

THE EFFICIENCY OF USING THE GOOGLE FORMS TOOL AT
THE STAGE OF A LESSON FOCUSING ON DIRECTING THE
TEACHING-LEARNING PROCESS FOR GEOGRAPHY
DISCIPLINE- AN ONLINE MODEL

EFICIENȚA UTILIZĂRII INSTRUMENTULUI GOOGLE FORMS
ÎN ETAPA LECȚIEI CONCENTRATE PE DIRIJAREA
PROCESULUI DE PREDARE-ÎNVĂȚARE PENTRU DISCIPLINA
GEOGRAFIE - UN MODEL ONLINE

Florentina TOMA^{1a,b}, Daniel Constantin DIACONU^{2bc}

Abstract: The pre-university educational system should be based on an educational approach in which the teaching, learning and evaluation methods aim to turn the student into an active agent in the learning process. This study is an attempt to evaluate the use of a personal learning environment based on the Google application - the Forms tool to support teaching and learning in the teaching-learning direction sequence, identifying the effects by calculating the magnitude of tests. The results showed that students who benefited from the teaching-learning model with the Google Forms tool registered better results in evaluation.

Key-words: *Google Forms tool; Kahoot! standardized assessment; specific competences; responsible attitudes.*

Cuvinte cheie: *instrumentul Google Forms; Kahoot! evaluare standardizată; competențe specifice; atitudini responsabile*

1. INTRODUCTION

With the emergence of the pandemic, Romania had to address the new online or hybrid teaching-learning-assessment system. Many teachers have been put in a position to associate their teaching discipline with digital competences, in order to ensure a good course of the teaching-learning educational process.

There are many research studies along the way regarding different international online teaching-learning-assessing educational methods, mostly in the academic field, but also the fact that they sometimes differ dramatically according "to the teachers' passion, abilities and competences", (Hattie, 2012), according to the quality of the

^{1 a} University of Bucharest, Simion Mehedinți "Nature and Sustainable Development" Doctoral School, Faculty of Geography, Bucharest, Romania, florentina.ghersin@drd.unibuc.ro

^{1/2 b} University of Bucharest, Department of Meteorology and Hydrology, Faculty of Geography, Bucharest, Romania, daniel.diaconu@unibuc.ro (corresponding author)

^{2 c} Research Center for Integrated Analysis and Territorial Management, University of Bucharest, 4-12 Regina Elisabeta Avenue, 030018 Bucharest, Romania

equipments and the necessary tools for the development of the educational process. As regards modern or traditional teaching, Bibić et al., 2015, Lukić T. et al., 2016, investigated which teaching method is more beneficial to "motivate student learning and acquire skills (knowledge, attitudes and skills)" in Geography.

Among the researches carried out in the field of hydrology teaching, it is noted that the role games have been analysed with regard to the effects of a test of negotiation of integrated water resource management (Loon Van & Anne, 2019), the use of the projects based on certain themes (Bring & Lyon, 2019), the online data-based training and hydrological modelling (Merwade & Ruddell, 2012) – all of these in the academic field.

Another topic of research is the training of responsible attitudes and practical skills with students, according to the curriculum. The literature focuses on practical applications, which encourage productive innovative methods of experimental learning among students, such as the study of incorporation of field learning opportunities (Zavar & Nelan, 2020), "classroom teaching combined with field trips " (Holgersen, 2020).

As for increasing student performance after improving teaching-learning-evaluation methods, a guide for teachers studying visible learning (Hattie, 2012) and the work of Gibbs et al., 1996.

In a series of scientific papers, the use of modern techniques and tools is being explored in the online model of teaching-learning-evaluation of geography, which encourages "student participation in active and experienced learning through the use of video games about disaster and disaster risk", (Gampell et al., 2020), as well as the incorporation into curricula and "use of mobile technology mobile device type" (France et al., 2020).

The improvement of teaching-learning-evaluation of geography discipline, by choosing teaching strategies that explore "the value of computer games as a tool for learning students and which lead to the development of ICT skills", was discussed by Sebastiá-Alcaraz & Tona Monllor, 2020, on the use of new technologies in geography, such as RU-EU game, a learning support in the form of situational simulation that cannot be reproduced in the classroom, such as natural disasters.

A comparative study of the effectiveness of modern teaching strategies in the geography class is found in the paper of Pehoiu & Homeghiu, 2014, and a recent study during the pandemic in the research of Dulamă & Ilovan, 2020.

Visible learning is presented as preparing, starting, conducting and closing a lesson, how teachers see learning through the eyes of students (the teacher is a cooperative and critical planner, an expert in adapting learning, a beneficiary of feedback) and how "it helps students become their own teachers "(Hattie, 2012).

Researchers found that a useful method for calculating the results of evaluations over certain time intervals and on certain samples using different scales is to calculate the size of the effect (Glass et al., 1981; Hattie et al., 2011; Hedges & Olkin, 1985; Lipsey & Wilson, 2001; Schagen & Hodgen 2009).

The perception of learning for pupils from a teacher's perspective is "to shape their ability to self-assess and self-regulate" (Cornelius-White, 2007), to develop responsible attitudes in real life and to interest in discipline.

With regards to the approach of using ICT tools for learning and their effects on students, a notable mention in the specialised literature: Glover, 2020, who argues that the "Google Forms" tool helps stimulate conversations around basic concepts in order to improve learning and equip students with both technological and collaborative tools to prepare them for future academic and professional contexts"; Andrew, 2019, investigated "students' attitudes towards various language learning tasks in Google apps, explored the advantages and limitations of using Google apps as a collaboration tool"; about using Google Forms as a mixed-learning initiative (Murphy, 2018; Liu & Lan, 2016) "suggests that many Web applications (e.g. Google Docs) play a key role in improving student motivation and involvement"; reviews Kahoot! literature, defining it as a "formative assessment or pause from traditional classroom activities, which affects learning performance, classroom dynamics, student and teacher attitudes and perceptions, and student anxiety".

Romania has been carrying out teaching training courses for the online environment since the beginning of the pandemic. It is noted that, although huge efforts are being made, through training courses for teachers, where numerous tools of open educational resources were presented, no methods of maximum efficiency have been found in the online model that do not depart from the training of students' competences. Lack of school legislation, uniform practices concerning the compulsory opening of cameras by students during online school hours and a code of ethics not adapted to the present pandemic times, it leads in time to the interest of a small number of pupils and to the inability of the teacher to train all students the specific competences according to the school curriculum. The decline in educational outcomes during the course of the online teaching-learning model strengthens this conviction. This leads us to the premise that teaching-learning-evaluation methods are lacking to stimulate the attention and interest of all students.

Based on Mayer's idea, presented in Hattie's book, 2012, in which all students are trained during the hour "to provide a personal answer, by clicking on a remote control", this research aims to investigate whether the teaching method of Google Forms tool used by all classroom students during the teaching-learning routing sequence, improves student performance in evaluations, compared to the passive method of using the PowerPoint presentation.

The goal of this research to analyze the methods involved in the educational process via the correct application of optimal teaching-learning-assessment tools. This task is necessary especially in the educative conditions created by the COVID-19 pandemic.

