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A Phenomenological Analysis of Students' Self-Perceptions of the Mathematical Online Study using and AI or ChatGPT

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ABSTRACT
This article highlights the importance of structuring a diverse online teaching activity using ai or chatgpt.

In the theoretical part, we presented its essential advantages, such as building a specific educational system that accumulates the benefits of online learning. In addition, we emphasized that educational ai offers the possibility to manage the curriculum, personalize the teaching process, and involve virtual tutors capable of generating the educational path specific to each student's individual characteristics. It can also offer real-time feedback and standardized assessment.

In the empirical part, we analysed, with phenomenological tools, the means of the student's self-perception of the advantage of online study. We analysed the appearance of some verbal markers that suggest the importance of the involvement of ai and chatgpt, as well as other digital platforms used in online academic activity. We emphasized the students' perceived difficulties encountered in using different digital systems.

In conclusion, students' perception is favourable to learning in a system combining online individual study (because it helps them to structure what they have to study ahead of time, adapt their rhythm, or access various online applications to enrich their background at cognitive levels such as knowledge, understanding, application) with the online formal study leading by the teacher or virtual tutor (because they build them solid cognitive competencies focused on higher cognitive levels such as analysis, evaluation, and creativity).

Keywords: Ai, Chatgpt, Phenomenological Analysis, Academic Online Approach in Mathematics, Virtual Tutor, Jaccard Index; Szymkiewicz–Simpson Coefficient

1) INTRODUCTION

(a) The beginnings of learning machines versus learning through intelligent systems

Skinner [1] was the first to conceptualize the notion of a training machine based on the need to provide prompt and positive feedback and to construct training at one's student rhythm [2]. In education, both Machine Learning and Deep Learning systems are promoted [3].

Intelligent systems assume interdisciplinarity [4] and are currently perceived as having functions in cognition, abilities to learn precisely from input data, and capabilities to produce interpretations [5]. They are involved in problem-solving [6] and in achieving a well-defined goal [7] related to the performance of some cognitive tasks [8].

Machine Learning is a subfield of artificial intelligence that improves a computer's performance in solving a task through experience [9]; it is also a general-purpose technology (GPT) that generates complementary innovation [10] in assisted instruction. It is generative of complete Learning, which can reach all the cognitive levels conceptualized by Bloom [11] and reconfigured by Anderson and Krathwohl (eds.) [12]. Deep Learning is learning connected to the programming paradigm that allows a computer to learn from observational data, called neural networks [13], a metaphor inspired by biological structures (although the biological brain is dynamic and analogic, whereas computational neural networks are static and symbolic [14]. Advances in neural

networks in recent years [15] are the result of the collaboration of several fields, such as computer science, statistics, cognitive psychology, pedagogy, and neuroscience [16], and provide additional resources for personalizing the instructional path based on the student's learning trajectory [17].

(b) The advantages of intelligent learning systems involved in teaching

Artificial intelligence can identify patterns that could indicate a student's preferred learning style or areas they prefer [18]. Hierarchical linear models and multiple regressions [19] explore how e-learning engages students and influences learning outcomes or the Bayesian network model to detect student learning styles [20]. Intelligent tutoring systems determine the optimal methods for effective learning [21] and establish student engagement in learning [22]. Additionally, AI finds ways to design discourses in the context of instruction, focused on computationally generated models trained to recognize the connection between students' conceptual understanding and their involvement in structuring the responses they give [23].

Following the analysis of the curriculum, the student's academic performance, their learning preferences, and their intellectual behaviours and feelings, the use of artificial intelligence in the mathematical academic area is diversified and customized on each instructional level: teaching, learning, and assessment [24].

In teaching, artificial intelligence can adapt educational content to students' individual needs, providing personalized learning. These are aimed at adapting lessons to the pace and level of each student, identifying gaps or confusion in their mathematical cognitive background, and building specific training resources to eliminate these learning deficiencies [25]. A specific one-on-one focus can also help eradicate marginalized students' learning difficulties for further development of teaching and learning effectiveness [26].

One strategy is recommending resources based on each student's skills, motivations, and interests, providing targeted support and real-time dynamic feedback. Interactive lessons can be created, helping students to practice and improve their skills specific to a particular sequence of mathematical content, adapted to the concerned didactic needs. Interactive simulations can be made for some abstract mathematical concepts accessible to them, and then exercises adapted to each student's level can be created and designed. Thus, they can be more motivated, involved, and independent in learning [27].

