

STUDENTS' KNOWLEDGE EVALUATION AS A MOTIVATING TOOL IN LEARNING OBJECTIVES

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Abstract. The assessment of knowledge, skills and competencies aims in not only evaluating and comparing students' learning objectives but also measuring another particularly important function - the motivation. The article examines assessment in the context of the competency model set out in the new law on pre-school and school education and its understanding by students and the level of motivation. Data from a study of motivational attitudes in students are presented in direct correlation with the methods and different ways of assessment, as well as with the analysis and the feedback from students. The analysis is based on surveys conducted with students from 11 to 19 years of age covering all types of schools in Bulgaria. Results are statistically reliable in clusters, variance and regression analysis.

Keyword: motivation; evaluation; methodology

Introduction

The teacher is constantly confronted with certain difficulties in his work, but one of the most serious points of conflict is assessment. There are various aspects of this process, some positive, others negative. Many teachers share their feeling of helplessness and insufficient coping with the work precisely from this confrontation with the student in the assessment process. In many cases, they feel helpless, which leads to a decrease in personal motivation to work. The readiness of the teacher to solve this problem is not great. Everyone manages on their own and as much as they can. The new Law on Preschool and School Education in Bulgaria has posed a new challenge, to assess not only the knowledge that is being done so far, but to learn to assess the skills and competencies of students as much as possible. An important point is the opportunity to assess the student's development and the learning process itself. But all this requires a much better assessment system and, accordingly, appropriate qualifications of teachers for independent preparation of materials for quality assessment.

“Two examples: The teacher fairly assesses students' learning achievements when they relate their knowledge and skills to a particular system of assessment

criteria and indicators, but the teacher acts fairly and encourages the student with higher grades, believing that it stimulates his motivation for learning, even if this assessment deviates from the actual achievement” (Kolishev, 2005). Fairness in assessment is a guiding principle in the teacher-student relationship.

Over time, from knowledge testing (even in methodological terms), we moved to knowledge control. From assessment with its functions, to learning for the sake of assessment. To change this dialectic, new competencies are needed in teachers, which should reflect on the students and parents, respectively.

Background:

What are the functions of student results assessment?

Different functions of assessment have been identified in the published literature: motivating, control, registering, ranking, selectivity, prognostic, orienting, learning support, reflexive. Undoubtedly, its main function is quantitative measurement. Measurement of knowledge, measurement of skills, if possible to measure competencies, but competencies in the context of durability of knowledge and the ability to apply. There is also a not so visible, but undoubtedly very important function, and that is the motivating one. Some sources also use the term construct, a psychological property of the individual and his attitude to the perception of knowledge and to some extent of skills. There are no studies for this condition focused on competencies. The importance of a construct for a person, in this case the students, can be determined only by directly observing and evaluating the behavior and perception of the action in this case - the assessment.

What we need to monitor:

- the level of students' achievements in what correlation they are with the grades they receive;
- motivating factors – external and internal and the development of these factors;
- the effect of evaluation – physically and psychologically.

A variety of forms of evaluation are needed, “which we offer so that their scope and opportunities serves for the analysis of results – statistical, behavioral and dynamic data” (Dimitrova, 2018). Following the dynamics of development according to the evaluation of the results, but also the emotional development of the trainees. Which we can put in the following scheme – the way from knowledge