2. DATA AND METHODS

2.1 Objective

Hypothesis proposed for the study research: "If in geography classes, all students are constantly involved in learning activities in all lesson sequences, then they will develop their specific skills and their school progress will be visible."

The general objective of the research is to determine the involvement of all students in the educational process during the course (predominantly in the teaching-learning sequence), by applying methods and an optimal teaching-learning-assessment tool to the geography discipline, by measuring the results of students' assessment and the skills they have acquired. This general objective took into account five specific objectives. The first specific objective was to measure the level of previously acquired knowledge of students through the online teaching method such as PowerPoint presentation in relation to the content to be taught by measuring the impact of tests. The second specific objective was to measure the skills and knowledge level of students acquired by applying two methods of comparative teaching-learning (PowerPoint- method passive and sequential structure and instrument Google Forms tool combined with PowerPoint presentation) to the contents about Hydrosphere. The third specific objective was to develop the capacity of self-regulation ability and self-assessment in students to the contents related to the Hydrosphere by applying a questionnaire as a theme. The fourth specific objective was to measure the level of knowledge subsequently acquired by students through the online teaching method of PowerPoint presentation in relation to the content to be taught by measuring the impact of tests. The fifth specific objective was to apply a Google Forms questionnaire for the group of students who used Google Forms and PowerPoint as tools of the teaching-learning method.

2.2 Participants

The research was carried out between October 2020 and May 2021, within the "Mihai Eminescu" National College from Bucharest, Romania and consisted in teaching-learning-evaluation in the field of geography, of the sequence contents and of the teaching units specific to the Hydrosphere: Hydrosphere in the 5th grade and the 9th grade (five teaching-learning-evaluation lessons and a summative/cumulative evaluation lesson), Europe's Hydrography in the 6th grade (a teaching-learning-evaluation lesson and a sequential evaluation lesson) and the 10th grade Hydrosphere resources (a teaching-learning-evaluation lesson and sequential evaluation lesson). It has been applied as an online teaching-learning method for students, using the Google Forms tool to 196 students out of the 392 (of which 112 students are gymnasium: two 5th grades, two 6th grades and 280 high school pupils: seven 9th grades - three 10th grades), in which students respond in writing to the tasks on the Google Forms form, based on the PowerPoint presentation of the lesson that the teacher presented.

Parallel classes of the same level of study are numbered in Romania by letters (A, B, C, D, E, F, G and H).

The other 192 students benefited from the open educational resource (RED) teaching-learning method- PowerPoint presentation, with the same content and the work tasks/learning activities. For all students, the Kahoot! game for the feedback sequence and the Forms questionnaire for sequential evaluation was used as a standardized assessment tool. Groups of students are intellectually homogeneous, but heterogeneous in high school specialization (maths-IT profile, social sciences

and philology), have a predominantly visual learning style, studying online pattern one hour or two hours a week from the common core curriculum.

2.3 Instrument

The following research methods and tools were used in the study: analysis (data collection on teaching-learning-assessment in the classroom) - in order to assess specific skills and performance and progress of students; quantitative statistical method of calculation the magnitude of the effect on school procurement of expected progress; questionnaire-based survey method, using the Likert ordinal scale; analysis of the products of students' activities; the experiment.

The tool used in teaching-learning students is the use of the Google Forms platform and the PowerPoint presentation; the formative test, the current test (feedback test) in the teaching-learning sequence, the sequential test and the summative/cumulative test on the Kahoot! and Google Forms platform were used to evaluate students, and the anonymous questionnaire with the Google Forms tool is for students' perception of the educational process, representing methods for qualitative test data. The Google Forms questionnaires were sent by the individual teacher to the students' institutionalized e-mail address and after they completed them, they were automatically sent with their name to the teacher's e-mail address to collect all the data.

2.4 Procedure

The study was thus divided into 3 research stages:

Stage 1 pre-research: After ensuring the class climate by applying a Google Forms 7C questionnaire - "the seven factors for ensuring the class climate" [1], a study of previous standardized feedback assessments of Kahoot! interactive exercise was carried out for all classes. It was used as a selection criterion for the choice of classes to participate in the learning experiment with the two comparative methods: two ISCED (International Standard Classification of Education) levels 2 and 3 in the lower anterior average classes (9th grade F, 10th grade E and 5th grade A) and two ISCED levels 2 and 3 in classes with the higher mean (9th grade F, 10th grade E and 5th grade A) and two ISCED levels 2 and 3 in higher mean classes (10th grade D and 10th grade G) and approximately equal average 6th grade, but with very small differences in the average score between classes, from a minimum of 0.3 percentage to the VI-a classes, to a maximum of 0.97 percentages in the IX-classes.

Stage 2 of the research itself: in which the two teaching-learning methods were applied: passive method with sequential structure of presentation PowerPoint of the lesson and type of use Google formats tool combined with the PowerPoint presentation for students.

All students of a class had written answers in the Google Forms questionnaire, by discovery, to work tasks identical and standardized to those in the PowerPoint presentation used by the teacher during the teaching-learning sequence, and the questionnaire was associated with a score to motivate students. The themes used have been diverse, from the correspondence between images and definitions, to the identification of river/lake/ghetto names on the blind map, to the explanation in their own words or the proposal of solutions of hydrological phenomena viewed in the

video or observed in the graphic and cartographic representations. In the Google formats method, students did not write the lesson in the notebooks, which is why the teacher posted a PowerPoint presentation and a worksheet of the content of the lesson on the Google Classroom platform.

Regarding the passive method of sequential PowerPoint presentation, the students responded verbally and freely to the work tasks of the PowerPoint presentation, and they noted the lesson scheme in their notebooks. The learning activities were determined on the basis of 3-5 specific competences in the school curriculum. The PowerPoint lesson included a presentation slide, for informing all students, with: the five operational objectives of the lesson, the standards of performance scoring by operational objectives and responsible attitudes in real life designed to be taught to students at each lesson.

As the assessment sequence, all students received a Kahoot! game with nine standardized questions raised on specific competences and depending on the operational objectives of the lesson and a feedback question on the lesson taught by the teacher. The topic consisted of completing a Forms questionnaire, aimed at training in students the self-tuning and self-assessment capacity, carried out predominantly on the Likert scale. This created a database of evaluation results and the basis of each class.

The methodology used to test the assumption of the magnitude of the effect studied is the quantitative statistical method of calculating the magnitude of the effect on school procurement of the expected student progress by class during the research period using the Jasp program. Standard class deviation was calculated at all evaluations and effect size in tests (equation 1), in two ways: for the same class as the two assessment moments - previous and during the implemented teaching-learning method using Google Forms instruments (equation 1, situation 1 and 2) and for the period of implementation of the teaching and learning method with the Google formats tool, the second phase of research for different classes (equation 1, situation 3).

