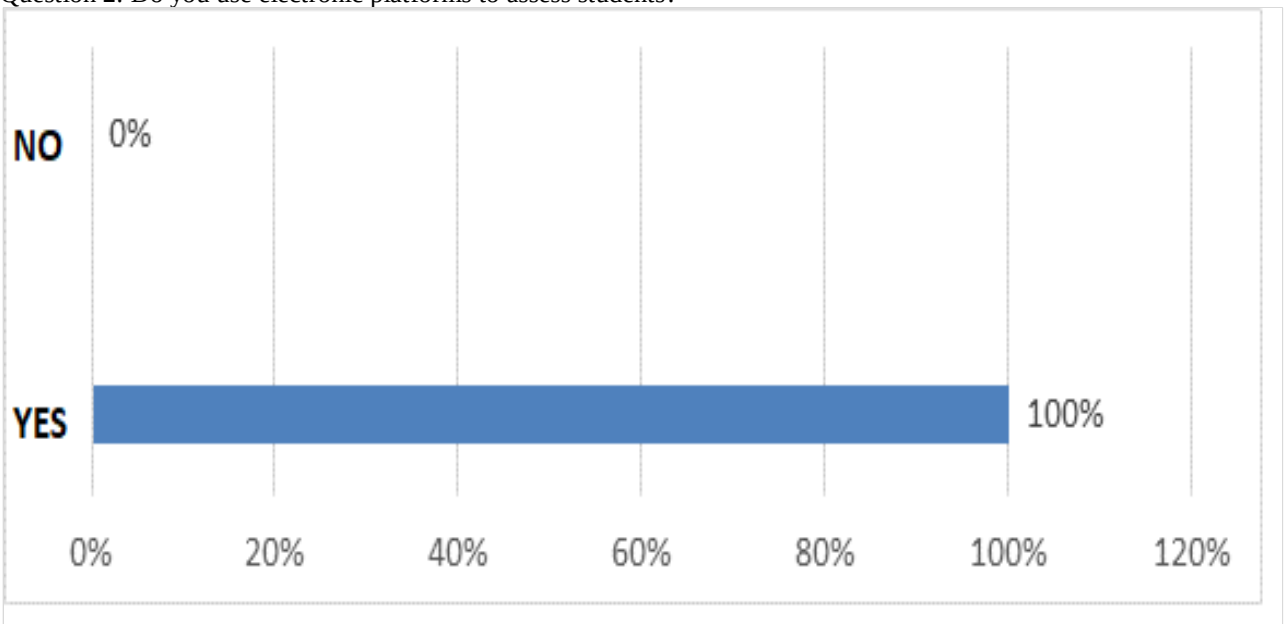

Fig.3:-

All surveyed educators use modern technologies in their work to assess students' knowledge and skills.

Question 3: In your opinion, the e-assessment of your students:

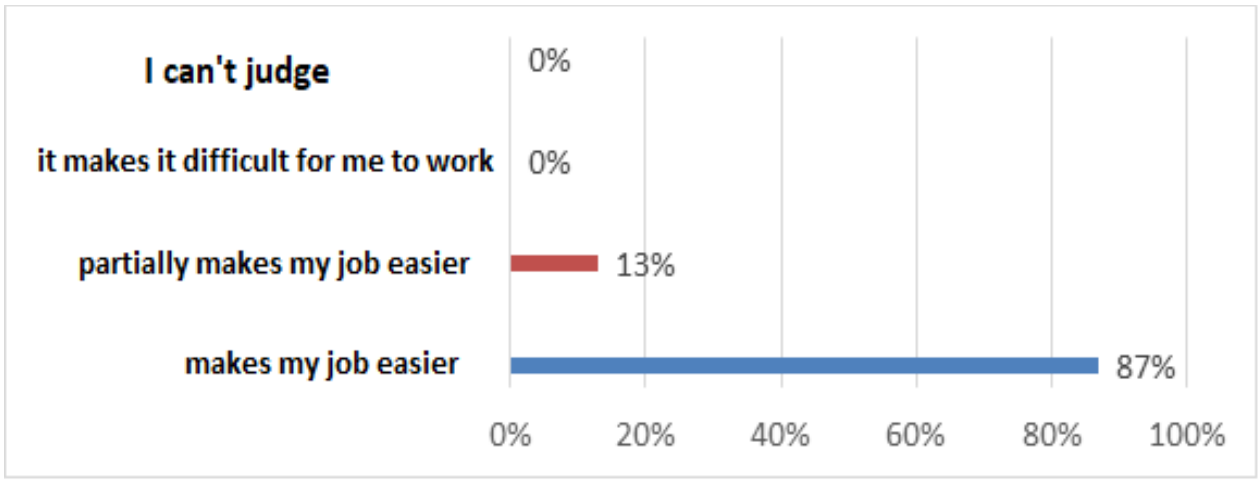

Fig.4:-

87% of the respondents are of the opinion that the use of technologies related to the electronic assessment of students facilitates their work. 13% share that it partly facilitates their pedagogical work.

Question 4: In your opinion, the electronic assessment of students is more effective than the traditional one?

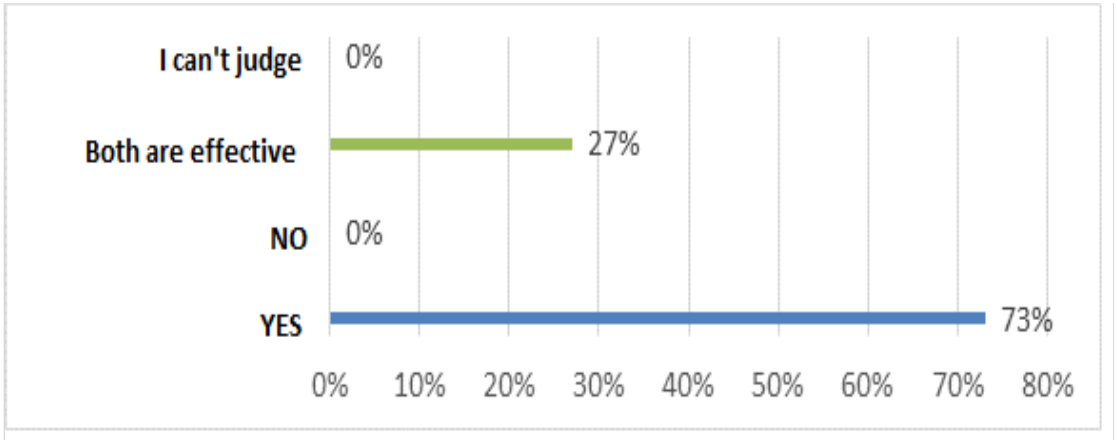

Fig.5:-

On the fourth question of the survey, 73% of the teachers are of the opinion that the electronic assessment is more effective than the traditional one.

Question 5: Do you think the students have the necessary competencies to work with the platforms you use in their assessment?

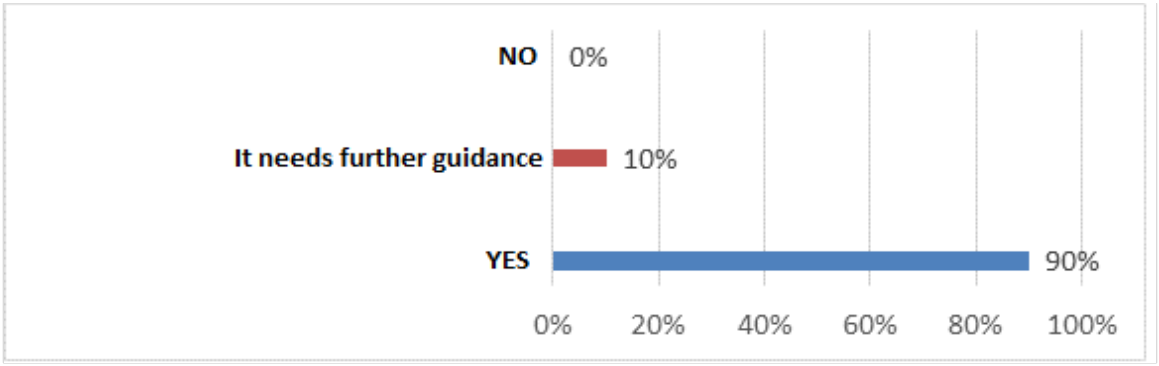

Fig. 6:-

90% of teachers believe that students have the necessary competencies to work with electronic assessment platforms. 10% of students need additional help from the teacher.