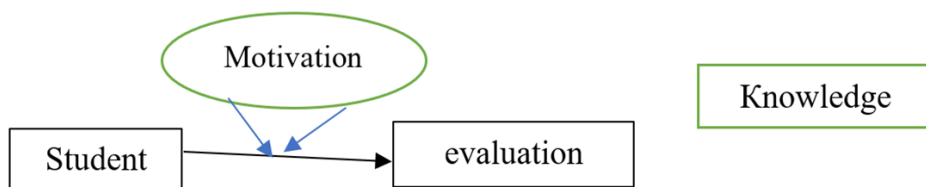


Figure 1-1

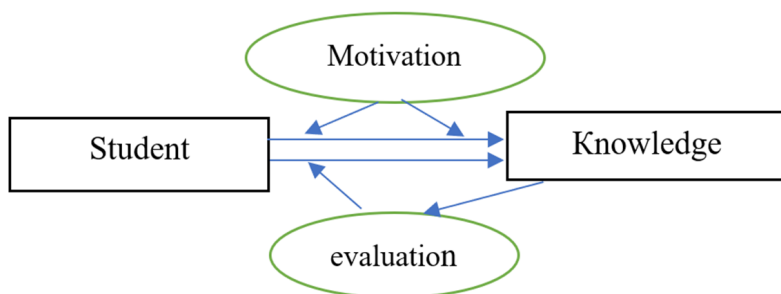


Figure 1-2

It is important how students perceive assessment, and this depends a lot on their teachers. “The achievements of the students allow to check and evaluate not one-sided knowledge, but in unity with the ability to apply them” (Georgiev, 2007). This is not an empty phrase, but a goal in learning, and this means in assessment. And the principle of “little but much”, ie. small amount of knowledge, but with great applied benefit. “A different approach and change in humanistic testing pedagogy is already needed” (Edwards, 2000).

“The construction of a new educational model presupposes a reform in the content and procedural environment of education... Nowhere in the normative documents is it clear which is the unit of comparison. Who and what do we compare with her” (Totseva, 2018).

Relevance of State Educational Standards /SES/

“The recently launched educational reform recognizes the role of SES as a major factor for a complete change of the educational system, but does not guarantee a qualitative change in the studied curriculum” (Rangelova, 2017).

The applicability of SES in the educational process must be subject to the topic and time, in the context of a calendar unit, in the training of students. There is a growing need for adequate updating of standards, and hence a better assessment of the material learned. There has been progress, but the pace of standardization and updating of subject training requirements has been smooth and slow.

Types of assessment that are depicted in the new Law (Table 1):

Table 1

Type	Current status	Responsible authority for the exam	Evaluating authority
During the school year	It is currently carried out by each teacher	Teachers	Teachers
At the end of a degree or apprenticeship	Externally Implemented by the MES	Commission of teachers	Teachers

Internal	It is carried out internally by the teachers	Teachers	Teachers
External	Externally Implemented by the MES	implemented by a MES commission of teachers and university professors	Teachers
Nationwide	Externally Implemented by the MES	implemented by a MES commission of teachers and university professors	Teachers
Regional	Externally Implemented by the RME	Commission of teachers	Teachers
At School level	It is carried out internally by the teachers	Commission of teachers	Teachers

We will not review all types of evaluation. The present study aims in to show that the teacher is the leader in the preparation of materials, implementation and assessment. Which immediately raises the question of where and when he/she prepares for this activity. This topic is missing or minimally studied in vocational training in universities.

When evaluating, one needs to ask some questions: What do we measure?, How do we measure it?, Why do we measure it?, What is the feedback we need?, What information will reach the evaluated and does it change anything in his attitude and motivation?

The main objectives of assessment according to the law on preschool and school education are:

1. Recognition of individual achievements and the need for learning.
2. Monitoring of the educational system.
3. Entrance for secondary and vocational schools and colleges.

What actually happens and what is evaluated with each type of evaluation.

No matter what we analyze, in practice it always comes to the point that students learn not to be able to do something, but to get an assessment.

If we turn to the state educational standards and the curricula for general education subjects in the respective classes, we will see that which topics are given and what ratings have different students received. Is it enough?

How many and what are the formats of the examination materials. “In the creation of SES is the need for measurability and achievability, but the expected results do not have differentiation and gradation of digestibility” (ie for what degree of digestibility what assessment should be made) (Totseva, 2018). Such criteria are most often present in NEE and SME, but whether the results of these assessments

have a motivating effect on the student. Does he know what he has not learned and what knowledge and skills need to be acquired even better. Providing sufficiently complete and good feedback is the basis of the motivating or demotivating effect of this type of evaluation.