The effect size (d) is:

$$d = \frac{M(test1) - M(test2)}{(AS\ test1 + AS\ test2)/2} \quad (1)$$

Where:

Situation 1 (the same class):

M (test 1) is the mean of the post-test (for the whole class); M (test 2) is mean pre-test (for the whole class); AS test 1 is the standard deviation of the post-test (for the whole class); AS test 2 is the standard deviation of the pre-test for the whole class.

Situation 2 (the same class):

M (test 1) is the post-test mean, during the use of the implemented method (for the whole class); M (test 2) is the mean pre-test previous (for the whole

class); AS is standard mean deviation of the same class for the two moments of the assessment.

Situation 3 (different classes):

M (test 1) is the mean test for class with Google Forms tool (for the whole class); M (test 2) is the mean test for class without Google Forms tool (the whole class); AS test 1 is the standard deviation class with Forms; AS test 2 is the standard deviation class without Forms.

Stage 3 post-research: Analyses the results of each class, thus comparing the teaching-learning method with the Google Forms tool, with the presentation PowerPoint method over the five weeks in the IX and V classes and for one week in the VI and X classes.

Rosenthal et al., 2000 show the formulas used for the reciprocal transformation of the most common indicators of effect size, r and d (equation 2 and 3):

$$r = \sqrt{\frac{d^2}{d^2 + 4}} \quad (2)$$

$$\text{and } d = \frac{2r}{\sqrt{1-r^2}} \quad (3)$$

Where: r is the coefficient of determination; d is the effect size.

A further three-and-four-weeks Kahoot! standardized game-type assessment in the VI and X classes was also carried out to compare the progress or backsliding of students after the method implemented with the Google Forms teaching-learning tool ceases to apply. The effect size has also been calculated for the next stage (equation 1, situation 4)

Situation 4 (the same class):

M (test 1) is the mean posttest during the usage of the implemented method (for the whole class); M (test 2) is the pretest, previous method implementation (for the whole class); AS is the standard deviation of the whole class for the two moments of the assessment.

Students who used the Google Forms tool method, received at the end a questionnaire stating its advantages and disadvantages and to what extent they agree to the re-use of this teaching-learning method during future course hours.

2.5 Data analysis

According to the method of the experiment, the most used working method was the Google Forms questionnaire method and the graphical method of the results obtained with the students in the Excel program. Column-type graphs were made on the analysis of the results obtained in class tests.

The Google Forms questionnaire for completing the answers to the activities / work tasks during the teaching-learning sequence was applied to a number of 192 students. The students' perception regarding the use of Google Forms and Kahoot! as teaching-learning methods was checked via a survey. The experiment was performed on 392 students from middle school (5th grades and 6th grades) and high school (9th grades and 10th grades). Regarding the analysis of the effects' magnitude, the formulas/equations presented in the research methodology were

applied and it was calculated for every class (14 classes in total), for the 12 lessons about the Hydrosphere.

3. RESULTS AND DISCUSSIONS

Results to the first specific objective: to measure the level of previously acquired knowledge of students through the online teaching method such as PowerPoint presentation in relation to the content to be taught by measuring the impact of tests.

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

In the first pre-research phase standardized Kahoot! - instrument assessments were applied for four lessons (in the 5th, 6th and 9th grades) or five lessons (10th grade), to observe the level of knowledge previously acquired by the online teaching method of PowerPoint relative to the content to be taught.

The results of the second specific objective: to measure the skills and knowledge level of students acquired by applying two methods of comparative teaching-learning (PowerPoint- method passive and sequential structure and instrument Google Forms tool combined with PowerPoint presentation) to the contents about Hydrosphere.

In the second research phase in itself, where students will acquire knowledge in line with adopted teaching strategies (with a procurement approach, targeted learning and skills-based targets) and evaluated standardized to the feedback sequence of game Kahoot! and sequential/summative test of Google Forms questionnaires. Thus, in the 5th grade A, 6th grade A, 9th grade D, 9th grade F, 9th grade H, 10th grade E and 10th grade G was used as a teaching and learning method the use Google of the Forms tool and in the 5th grade B, 6th grade B, 9th grade A, 9th grade C, 9th grade E, 9th grade G and 10th grade D the presentation PowerPoint method was used.

It was pointed out that issues: both methods were identical work tasks, learning through discovery; during teaching -learning with and without Google formats tool, the teacher was moderator- read and explain the work tasks that contained suggestive graphical and map representations, explained the contents so that all students can either answer in writing or orally. The PowerPoint presentation lesson on both models included: checking the previous lesson, aceptive training, directing teaching-learning through discovery work tasks, feedback and knowledge retention sequence, homework.

Formative assessment is the assessment of the feedback sequence at the end of the lesson taught, from the contents of that lesson. Summative/cumulative evaluation is the evaluation that includes the contents of a chapter, and all the scores come from the evaluation on the Kahoot!.

All results of the assessments (class average) are given in Fig. 1 (5th grade), Fig. 2 (6th grade), Fig. 3 (9th grade) and Fig. 2 (10th grade), reflecting a higher level

of knowledge for all classes that used the Google Forms tool in the teaching-learning sequence, which are the subject of research.

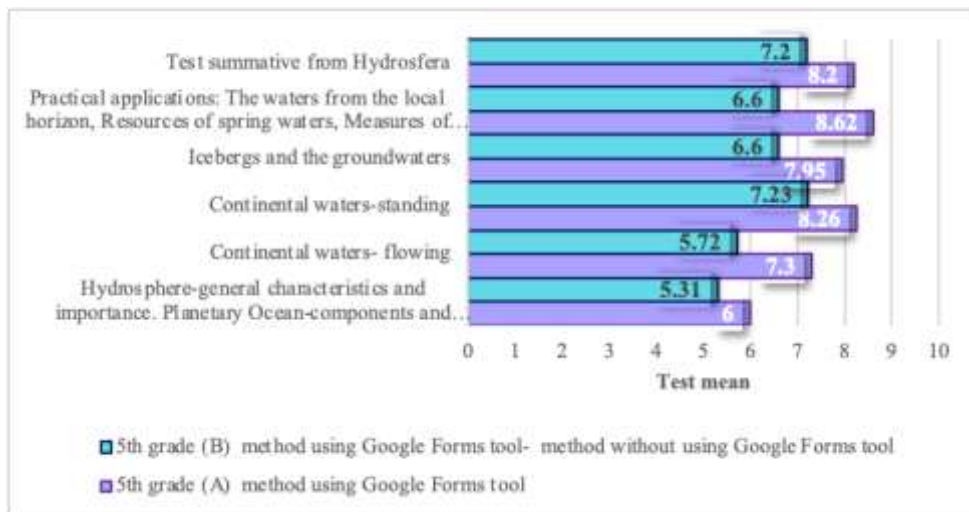


Fig. 1 Class average obtained in the feedback sequence of type Kahoot! and the sequential test in chapter Hydrosphere - 5th grade