Teachers can provide blended learning experiences, online and on-site, to give students substantial preparation for the course and seminar. AI-based content delivery through platforms such as Coursera or Khan Academy can provide students with personalized content videos adjusted to each student's understanding, problem sets, and pre-course reading material to familiarize them with the subject, which the teacher will present later. The teacher needs to encourage students to engage cognitively in the interactive viewing of these materials. This opportunity engages students responsibly in using this type of tool, testing the knowledge they have acquired, and completing the proposed tasks for each sequence of concerned material so they can be fully prepared for listening to the course [28].

Teachers must also train students to be vigilant about the answers they receive from AI platforms and then verify them. There are a multitude of options, such as questioning robochats about each inference made in the resolution path to correctly understand each sequence of resolutive design, checking the theoretical or applied part presented in the course or seminar, and being aware of the existence of more straightforward and more coherent alternative options solving, or searching for other resources where the chatbots' answer can be compared with the new sources.

(c) The advantages of intelligent learning systems involved in learning

Artificial intelligence can generate interactive graphs and models that allow students to explore the behaviour of functions, equations, statistical data sets, or complex systems governed by differential equations that help students connect theoretical mathematics with practical applications. Also, augmented and virtual reality allows for exploring 3D models' behaviour and mathematical knowledge of spatial and geometric concepts. GeoGebra and Desmos are widely researched in universities to help students visualize and interact with real-time models of mathematical concepts that help students connect theoretical mathematics with practical applications. Augmented and virtual reality: AI, combined with AR/VR technologies, allows students to explore 3D models, mathematical development, and understanding of spatial and geometric concepts [29].

Through assessment processes, teachers can understand trends in student performance, predict some assessments, and identify students at risk of not meeting curricular requirements or even dropping out. All this leads to the refinement and optimization of the curriculum based on real-time feedback [30], which structures reports generated by concrete data obtained from a set of successive tests, formative assessment loops, which can be designed with the help of platforms, such as Edulastic or Smart Sparrow. Thus, the teacher understands how to build cognition at higher stages (analysis, evaluation, and creation), constructively adjusts his teaching approach, and offers students formative educational experiences.

Artificial intelligence can also make accessible to professors the management of the student group, but also the management of learning [31] by using intelligent systems to track student attendance, monitor their behaviour, and identify physical absenteeism or moral problems. Predictive analysis of the results obtained by students on a set of assessment tests assigned to specific contents taught over time allows decision-making in curriculum design. Artificial intelligence helps to design and improve mathematics programs, suggesting curriculum adjustments and learning plans based on adaptive iterations generated by intelligent systems [32] to increase overall learning.

They can also contribute to ways of adjusting teaching strategies in areas of interest where theoretical-practical topics pose problems for students, as intelligent technologies provide opportunities for personalized learning to meet individual student's needs [33].

There are artificial intelligence-based instructional systems that personalize educational content according to the student's extracurricular interests, and it has been proven that such an approach to instruction could lead to more effective learning [34].

EdTech platforms, such as Knewton, provide adaptive content recommendations based on student's interests, helping teachers optimize their curriculum and address it through appropriate strategies, with optimal content structuring to cover students' learning gaps [35].

Neuro-linguistic programming technologies promote personalized education based on individual student portfolios [36]. Students are advised to use artificial intelligence platforms outside class and seminar hours for initial content learning. Thus, teachers are given a chance to escape from repetitive tasks [37], and students are guided to use the time with the teacher to design debates, deeper discussions, problem-solving, and group activities. This type of blended learning allows students to use online learning through platforms for routine activities or to be easily guided by virtual tutors [38]. These tutors can adjust the modules that students by their study can access through personal sessions. Then, on-site, students focus on conceptual understanding, developing critical thinking, and advanced complex problem-solving. These sessions can be organized on-site, using homogeneous, heterogeneous teams, in pairs, or individually, depending on the type of strategy the teacher applies.