“The standard should be tied, on the one hand, to a mandatory minimum for mastering the knowledge, skills and competencies to be measured, and on the other hand, to become the basis for constructing a system for assessment at higher levels” (Georgieva, 2008). Assessment should create a sense not only of quantitative assessment, but also of qualitative, but also sufficiently differentiate the level of each student. This requires a reliable system for internal and external evaluation and with clear feedback and analysis of each individual work. This activity is in the hands of every teacher. He has the freedom to develop and apply it according to his own attitude. Each teacher should plan their assessment of the material using the Taylor Matrix. Unfortunately, almost everyone chooses tasks from collections and does not think about cognitive levels and assessed knowledge. Namely, this will contribute to changing the attitude from learning to assessment, to assessing what has been learned and giving motivation to learn by replenishing knowledge.

It is important when evaluating to ask first: What do we evaluate?

1. Can the student understand the content of the task – Reading comprehension, Communicative mathematical literacy, Recognizes the activities in the task.

2. The student's ability to think in algorithms. To compile mathematical models/ equations, inequalities / and know where they can be applied in the surrounding reality.

3. Computing technique – the skill of rational calculation – numerical literacy, combinatorial and rational thinking and the accompanying correct action.

4. Applicability and interdisciplinary connection – students to see clearly the applicability of the task and assess their functional literacy.

“Axioms of the educational system:

... 9. Reliable and valid assessment of student achievement provides information about the knowledge, skills and understandings of the individual student, helps him to know what he needs to improve and provides access to the next stage of education” (Budjel, 2019), and it is essential that this assessment does not is a tool for the teacher to bully and impose authority, and to have a motivating function for the student. Good evaluation also leads to external validation. “Our school teaches how to study day in and day out to get grades. The students' scheme is when and what to study in order to get the best grade and in general they don't think what this knowledge is for”¹⁾.

To avoid the feeling in students that they are learning to evaluate and to build a confidence and inner motivation in students. “Trust is a relationship between teacher and student, in which each party is convinced of the capabilities and good intentions of the other party” (Kolishev, 2005).

Evaluation by PISA

The 2012 International Assessment by the Organization for Economic Co-operation and Development (known as PISA) focused on determining and measuring students' mathematical literacy. After the publication of the achievements in our participation, e.g.

The aim of the present study is to establish students' attitudes and views on the assessment process.

Subjects:

The study involved 308 students from over 10 schools. 130 of them are boys. All subjects were in the age range 11 – 18 years, in adolescence. According to the “residence” factor, 45 people live in a settlement with up to 1,000 people, 92 students live in a settlement with up to 5,000 people, 7 children live in a settlement with up to 10,000 people, 4 live in a settlement with up to 30,000 people, 18 students live in a city with up to 100,000 people, 75 respondents indicated that they live in a city with up to 500,000 people, in a large city with over 500,000 people live 67 students. Materials and methods

In order to reveal the attitudes, attitudes and experiences of students regarding school assessment, a questionnaire of 16 questions was prepared, the semantics and connotation of which are focused on the dem / motivating aspects of assessment in the acquisition of new knowledge and skills (eg "After get acquainted with the results of an assessment and the assessment is lower than expected, does this motivate you to return to the material and complete your knowledge?"). The answers to the questions are provided on a five-point Likert scale: 1 – no, 2 – satisfactory, 3 – to some extent, 4 – to a large extent, 5 – mandatory.

Methodological analysis

It was found that the survey has a high reliability ($\alpha = 0.932$).

In order to structure and summarize the statements in larger classes, a cluster analysis was performed, which clarifies what statements approximate each other the most. The cluster analysis shows that there are four types of statements, which are divided into four clusters (Fig. 1).