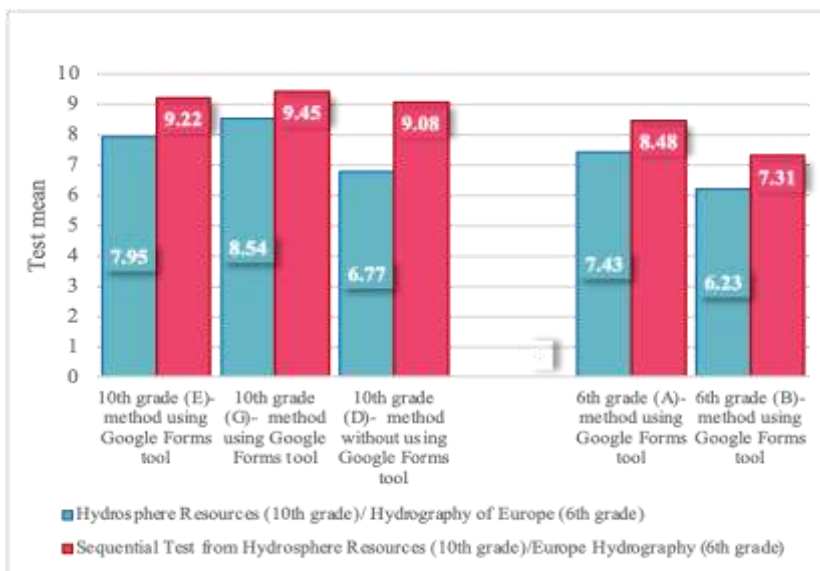


Fig. 2 Class average obtained in the feedback sequence of type Kahoot! and the sequential test in lesson Hidrofera Resources- 10th grade and in lesson Europe Hydrography - 6th grade

According to Cohen, 1988, the interpretation grid of the size of the effect is: around 0.20: low effect; around 0.50: medium effect; around 0.80 and over 0.80:

strong effect, and after Rosenthal et al., 2000, r of 0.1 low effect, r of 0.6 medium effect and r of 1.4 high effect.

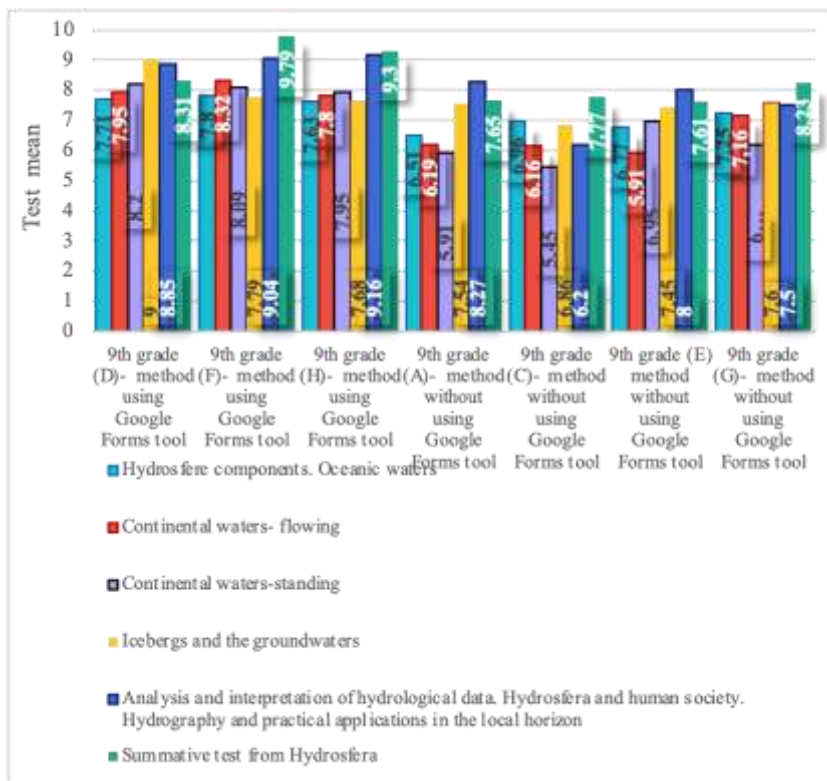


Fig. 3 Class average obtained in the feedback sequence of type Kahoot! and the sequential test in chapter Hydrosphere - 9th grade

During the research period with the two comparative teaching-learning models, against the background of a standardized assessment, in terms of the assessment and magnitude of the effects (values of impact size by class for students' school knowledge), the comparative values between classes during the use of the Google Forms method are: the effect size in 5th grade A (with Forms) versus 5th grade B (without Forms) is 1.49, with strong effect; in 6th grade A (with Forms) as compared to 6th grade B (without Forms), $d=1.56$, with strong effect; in 9th grade D, F and H (with Forms) versus 9th grade A, C, E and G (without Forms), $d=0.67$, with strong effect; in 10th grade E and G (with Forms) compared to 10th grade D, $d=1.06$, with strong effect.

The status of the effect size value for each class as a function of the mean at post-test and pre-test shall be given as follows: in classes with a Google Forms learning model, better results were achieved in the evaluation, so in the 5th grade, $d=1.53$, which means a strong effect and $r=0.6$ medium effect; in 6th grade A, $d=1.66$ strong effect and $r=0.64$ medium effect; in 9th grade: 9th grade D, $d=2.94$ strong effect and $r=0.83$ medium effect, 9th grade F, $d=2.16$ strong effect and

$r=0.73$ medium effect, 9th grade H, $d=1.60$ strong effect and $r=0.6$ medium effect; in 10th grade: 10th grade E, $d=2.67$ strong effect, and $r=0.8$ medium effect. 10th grade G, $d=2.19$: high effect and $r=0.6$, with medium effect, which means that the positive influence factor is this effective method that improves student results, highlighting their progress.

In the other classes with a teaching-learning model without instrument Forms, presentation PowerPoint, similar and lower results were achieved in the assessment, with the effect being below the minimum value in all classes: in 5th grade B, $d=-0.33$; in 6th grade B, $d=-0.08$; in 9th grade A, $d=-0.24$, 9th grade C, $d=-1.27$, 9th grade E, $d=-0.10$; 9th grade G, $d=-0.87$ and in 10th grade D, $d=0.74$ the effect is high.

Thus, during the implementation of the teaching-learning method with the Google Forms tool and PowerPoint presentation, the value of the test impact size in all experimental classes recorded values higher than 1 (Fig. 4).