In learning, e-learning platforms can generate tutors and virtual assistants to provide additional support outside of class hours, who can correctly answer questions on various topics if they are properly trained, can help understand concepts through valuable examples, can assist with scheduling and planning lesson [21]. Based on analysis of student's skill levels, intelligent systems adjust content and difficulty in real-time, generate personalized math learning pathways, provide problems that match students' abilities, and dynamically adjust the difficulty as their skills progress [39]. Virtual tutors guide students through complex math problems and don't just provide the final answer; providing step-by-step explanations in each sequence of problem-solving reasoning. AI [40] offers instant corrections and explanations as students' complete tasks, helping them understand where they went wrong. Tutors are actively training students, as students can ask questions, explore different solution paths, and gain a deeper understanding of problem-solving methods; in addition, intelligent systems track each student's learning patterns and provide recommendations for future studies. Google's Socratic and platforms like Carnegie Learning offer AI-based tutoring systems that help students learn advanced math content.

(d) The advantages of intelligent learning systems involved in evaluating

Artificial intelligence can simplify the assessment process, primarily through standardized docimological tests, with objective-type items such as multiple-choice questions with confidence levels that ensure more excellent reliability of scoring; it can also be used to assess some subjective tasks, such as the assessment of open-ended questions or essays. Additionally, AI-based educational systems have been found to help reduce learning anxiety among students by using cognitive performance analysis and applying a positive feedback loop [16].

Standardized assessment provides immediate information about student performance efficiently, accurately, objectively, and quickly, and it performs a detailed analysis of students' cognitive background, skills, competencies, and abilities to make inferences and make decisions in solving problems. Among the benefits of assessment through artificial intelligence systems are the speed of marking many students, the rhythmic evaluation, ease of administration by the teacher, and objectivity. However, this can have repercussions if there are distortions, ambiguities in the construction item statements or dysfunctions in structuring the correction and scoring scale [41]. There are tools (e.g., Google Forms and Flubaroo, Gradescope, Microsoft Forms and OneNote, Moodle with specific math plugins like STACK and GeoGebra) that use artificial intelligence to create special math assignments but also to automate their grading. They can analyse student responses to detect signs of plagiarism or overly similar solutions between students [42].

(e) Challenges of using artificial intelligence in education

One of the challenges of academic institutions is including students with disabilities. Customizable learning environments (such as the Kurzweil 3000 platform) are structured into applications such as speech-to-text and text-to-speech for students with disabilities, thus helping them through assistive technologies to engage in solving mathematical tasks. AI-based platforms can create personalized learning pathways for students with learning differences, ensuring everyone can work independently and overcome specific challenges. Through continuous assessment focused on platforms such as Coursera and EdX, students can clearly understand their mathematical skills through automatic personalized feedback [43]. encouraging them to progress at their own pace, ensuring they master the fundamental concepts before moving on to complex topics.

For gifted students, tools can be used to build special training programs that harness their full intellectual potential. In advanced academic contexts, artificial intelligence is used to help design mathematical research projects teachers or students propose. The organization of learning can be achieved with the help of Microsoft Teams, WebEx, GitHub, and Piazza structures that facilitate collaborative work for students to solve problems or projects with a higher degree of difficulty. They allow a group of students to form and analyse their performance in various tests related to the contents involved in solving the collaborative tasks. Homogeneous groups that are balanced in terms of skill level and learning styles can be generated, thus contributing equally to the achievement of tasks. Also, depending on the strategy adopted by the teacher, heterogeneous groups can be generated, with different levels of skills, values , and attitudes, but to be valued at various stages of the project, thus allowing receiving support from colleagues, collaborative learning from others, and knowledge sharing. Advanced students can be integrated into different types of study activities, where platforms such as Wolfram Alpha, Mathematica, or MATLAB offer them personalized support in experimenting with mathematical modelling of natural phenomena, exploring patterns, and developing hypotheses that can then be studied through implementing tools for proving theorems, using different types of reasoning (inductive, deductive, abductive), amplifying their cognitive experience, engaging in the symbolization and formalization of abstract mathematical contents.

There are numerous ethical considerations related to the responsible use of artificial intelligence [44]. Data privacy concerns relate to tracking and storing students' personal information. Another aspect that creates problems can be the excessive use of technology, which can induce a reluctance towards human interaction. Another sensitive element is the chance of self-conception of prejudices related to the accuracy of the information provided by these intelligent systems. This element can hurt their use or, on the contrary, can create too much confidence in using incompletely trained systems, leading to learning errors. Students must know the human role in training artificial intelligence, content production, evaluation structures, and supervision of these automatic systems. Literacy in the use of artificial intelligence is essential in our modern age to develop students' ability to responsibly and critically use, provide, and implement artificial intelligence tools.