The first cluster includes statements such as: “Do you receive specific recommendations and guidelines for better results in advance?”, “Are you familiar with the evaluation criteria in advance?”, “Are there any explanations for the errors / reviews when returning the written works?”, “Do you understand the reviews that teachers write on your written works?”. When considering the semantics of statements, it can be summarized that this includes statements whose purpose is to check whether students understand the rules and criteria of teachers in assessment.

The second cluster includes statements such as: “Do teachers assess you according to the rules – oral and written, through tests and class work, write the required number of assessments for the term and year, etc.?”, “Are various assessment methods used? (homework, projects, teamwork, etc.) or to evaluate

each other with your classmates?”, “Are you evaluated fairly?”, “Do teachers and the school give you the opportunity to participate in competitions and Olympiads in mathematics?”. Here the general idea of the statements is aimed at using vario.

The third cluster includes the following statements: “If you received a high grade, does it motivate you to work harder in mastering the next material?”, “Do teachers analyze your results and achievements to know how to continue your work on the subject?”, “Once you are familiar with the results of an assessment and the assessment is lower than expected, does this motivate you to return to the material and complete your knowledge?”. This includes statements whose connotation is aimed at the motivating function of evaluation.

The fourth cluster includes statements such as: “Is the distance form of education suitable for teaching mathematics?”, “Is the electronic form of assessment suitable for a fair assessment of knowledge and skills in mathematics?”, “Does the electronic form of assessment cause you greater trust and justice?”. The general idea of the statements here is related to the remote and electronic form of evaluation.

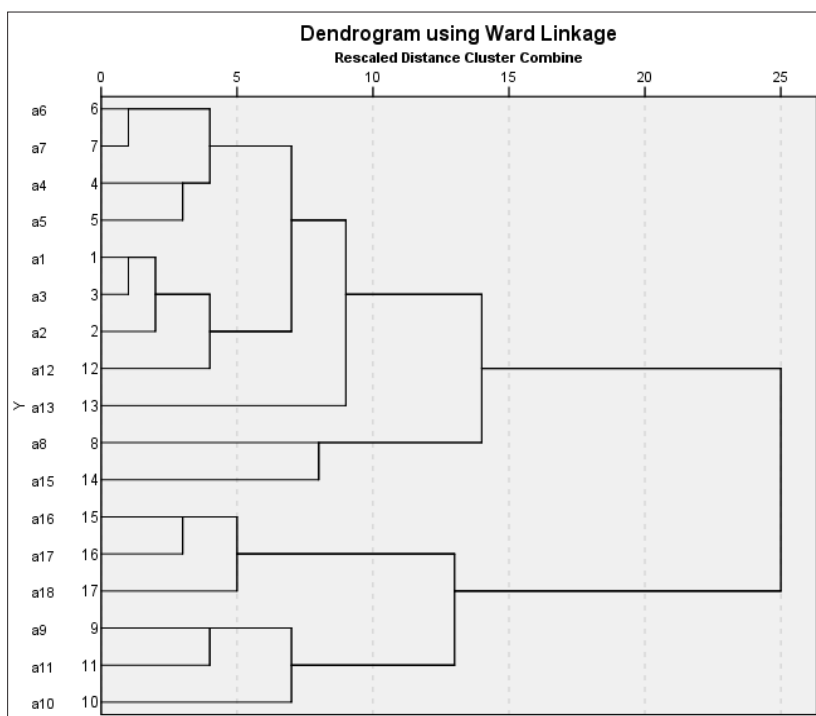


Figure 2. Hierarchical structure of the statements from the survey, measuring the motivational function of the assessment

It appears that there are four scales: remote and electronic assessment with the motivating function of assessment on one side and the rules and criteria of teachers who the use of various forms and methods in the assessment process on the other.

The one-way multivariate analysis of variance: influence of gender, age, place of residence and competition motivation on the motivational function of assessment, the distance form of assessment, the use of different assessment methods and the evaluation criteria. In the initial formulation and structuring, we did not consider that the factor “participation in Olympics and competitions” would have an impact on motivation, but it turned out that this was not the case. And although it was placed as secondary and hardly influential, it turned out not to be the case. It is for this reason that it displays in the first place its results.