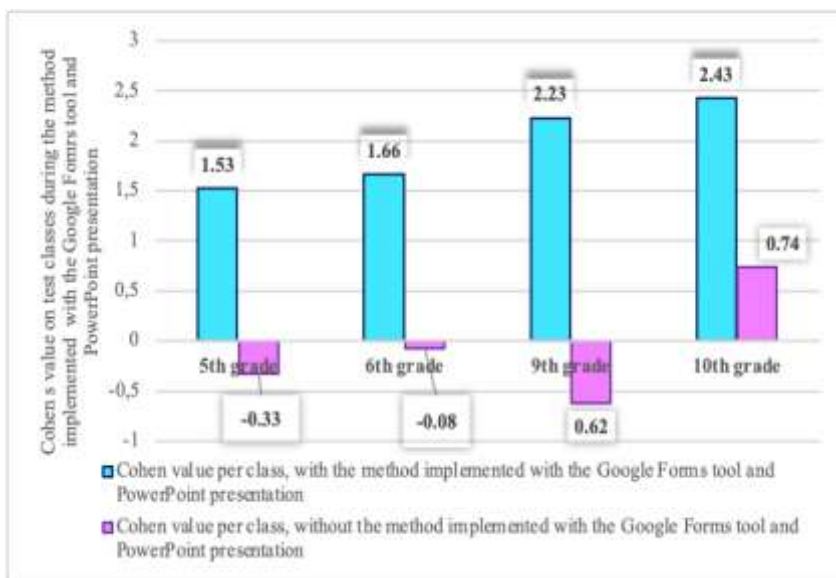


Fig. 4 The size of the effect on the class while using the Google Forms method and PowerPoint presentation (after Cohen) in the Kahoot! game feedback sequence! and the Google Forms sequential test in the Hydrosphere chapter, online model in the 5th, 6th, 9th and 10th grades

As during the implementation of the teaching-learning method with the Google Forms tool and PowerPoint presentation in all experimental groups, values higher than 1 point per class were registered, compared to the control groups, the statistical hypothesis is accepted, and the research hypothesis is refuted. The test validation method was performed by entering the data from the Excel/manual program into the SPSS program with the test results and the differences between

them (experimental groups and control groups - during the implementation of the method with the Google Forms tool) by classes (Fig. 5).

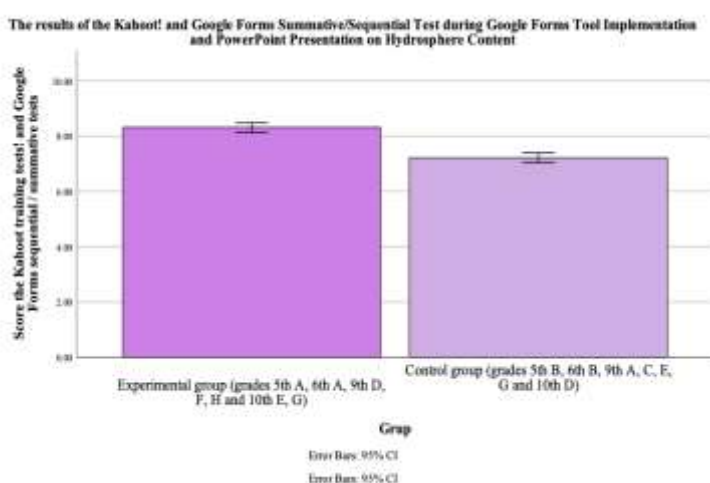


Fig. 5 Bar chart in the SPSS program - Results of the Kahoot! and the Google Forms summative test during the implementation of the method with the Google Forms tool and PowerPoint presentation on the contents of the Hydrosphere, in all classes in the sample - 5th, 6th, 9th and 10th grades (experimental group and control group)

The results of the third specific objective: to develop the capacity of self-regulation ability and self-assessment in students to the contents related to the Hydrosphere by applying a questionnaire. Also, at this stage of research, with a view to developing students' self-regulation and self-assessment, the principle whereby students learn to become their own teachers. During a week in 6th and 10th grade and five weeks in 5th and 9th grade geography teaching-learning-assessment (Hydrosphere), all students receive a Google Forms questionnaire (9th grade) and five Google Forms (5th and 9th grade) questionnaires on their perception of learning. The student questionnaire includes 17 questions containing: matching specific skills to the operational objectives of the lesson, the extent to which they understood learning activities and content from the operational objectives of the lesson, understanding scoring standards from each operational objective, which resources are the ones that helped them understand the lessons' content and to what extent the lesson is forming responsible attitudes in real life.

Class results on the survey regarding the extent to which students understood the contents by operational objectives and how to self-assess students by scoring standards for each operational goal (Fig. 6, Fig. 7 - in the 5th grade, Fig. 8, Fig. 9 - in the 5th and 9th grades, Fig. 10, Fig. 11 - in the 6th and 10th grades).

Thus, the minimum and maximum average values per class recorded for understanding the contents are: 0 for total class disagreement and full-scale

agreement, with a percentage medium of: 77.08 % for the 5th grade, 56.8 % for the 6th grade, 51.74 % for the 9th grade and 34.08 % for the 10th grade.

The minimum and maximum average values of 3.12 % in the 10th grade, 5.93 % in the 6th grade, 5.53 % in the 9th grade and 8.32 % in the 10th grade can be found in scoring standards for each operational objective (self-assessment of students): at a minimum grade of 5-6 and at a maximum grade of 9 to 10, the average percentage shall be 77.08 % in the 5th grade, 55.42 % in the 9th grade and 7-8 in the 5th grade, 46.76 %, 41.3 % in the 10th grade. In this way, we can see a high degree of confidence in the accumulation of the knowledge during the class.

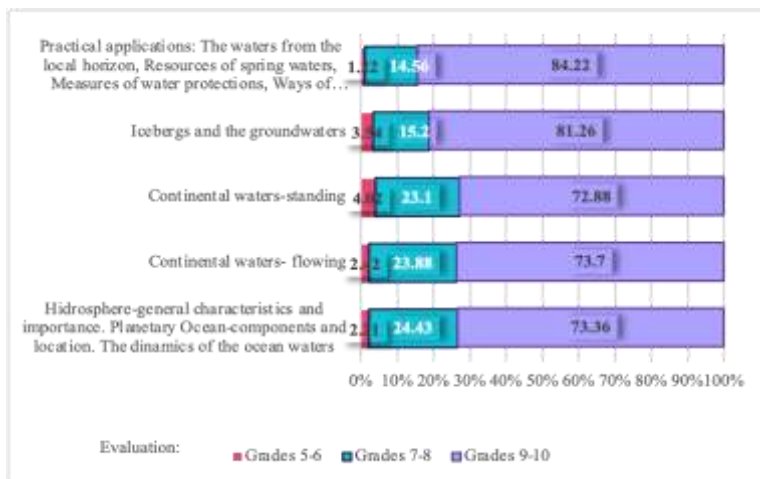


Fig. 6 Self-tuning and self-assessment: Theme- the perception of students about understanding performance standards of scoring on operational objectives in chapter Hydrosphere (percentages) - 5th grade

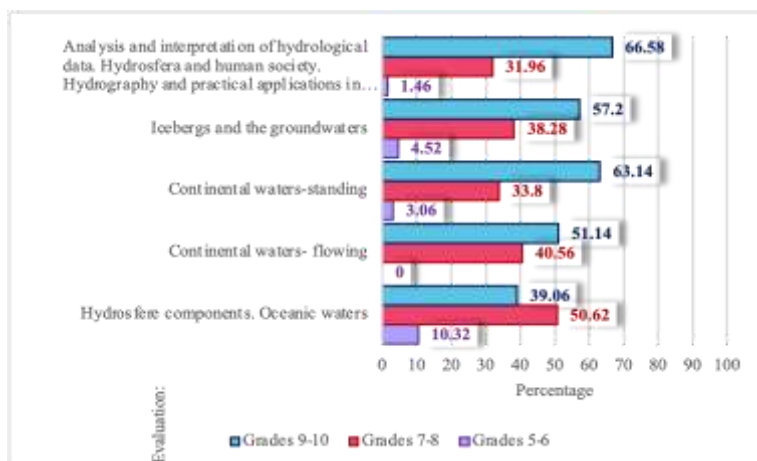


Fig. 7 Self-tuning and self-assessment: Theme- the perception of students about understanding performance standards of scoring by operational objectives in chapter Hydrosphere (percentages) - 9th grade