2) METHODS AND METHODOLOGY

(a) The type of study

The study represents a phenomenological analysis, also called the science of conscious experience [45], whose name comes etymologically from the Greek words φαινΟμενον (apparent) and λόγια (words). The phenomenology addressed falls into the category of existential phenomenology, focusing on a descriptive, reflexive, and dialectical study based on content analysis [46], according to the most effective logical-aesthetic and formal, logical-semantic, structural methods to detect personal opinions of respondents [47].

For this purpose, the grounded theory, conceived by Glaser and Strauss [48], and updated by Strauss and [49], was used for the systematic study, which involves concluding certain theories conceptualized by collecting and analysing the opinions expressed verbally or in writing by a group of study participants [50].

(B) THE PURPOSE OF THE STUDY

The telos of this article is to emphasize the importance of structuring a diverse online teaching activity based on the use of WebEx-type platforms and the involvement of specific educational systems, such as AI and ChatGPT, specific to online learning (Desmos, EdTech Khan, Academy, Google Forms, Microsoft Forms, OneNote, Moodle, GeoGebra, Coursera, MATLAB), which facilitate the organization of didactic activity at performance levels through the facilities they offer, which stimulate the construction of an operational background at all cognitive levels [11]; [12]: knowledge, understanding, application, respectively analysis, evaluation and creativity, in this case mathematical creativity [51].

(C) STUDY PARTICIPANTS

The participants were voluntary subjects, students who voluntarily expressed their desire to participate anonymously in this online questionnaire regarding the effective ways of organizing the online teaching activity through the WebEx platform, but also aspects regarding the use of AI and ChatGPT in solving teaching tasks related to the academic activities in which they are enrolled. Following the online launch of the questionnaire for a group of 350 students from the Faculty of Psychology and Educational Sciences, Department of

Educational Sciences (bachelor's and master's), from "Alexandru Ioan Cuza" University, participants in the Didactics of Mathematics courses (bachelor's or master) [52], 97 students chose to answer to this questionnaire. Twelve students participated in the preliminary phase of the study, in the pretest stage of the questionnaire. The students who participated in the pretest did not participate in the actual questionnaire, therefore only 85 students remained who answered the questionnaire in the study stage.

(D) STUDY TOOLS

The online Google Forms questionnaire was the tool for collecting information regarding the students' opinions about thoughts, memories, emotions, desires, and personal and formal educational experiences. The advantages of this type of information collection are multiple and refer primarily to the fact that it is accepted without reservations by respondents, voluntary, and anonymous. It can be easily pre-tested and administered without researchers' intervention. Because the non-interaction of the respondents with the researchers or other colleagues, the online questionnaire allows a more natural reaction from the students, closer to the truth of what they feel and think, without the tendency to conform to preconceived standards. Anonymity, the lack of intrusion by strangers, and the relaxation conferred by the possibility of answering from one's comfort zone are intensely felt by the respondents, a fact that causes them to be more honest, assumed, and brave in saying what they think and feel relative to the studied academic educational situations. The advantage of the questionnaire over the interview is the fact that they have to write the answer themselves, which requires them to make a specific cognitive effort, becoming aware of what they want to say, thus being more sincere or not, respectively more natural or more artificial, depending on the nature of each.

The disadvantage of applying such a data collection tool is the fact that no direct observations can be made, but only indirect observations on the level of health, well-being, and emotional balance, on the level of concentration and motivation of the students at the time of writing the answers to the questionnaire. This is no longer possible using non-verbal or para-verbal markers, which can provide valuable information in decoding verbal responses in an interview. However, opinion, behaviour, attitudinal, and motivational information are described or can be deduced indirectly through the content analysis of the documents received from the respondents.

After the pretest, we found that not all the questions requiring information regarding the study's telos could be kept as forms. Following this observation, the questionnaire was restructured, transforming the wording of the questions that created anxiety (fear of self-expression, fear of a knowledge test situation, fear of not meeting the expectations of others, low physiological resistance to stress, problems and fears in relationships with teachers; [53]).

The questionnaire includes an open question to collect information about a short curriculum vitae and curriculum studiorum of the subjects involved in the study. Also, the data collection tool consists of an open question, which requires specifying at least two advantages of online learning compared to on-site learning from the perspective of students pursuing bachelor's or master's studies in primary education pedagogy.