Question 6: Do you find it difficult to work with the e-assessment platform you use?

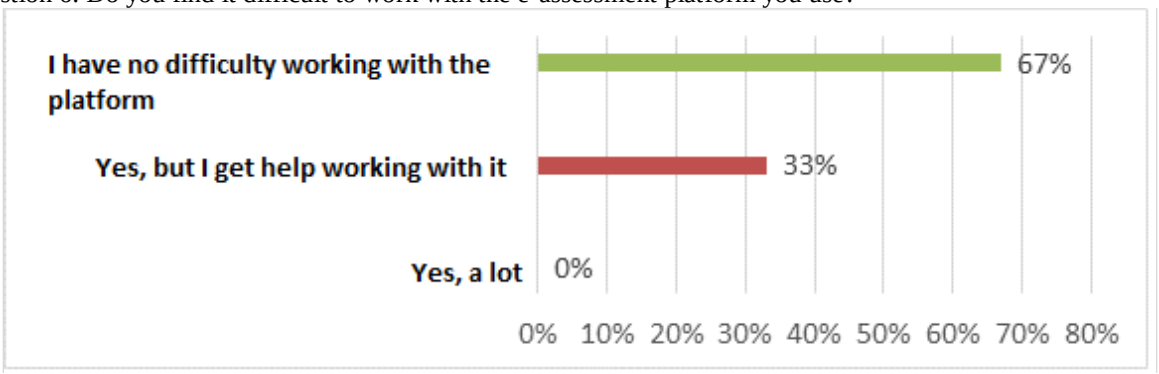

Fig. 7:-

67% of respondents do not encounter any difficulties in working with the electronic platform , and 33% of teachers over the age of 50 have difficulty using the platform, but receive help from colleagues.

Question 7: What do you think are the leading advantages of e-grading?