Participation in competitions and Olympiads of students has an impact not directly on the motivation factor, through its relationship with the effectiveness of the use of different methods by teachers: $F = 5.161$; $p = 0.044$. Students who have an intrinsic motivation to participate in competitions (personal desire and assessment of the level of their knowledge) are more effectively aware of the assessment process by teachers and their rules.

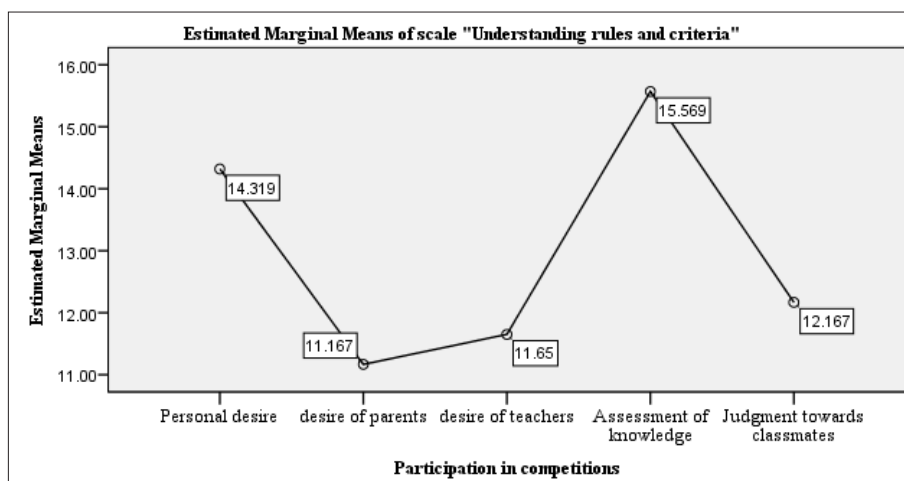
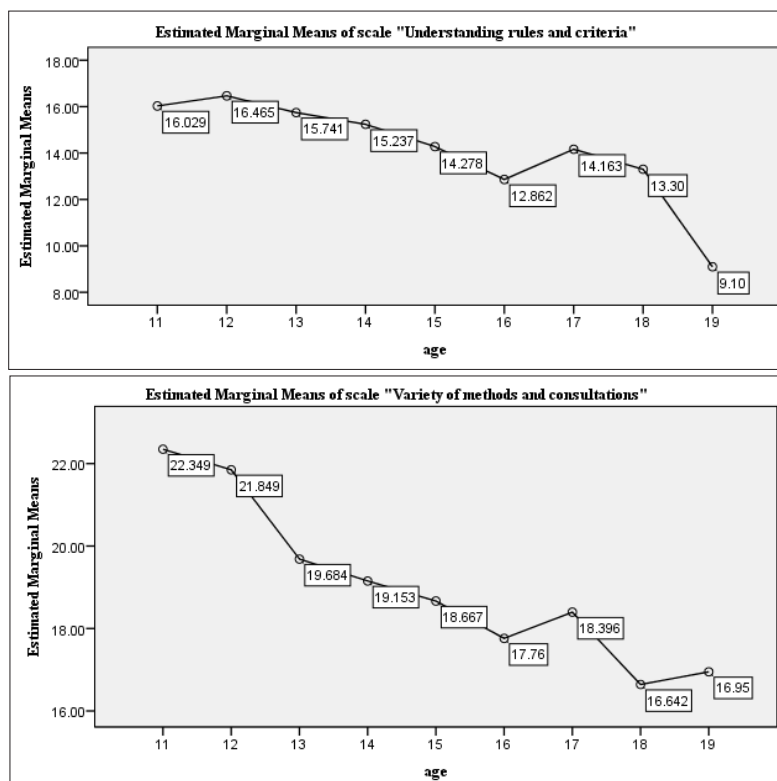


Figure 3

Gender significantly affects the motivating function of assessment: $F = 9.201$; $p \leq 0.0001$. Boys are significantly more motivated to evaluate than girls.