Indirect observation involved studying the respondents' narrative discourse. In this sense, I turned to establish the significance of the use of different language functions in correspondence with the six specific elements of communication (the referential function describes a situation, object, or mental state, which corresponds to the factor of CONTEXT; the poetic function focuses on the MESSAGE [54]; the emotive/expressive/affective function is best exemplified by interjections or sound, that do not alter the denotative meaning of an utterance but do add information about the SENDER; vocatives and imperatives best illustrate the conative function engages the RECEIVER directly; the phatic function is the use of language only for convenient interaction and is associated with the CHANNEL; the metalinguistic/ reflexive function is the use of language to discuss or describe itself) [55]. We also analyzed the meanings of the respondents' writings through logical-semantic and structural methods [56]; [57].

(f) Study question

RQ: What are the main advantages of studying online, compared to on-site on the Webex platform, by using AI (through the educational platforms Desmos, EdTech Khan, Academy, Google Forms, Microsoft Forms, OneNote, Moodle, GeoGebra, Coursera, MATLAB) and ChatGPT in structuring the didactic tasks specific to the Didactics of Mathematics course, from the perspective of the student?

3) RESULTS

RQ analysis

We considered the open-ended questionnaire to answer the research question: Please specify at least two advantages of online learning compared to on-site learning from the WebEx platform and AI and GPT Chat to structure the didactic tasks specific to the Didactics of Mathematics course.

The following categories (Table 1.) were detected with the adjacent themes and occurrences resulting from the analysis of the students' answers, which were then transcribed in the following table in the appendix. This table describes the categories and themes detected, as well as their occurrences, following the analysis of the student's answers regarding their opinion's vis-à-vis the advantages of online academic study compared to on-site.

A close look at the main favourite topics of students reveals the students' preference for the advantages of online learning from the category facilities in participation and involvement in online courses and seminars on the WebEx platform, which uses AI and ChatGPT, with a relative frequency of 53.72%. Here they appear with priority, the following relevant themes: accessibility to attend courses from anywhere (10.1%), economy, time economy (8.51%), physical comfort (7.97%), mental comfort (7.97%), schedule flexibility (6.91%), and management of learning (4.78%).

The last large category is represented by the opportunities for effective online learning on the WebEx platform, which uses AI and ChatGPT with a relative frequency of 38.83%, with the themes revealed by students, such as the accessibility of study materials (6.38%), the speed and ease of information delivery in real-time (4.8%), efficiency in learning (4.8%), opportunities in personal development (4.24%), varied student's learning activities (3.72%), accessibility of learning in online activities (2.66%), access to a large volume of information (2.12%), the possibility to be tutoring in online learning (2.12%).

The last category presented by some students represents the disadvantages of online learning on the WebEx platform, which uses AI and ChatGPT (7.45%), listing the themes: weak internet connection (2.66%), reduced digital skills (1.06%), risk of diseases (affects vision) and stress (too much emotion in such courses) (1.6%), inefficiency in receiving and acquiring information ("I can't keep up with what is communicated online," "on-site environment make me understand the information better and I am are more motivated to learn")(1.6%), on-site learning allows more individual study time (0.53%).

We also need to specify the occurrences of the leading digital platforms that use AI and are frequently used in various online courses. As a generic name, artificial intelligence appears in the utterances of the 85 students and has a relative frequency of 10.6%. The highest frequency has ChatGPT, with 20%, followed by digital applications used, but perhaps not with particular interest to most students, thus the following frequencies were obtained: Google Forms with 3.5%, Desmos with 3.5 %; EdTech 3.5%; Khan Academy 4.7%; Microsoft Forms 4.7%; Moodle 12.94%; Coursera 9.41%; MATLAB 7%.

The language used has a reference function, statements are made directly to the point, expressions are short and precise, and a lot of verbs (access, use, connect, participate, deploy, streamline, save, avoid, achieve, be present, etc.), without using poetic devices specific to the expressive function of language. Although there are no personifications, hyperboles, ellipses, enumerations, or other means to induce emotional states, even if sometimes there were clarifications regarding particular situations that contained elements of personal sensitivity, the expressive function of language is discreetly present. The attractive advantages of technology are directly accented because the content can be creatively transmitted. The metaphor "theory meets the magic of technology" emphasizes this idea. In addition, some adverbs of comparison sometimes have a repetitive character (more convenient, more direct, more accessible, more relaxing, more comfortable, etc.) to strengthen the listed characteristics.