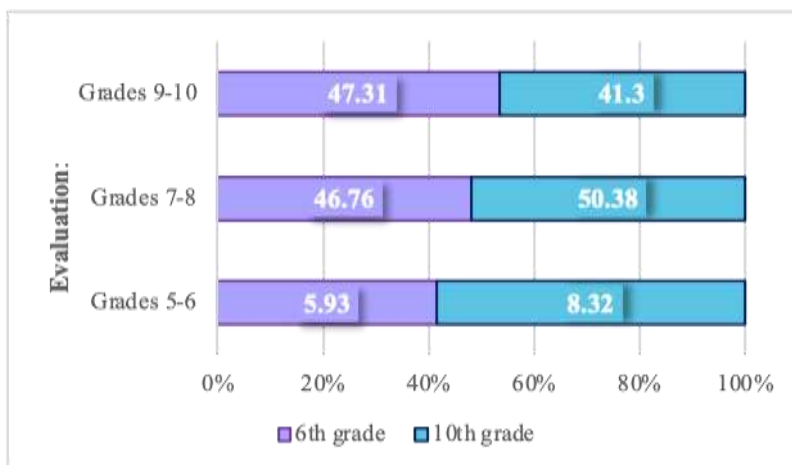


Fig. 8 Self-tuning and self-assessment: Theme - student perception of understanding performance standards of scoring on operational targets at the European Hydrography lesson and hydrosphere resources (percentage) - 6th and 10th grades

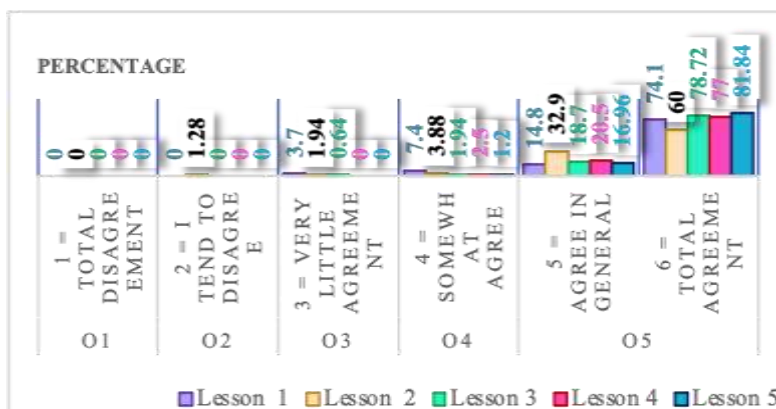


Fig. 9 Self-regulating and self-assessment: Theme- Understanding learning activities and content from operational objectives (O1-O5) to chapter hydrosphere (percentage) - 5th grade

Also in the theme survey, the extent to which students believe that they have developed responsible attitudes in real life after they have been presented by the teacher at the start of each lesson during the period studied, with results per class (Fig. 12). The minimum and maximum mean values recorded in the classes are: 0 % for the total disagreement scale in the 5th, 6th, 9th and 10th grades and in full agreement of: 82.32 % for 5th grade, 74.10 % for 6th grade, 77.76 % for 9th grade and 37.70 % for 10th grade.

The results of the fourth specific objective: to measure the level of knowledge subsequently acquired by students through the online teaching method

of PowerPoint presentation in relation to the content to be taught by measuring the impact of tests.

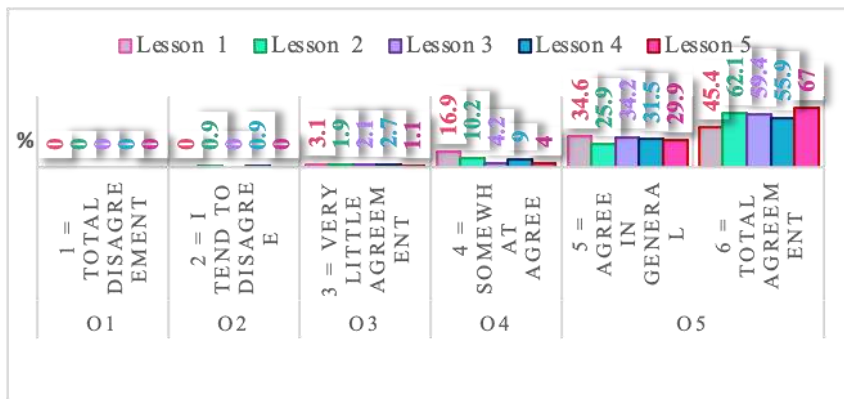


Fig. 10 Self-regulating and self-assessment: Theme- Understanding learning activities and content from operational objectives (O1-O5) to chapter hydrosphere (percentage) - 9th grade

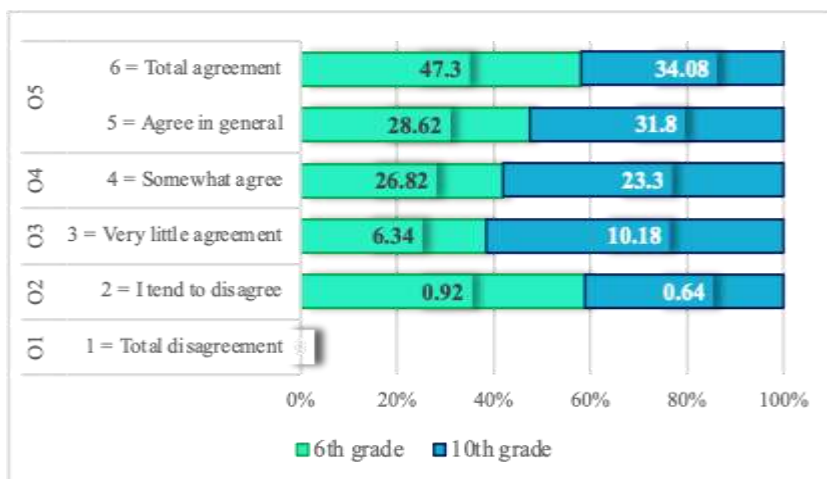


Fig. 11 Self-tuning and self-assessment: Theme - Understanding learning activities and content from operational objectives (O1-O5) to the European Hydrography lesson and Hydrological resources (percentages) - 6th and 10th grades

In post-research phase 3, the results of each class are analysed, comparing the results of the teaching-learning method with Google formats and the passive presentation PowerPoint method over the two or six weeks.

A subsequent Kahoot! interactive exercise-type assessment phase in the 6th and 10th grades was also carried out and analysed in order to observe the progress or backsliding of students after the stop applying the teaching-learning method with the Google Forms tool, thus calculating the size of the impact on the tests.