Age influences the evaluation criteria $F = 3.683$, $p = 0.001$, as well as the perception of the effectiveness of using different evaluation methods $F = 2.992$; $p = 0.04$. In both cases, the youngest students in the sample gave the highest scores on these two scales.



Figures 4, 5

It is important to consider the influence of certain independent variables such as gender, age, place of residence and the motivation of students to participate in competitions on the motivational function of assessment. For this purpose, only the statistically significant influences on the three statements, whose semantics are focused on the motivational function of the assessment, namely: "If you received a high grade, it motivates for more work in mastering the next material?", "Do teachers analyze your results and achievements to know how to continue your work on the subject in the future?", "Once you get acquainted with the results of an assessment and the assessment is lower than expected, does this motivate you to return? ETE material and fill your knowledge?".

Statistically significant differences were found between the following factors and claims:

The age factor and the cluster's statement about the motivating function of the evaluation have a serious coefficient. Which shows that with increasing age,

the assessment itself decreases its motivational function. Adolescent students responded significantly more positively than adolescent students: $F = 4,278$; $p \leq 0.001$.

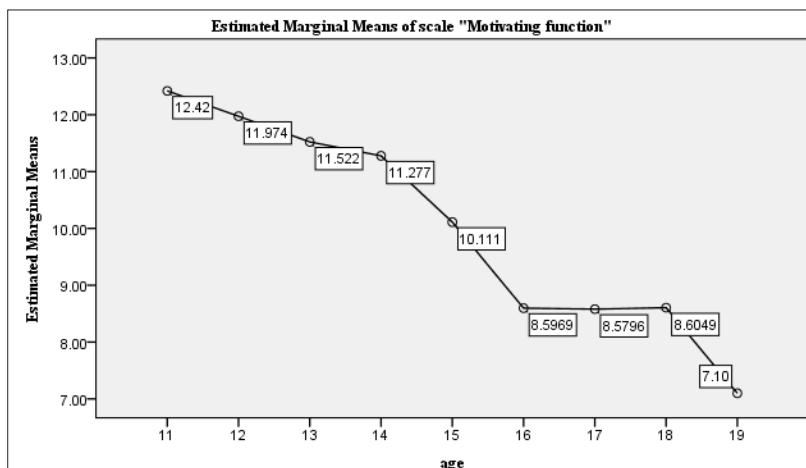


Figure 6

There is also a statistically significant difference in the age plan with regard to the question “Do teachers analyze your results and achievements so that you know how to continue your work on the subject in the future?”. Again, the most positive response was in adolescents compared to adolescents: $F = 6.391$; $p = 0.002$.

Do teachers analyze your test results in ‘a stimulating further work manner’?

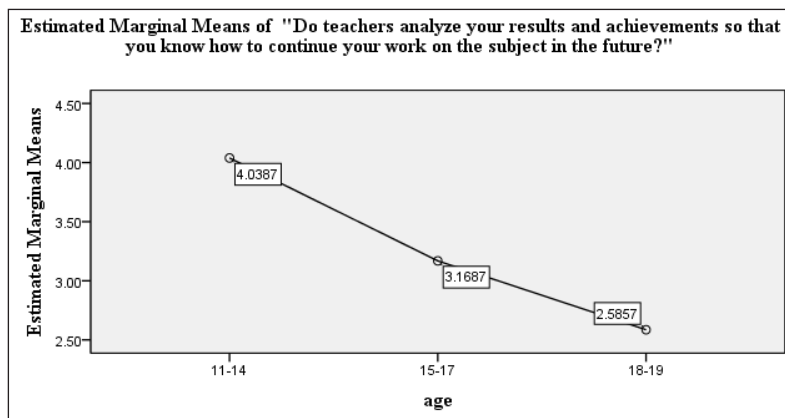


Figure 7

Do teachers analyze your results and achievements so that you know how to continue your work on the subject in the future?