A special symbolism is represented by the theme of opportunities in development, in which the referential language quickly acquires emotional nuances because the language suddenly becomes more personal in the first person ("I'm more relaxed, I concentrate better."), or with a touch of some subjects sensitive in the second person ("If you are afraid to present a project, online it helps you.", "The external environment does not pressure you.", "You feel more comfortable talking online"), in the third person ("It also encourages introverted people to provide answers, given that they are not in a situation where they are looked at directly by the rest of their colleagues.", " Shy people can be noticed by the conscientiousness with which they do their homework or answer the class.", "If you have trac to present some online project, that helps you."), or even impersonal ("Combating shyness," "More discipline," etc.).

The expressive function is used in the challenging medium theme, suggesting the speakers' enthusiasm. The epithets are meant to highlight students' excitement when they talk about online learning. If the first student uses impersonal speech ("Online learning is challenging, you can access online platforms such as AI or ChatGPT."), but the denotative epithet "provocative" indirectly suggests the respondent's enthusiasm; the second student uses assertive and personal speech, which is next to the denotative epithet "challenging," a reinforcement of the idea of delight in online learning: "I like this" ("Online learning is challenging and I like this because you can connect online platforms like AI or ChatGPT"). The third student who approaches this theme is austere and referential, using indirect speech ("Direct interaction"), which nevertheless has the valence of connotatively enunciating the idea of joy in online learning, as he perceives "interaction" (unarticulated) alongside the epithet "direct" which represents a valuable characteristic from the human point of view because direct interaction is

one of the desideratum of the present [58].

The phatic function of language was not used either; the questionnaire was taken seriously, perhaps out of the desire to make specific changes in situations that were crucial for some students. Here, I mean those students with particular difficulties in adapting to learning online.

The topic of mental comfort is dense, frequently addressed by students, and is considered one of the substantial advantages of online learning. The idea of spiritual comfort is multivalent seen by them:" learning environment, accessibility regardless of the workspace";" there is no risk of being late for classes and seminars"; "more freedom, familiar environment"; "students feel comfortable"; "the activity can be carried out in any space"; "I don't feel limited by a particular setting in which I have to be present". Underlining the qualities that make online learning a preferred environment for students, they repeat the adverb "more," which emphasizes the idea and draws attention to the valorising elements: "more comfortable," "more pleasant," "more relaxing," "easier,"" accessible," "more freedom," "easier."

The theme of organization has numerous references to the management of learning time, which for a student is a necessary skill to fulfil all the didactic tasks of the courses they attend ("Manage tasks as you like, and you can access online platforms such as AI or ChatGPT.", "Students can organize their learning program, they can access AI or ChatGPT online platforms.", "There is better organization, you can access AI or ChatGPT online platforms.", "Time efficiency." "Learning can be done at any time and from any place; online platforms such as AI or ChatGPT can be accessed."), but at the same time, there are also elements specific to students who also have a job ("The student is in the comfort of home or at work, he manages to attend the class and do other tasks that he would not have had time for if he had been physically in the class.", "I can enter classes from anywhere, and I can do other things at the same time.").

The theme of the quiet learning environment is not a rich one, but it highlights aspects less visible to the teacher but which can be of interest to the student because there are people who cannot concentrate in every condition, and the term inclusive education, has considering precisely the consideration of these aspects ("Reduced background noises.", "That hum that would be made in the lecture hall is significantly reduced.", "You can learn from anywhere; photograph the content to recapitulate it afterward. Isn't distracted by any colleague.").

Of the 85 students, 83 provided conclusive answers, which allowed the extraction of concrete information about their opinions regarding online study using AI and ChatGPT. From these 81 answers, we were able to structure two broader categories. The first category is that of students who envisioned facilities that enable participation and engagement in online courses and seminars on the WebEx platform using AI and ChatGPT that determined the set of answers marked A, with $|A| = 101$. The second category is that of students who emphasized the advantages regarding adequate online learning opportunities on the WebEx platform, using AI and ChatGPT (B1) but have analysed the disadvantages (B2), marked B, with $|B| = 87$. I plotted the co-occurrence map and thus obtained $|A \cap B| = 81$ (Figure1. Map of co-occurrences between the analyzed themes).