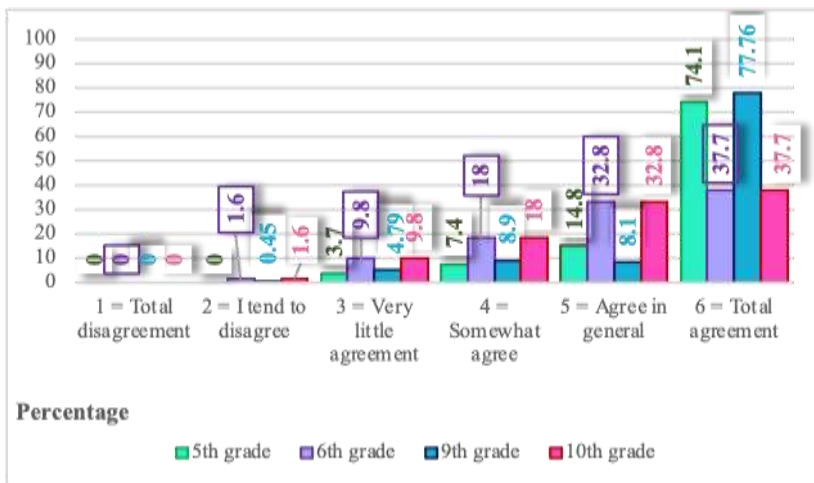


Fig. 12 Self-regulation and self-assessment: Theme - training responsible attitudes in real life in all classes included in research

For this subsequent research period, the impact size values in the 10th grade D were $d=0.0007$ and for the remaining four classes the impact size values were below the minimum limit. What the results clearly highlight is that students who did not provide answers to learning activities during the course hour and participated in the Kahoot! test achieved very poor results.

The results of the fifth specific objective: to apply a Google Forms questionnaire as a theme for the group of students who used Google Forms and PowerPoint as tools of the teaching-learning method.

Also at this stage, students who have benefited from the Google Forms tool learning method have received a form questionnaire regarding their perception of the advantages and disadvantages of the method and whether they would re-use this method (the results obtained are presented in Fig. 13). The maximum mean values by recorded classes of the total accord scale are 71.05 % this method.

As for students' perception of the benefits of using the teaching-learning method with the Google Forms tool, 5th grade students: think they better understand the lesson, all attend the lesson, get higher scores in the ratings, it is an easy and interactive method, get a quick assessment score, they are more careful, they have more patience, learn faster and easier, can answer even if they are timid, the lesson is well structured over time, no one can notice what other student is writing, they do not occupy space in the phone/tablet, they do not waste time with writing.

The 6th grade students see it as an efficient and fast method, they understand better, they focus only on answers, not on writing, the lesson is more interesting and interactive, it enables everyone to respond, the result is delivered quickly and time is saved. Perception of students in the 9th grade: they all participate actively throughout the hours, constantly learn, the lesson is practical, interactive, easier to learn, comfortable, reaches the learning style of each student, innovative and efficient, responses remain private, more information is retained during the hour,

the progress is noticed every hour, it develops their ICT skills, capture and require increased attention, offers timing of teaching and the ability to feedback, gives all students the chance to answer, shorter duration, learning in a novel way, more interesting and more enjoyable, at the end they all receive a copy of individual answers, so students easily notice mistakes, develop competitiveness, facilitate distributive attention, is well organized and secure.

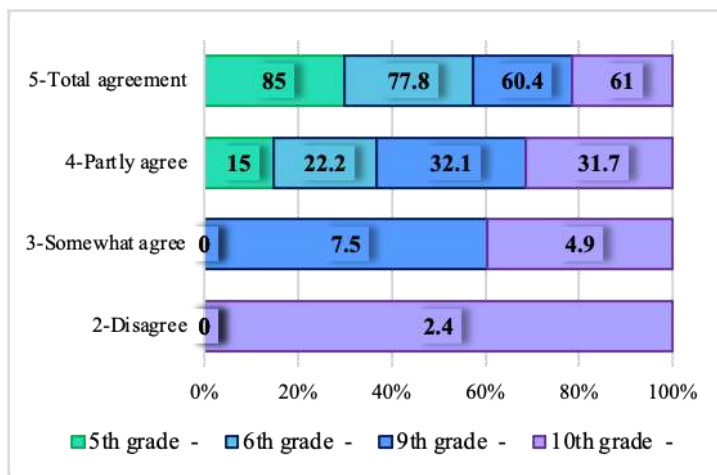


Fig. 13 The 192 students' perception of the future re-use of the method teaching-learning with the Google Forms tool

The 10th grade students consider the following advantages: the method improves learning, provides court assessment, learn more quickly, express written opinion of all students, accessibility, no longer use writing tools, the method of learning resembles an attractive, intuitive computer game, develop attention, ability, memory and logical learning, are not interrupted by colleagues, observe in real time everything they know, simplicity and ease of writing answers, efficiency, accuracy, attractive, easy, the possibility of interactive and organized learning.

As a feedback of students on the disadvantages of using the teaching and learning method with the Google formats tool, 5th grade students: 65% of students do not find a disadvantage with this method, some say it was more difficult to accommodate the first hour of implementation, the formats application did not, very rarely though, let them check an answer, you can lose answers if you break the internet or enter another application. 55% of 6th grade students do not find any disadvantage to this method, others say it becomes difficult and tiring if there are more columns and need to be scroll on the image, extra time is spent on phones, something can be changed accidentally without realizing, it is harder if you only have a device, if you don't know English, you cannot pass the checking stage.

The perception of students in the 9th grade: 52% of students do not find any disadvantages, others say that they are watching screens too much, there may be sending errors, a student can fall behind and it would be difficult to recover,

students with only one device have been disadvantaged during this type of learning, because it is necessary to look at the proposed materials and to solve the questionnaire in real time, they can lose the lesson discussion very easily if they lose attention for a few seconds. In the 10th grade, some students think they need digital skills they don't have, suffer technical problems with the Internet or with the device that can be used during the hour, too much time of intensive attention, more difficulty to recover for inattentive students who can lag behind and they cannot solve the questionnaires in a serious manner unless they are being stimulated with assessment rating.

The research was completed by applying the Irving scale of assessment of the geography teacher and by producing an individual factsheet of student progress.

4. CONCLUSIONS

Research results show that the teaching and learning method with Google formats, associated with the teacher's PowerPoint presentation of the lesson, is more effective as evaluation results than the presentation PowerPoint teaching method.

The main aim of the research was to verify the hypothesis defined in the initial decision – that involving all students in the teaching and learning process leads to higher performances, with the use method Google formats, combined with the presentation of PowerPoint, as opposed to the use of a presentation PowerPoint method, which does not allow all students to formulate answers and also leads to the attention and motivation of students for learning and skills acquiring from the curricula. The validation model of the research hypothesis - the interpretation grid of the effect size value, according to Cohen. Since the size of Cohen's (*d*) effect during the implementation of Google Forms instrumental teaching and learning in all classes has been above 1 and (*r*) of Rosenthal et.al., has values above 0.6, the conclusion is that the effect is significant both statistically and practically, and the null hypothesis is rejected (interpretation after Fan & Chen, 2001, based on the guidelines suggested by Cohen, 1988, chapter 3). There is also an effect of the method implemented, as the null hypothesis was rejected, with a value worth considering.