If you test results are lower is this still motivating you to go back and learn from your fouts?

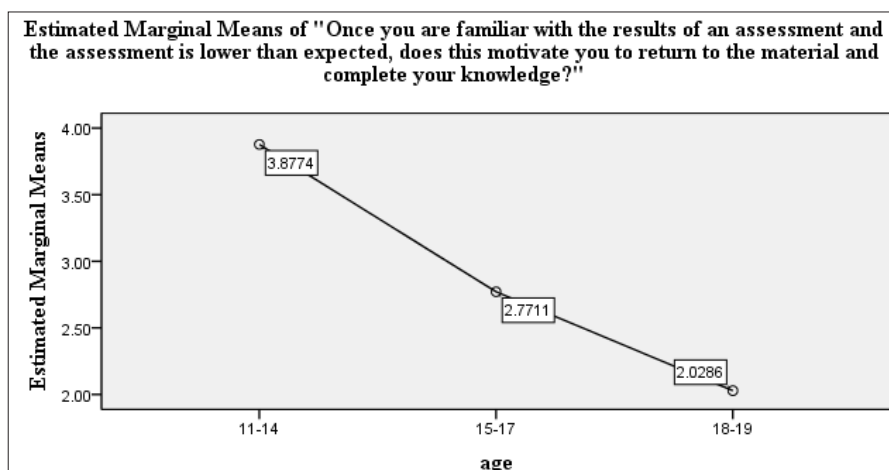


Figure 8

The difference in the tie range is statistically significant with regard to the question “Once you are familiar with the results of an assessment and the assessment is lower than expected, does this motivate you to return to the material and complete your knowledge?”: $F = 7.487$; $p = 0.001$

Which leads to the conclusion that students do not pay attention to the “look back” approach. And the corresponding omissions remain as such. This is not fatal for some subjects, but it is a serious problem when studying mathematics. And this ratio is significant and cannot be ignored.

There were no statistically significant differences in the age factor and distance/e-learning.

Table 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.040	.626		.063	.950
Understanding rules and criteria	.368	.049	.440	7.594	.000

Variety of methods and consultations	.103	.051	.129	2.043	.042
distance/e-learning	.299	.049	.293	6.114	.000
a. Dependent Variable: Function 'motivation'					

Regression analysis shows that clear evaluation criteria have the strongest influence on the motivational function of evaluation ($\beta = 0.440$; $p \leq 0.001$). When students are aware of the requirements of their teachers in assessment, then teacher assessments motivate students the most to learn. Remote assessment also influences students to feel motivated by grades ($\beta = 0.293$, $p \leq 0,03$). The use of various evaluation methods has the least effect on the motivating function of the evaluation ($\beta = 0.129$, $p \leq 0,03$). It is indisputable that the high place of remote assessment has a connection with the pandemic, but in previous studies it was important because of the students' sense of greater justice.

Conclusion

Three significant conclusions come out from the present study:

1. Clear pre-set evaluation criteria and syllabi with guidelines how the evaluation will be performed is the most important motivating factor.
2. Test results assessment significantly affects students motivation and creates opportunity for additional consultations and individual work.
3. We have to agree that the lack of complementary knowledge of students is seriously neglected. This is a major omission and lowers the motivation of students as they move on to higher grade, ie. in the age plan for learning mathematics.

In conclusion, “for teachers what should be best assessed is the input effort, not the skills. They assess how deep are students in a specific subject, how hard they worked on a project” (Heiberger, 2019).

“Judgments from teacher test result assessment cease to be global, general. In the specific conditions of the theoretical and practical activity of the students they are understandable, meaningful, visible in results and act mobilizing and stimulating” (Georgiev, 2007). The more time the assessment takes place in the learning process with all its functions, with priority being the motivating one, the better, it fits into the development of learning.

NOTES

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