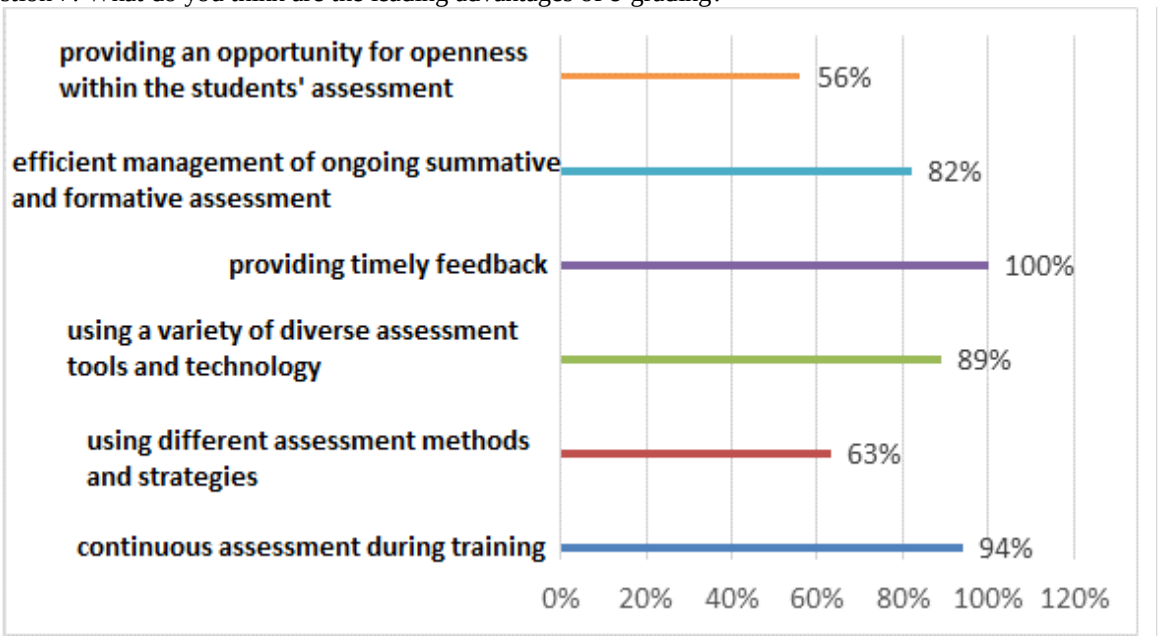

Fig. 8:-

To question #7, the surveyed educators gave more than one answer. All agree that a leading advantage of e-grading is the provision of timely feedback. 96% indicated the ability to continuously assess their students during learning, and 89% the use of a variety of means and tools for assessment.

The last question of the survey concerns the possibility of implementing an assessment system outside the classroom. Teachers demonstrate a positive attitude. The results are presented in **Fig.9.**

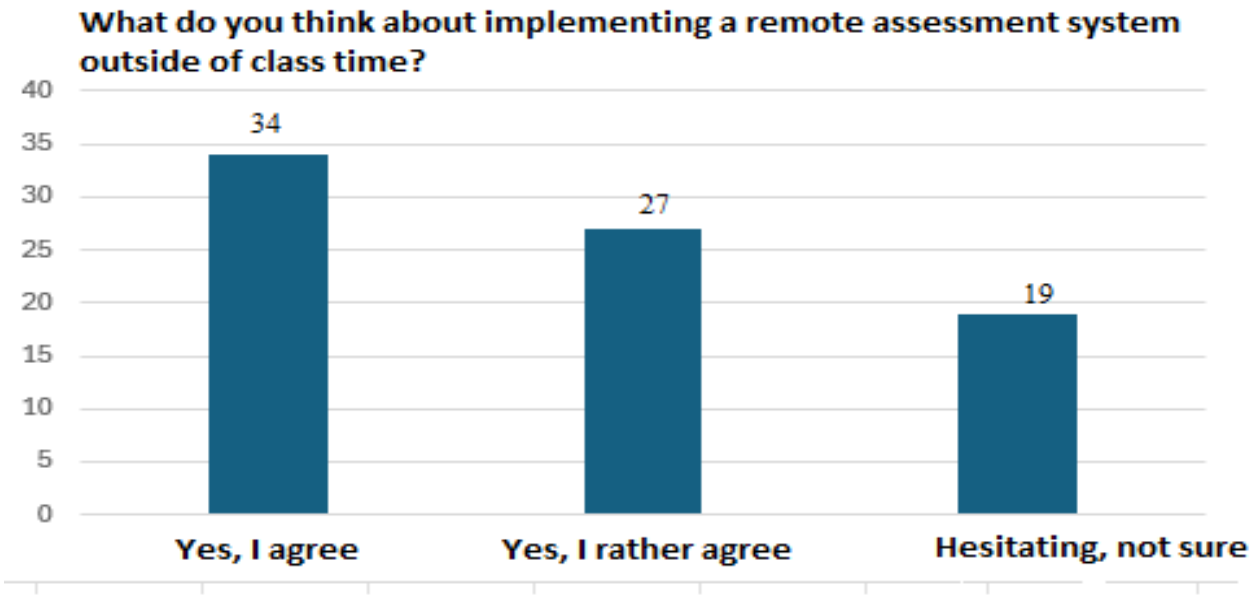

Fig. 9:-

Conclusion:

Online assessment is an important part of the learning process and should be prepared and implemented with the same care and attention as the teacher's preparation for the relevant lesson. Currently, there are various technologies for electronic assessment of students' knowledge and skills that are accessible and easily managed by the teacher. They allow you to create interesting tasks for online assessment. It is a matter of personal choice which of these will be used to assess student learning and associated software to match the needs and outcomes to be achieved. Teachers' attitudes are positive. In relation to the possibility of assessment outside of class, teachers are also positive, believing that this way there will be more time for clarification of the material and group activities.

Notes

Ordinance No. **11** of **September 1, 2016**: On the assessment of student learning outcomes, Republic of Bulgaria. Retrived: https://lex.bg/bg/laws/ldoc/2136905302https://diuu.bg/emag/13951/2/

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