The results of the research obtained have also demonstrated the criteria for success. by knowing the purpose as an experienced use method Google formats tool, improves the quality of teaching-learning-evaluation and is a participating-active among all students in a class.

The results achieved have shown first and foremost that the issue of training and choice of appropriate teaching strategies by the teaching staff has brought an understanding of the impact of teaching and learning during this period of research. developing a conceptual and deep understanding of students, as evidenced by other scientific papers (Moore & Gilmartin 2010, Perry & Karpova 2017, Sabo 2012, Webb 2005, Ruan et. al 2021, Wang & Tahir, 2020). These results are quantified by significant progress in students' knowledge.

The proposed methodological addition leads to the question of a teacher: How can I train the specific competences of school curricula to all students in a class during 40 minutes of teaching-learning-evaluation in the online model? and to identify variables that influence educational outcomes. It also helps to complement practical approaches to effective teaching-learning-evaluation methods.

Considering all the aspects, the methodology presented in this paper can be successfully applied at all levels of class and for all the contents from the geography curriculum.

This study was aimed at preparing a list of interventions to optimize the teaching and learning method with the Google Forms tool, following the interpretation of the questionnaire on the perception of students of its disadvantages and the theme made by students, on their development of the self-assessment and self-regulation capacity.

The training of curriculum-specific skills for all students through their active participation and the optimum educational progress of students is mainly due to the degree of student involvement throughout the educational and educational process, to the training and stimulation of all students in a class during a course.

The method does not lead to a departure from learning objectives of content specific to curricula and does not require special digital skills.

We also note the need to complement the results obtained in the evaluation with the size of the effect, in order to analyse the results, whereby the teaching staff can conclude on the level of impact of the new approach implemented on the success of students' learning.

The efficiency of the teaching-learning method with Google Forms tool, associated with the PowerPoint presentation, based on the principles of active, deep and effective learning, which has demonstrated that it can compensate for various shortcomings in other methods, depends on several social and economic factors. Thus, from the teacher's side, it presupposes: passion, level of competence in teaching and transposition, high availability of time for designing and organizing all teaching activities (presentation of PowerPoint and lesson scheme in word for posting students on the Google classroom platform, the standardized realization of Google Forms questionnaires for students during the teaching-learning process and the homework given, the standardized Kahoot! type feedback sequence and also the comparative interpretation by measuring the obtained results).

As regards the work of all students, the method requires constant and increased attention, two electronic devices (preferably for those who only have a phone), permanent and quality internet connection and longer time to complete the themes.

We believe that the results of the analysis of students' cognitive acquisitions by applying the two-comparative teaching-learning-evaluation methods will contribute to increasing the relevance of approaches established in the analysis of this topic and in the re-use of teaching-learning with the Google Forms tool in order to increase the school performances of students.

At the same time, acting-participatory methods of learning through discovery, develop cognitive intelligence skills for students, critical thinking, a responsible and active attitude toward learning, stimulate and improve their education.

The main conclusion of our study is that Google Forms, Kahoot! and the presentation of PowerPoint have a positive effect of learning (Toma et al, 2021), especially these three digital technologies energize the students of the class and for the teacher they represent motivating tools of the didactic activity.

The main contribution of this study is the application of an effective teaching-learning method for middle and high school students based on the Google Forms tool which differentiates it from other teaching-learning methods, in the sense it facilitates the attention of all students. For such a method to work effectively, it is vital to encourage its use among students and teachers. The use of digital technology is suitable for measuring and accepting e-learning tools (Cheung & Vogel 2013; del Barrio-García et al. 2015; Joo et al. 2014).

For this reason, using the Google Forms tool as a teaching-learning method provides an insight into the expected results of students, which is the underlying assumption of its use.

Although the tool involved in the intent of using different digital technologies has already existed and has been studied in literature as an evaluation tool, this study explains the use with an original approach, centered on the Google Forms tool as an active teaching-learning method for all the students of a class.

More specifically, the hereby study evaluates three additional cause-and-effect relationships (learning - good results in evaluation-perception) by proposing that they have an influence on the preoccupation of using ICT in pre-university education: the Google Forms tool and PPT Presentation as teaching-learning methods and the Kahoot! interactive exercise as an evaluation tool. This research brings a major contribution since, to date, no other study has shown how significant the effect on evaluation tests is in the context of pre-university educational system with regards to the interest manifested in using a teaching-learning method based on the Google Forms working tool, combined with PowerPoint presentation.

The results of the study suggest that the test results students obtained are significantly more valuable in those who used the Google Forms tool and may be recommended for ICT analysis applied to e-learning in pre-university education.

In addition, it is demonstrated that both the usefulness and the perceived ease of use have a positive and significant influence on achieving the competences in the curriculum, applicable to all students.

These results of how significant the positive effect is, are consistent with previous results in the literature (e.g. Hattie, 2009).

Using the Google Forms tool as a teaching-learning method allows the student to be an active agent in the learning process, as do other Google applications (Rejón-Guardia et al., 2019).

The results of this study have a number of practical implications for the pre-university education system. Firstly, adopting Google Forms as teaching-learning

method, combined with PowerPoint presentation, will be of interest to those schools that wish to encourage students and teachers to adopt these modern ICT methods and tools, ensuring greater success in applying the appropriate teaching strategies that teachers adopt.

It is also important for the teacher to understand the importance of making it easier to use the Google Forms tool and PowerPoint presentations as a teaching-learning method, and that this will have a positive influence on students' outcomes, and that it can be used in all three teaching-learning models (traditional, hybrid and online).

The present study has also found that the standardized evaluation of students' results using the Kahoot! interactive exercise enhances students' grades, motivation for learning and discipline of study, combined with pedagogical or methodological teaching approaches (Dolezal et al., 2018).

Also, the use of a teaching-learning-assessment method using digital technology influences the student's educational trajectory, as it allows them to be actively involved in their own learning process.

Limitations and future lines of research:

The results of this study will be of interest to the literature on teaching-learning-assessment models through new technologies and for the pre-university education sector.

The information presented in this paper will help pre-university institutes to investigate the experiences of other teachers and students by transforming all students into an active learning agent throughout all lesson sequences.

The study has also got certain limitations that need to be considered, but that could indicate potential future lines of research. One of the main limitations is that concerning the size and origin of the sample (192 students of a single Romanian high school who used the teaching-learning method with the Google Forms tool), therefore, generalizations based on these results should be treated with caution.

Another limitation of the study may be represented by the reduced content in the curriculum during the use of the teaching-learning method with the Google Forms tool (a single chapter for 5th and 9th grade and a single lesson for 6th and 10th grade).

Possible future lines of research may be the application of the proposed teaching-learning method in the context of students throughout several stages of the curricula, or in different geographical areas in order to achieve results which can be easier to generalise.

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