To study the categorical analysis results, we calculated the Jaccard index [58], and the Szymkiewicz–Simpson coefficient [59]; [60].

To calculate the Jaccard index, we used the formula:

$$J(A, B) = \frac{|A \cap B|}{|A| + |B| - |A \cap B|}, \text{ where } 0 \leq J(A, B) \leq 1. \quad (1)$$

We obtained the Jaccard index to be 0.757. This value indicates that the students' answers are similar, and there is no great variety in the expressed ideas because they aim to provide concrete information to the question under discussion.

To calculate the Szymkiewicz–Simpson coefficient, we used the formula:

$$\text{overlap}(A, B) = \frac{|A \cap B|}{\min(|A|; |B|)}, \text{ where } 0 \leq \text{overlap}(A, B) \leq 1. \quad (2)$$

We obtained that the overlap of the answers provided by the students is 0.67, a value indicating that one-third of the answers had elements in common, as they referred to the same content related to the advantages and disadvantages of online learning using AI and ChatGPT.

4) CONCLUSION

The responses to the survey question were special and remarkably consistent, exceeding many of our expectations.

What impresses the students' opinion regarding the advantages of online learning is the fact that the emphasis is

predominantly on facilities related to accessibility from anywhere, accessibility at any time, saving time, physical and mental comfort, schedule flexibility, and organization, only then following the financial economy. Challenging environment, health benefits ("I can be present even when I'm sick," "I sleep more," "less fatigue").

In the category of adequate online learning opportunities on the WebEx platform, which uses AI and ChatGPT, students specify the accessibility of study materials, the speed and ease of delivering information in real-time, efficiency in learning, opportunities for personal development, the varied student's learning activities, the accessibility of learning in online activities, access to a large volume of information, the possibility to be tutoring in online learning, a quiet learning environment, creative and easy to present the study materials, the organization of the didactic activity for a better understanding of the information, learning in self-rhythm, improving digital skills and opportunities for students with disabilities.

What impresses the students' opinion regarding the advantages of online learning is the fact that the emphasis is predominantly on facilities related to accessibility from anywhere, accessibility at any time, saving time, physical and mental comfort, schedule flexibility, and organization, only then following the financial economy. Challenging environment, health benefits ("I can be present even when I'm sick," "I sleep more," "less fatigue").

One important category of students is those who looked from the point of view of disadvantages of online learning and listed the weak internet connection, reduced digital skills, the risk of diseases and stress (too high emotions in such courses), inefficiency in receiving and acquiring information and the fact that learning on-site allows more time for individual study. These disadvantages are generally exhibited by very few students who have vision problems, have fewer digital skills than others, and process information more slowly than the average of their peers. This segment of students, even if they represent only 7.45% of students, they are an essential source of valuable people who must be encouraged and for whom integration solutions must be found by promoting the improvement of digital skills, providing personal tutors human or virtual, with which to practice the contents more for an improvement of the information processing capacity.

In the category of adequate online learning opportunities on the WebEx platform, which uses AI (through the educational platforms Desmos, EdTech Khan, Academy, Google Forms, Microsoft Forms, OneNote, Moodle, GeoGebra, Coursera, MATLAB) and ChatGPT, students specify the accessibility of study materials, the speed and ease of delivering information in real-time, efficiency in learning, opportunities for personal development, the varied student's learning activities, the accessibility of learning in online activities, access to a large volume of information, the possibility to be tutoring in online learning, a quiet learning environment, creative and easy to present the study materials, the organization of the didactic activity for a better understanding of the information, learning in own rhythm, improving digital skills and opportunities for students with disabilities.

5) REFERENCES

[1] .Skinner BF. Teaching machines. Science. 1958. 128, 969–977. https://doi.org/10.1126/science.128.3330.969.

[2] .Azaroff BS. The Shaping of Behaviorists: B.F. Skinner's Influential Paper on Teaching Machines. *European Journal of Behavior Analysis*. 2004, 5(2):129-135, DOI: 10.1080/15021149.2004.11434239.

[3] .Sze V, Chen YH, Yang TJ, Emer JS. Efficient processing of deep neural networks: A tutorial and survey. *Proceedings of the IEEE*. 2017, *105*(12), 2295-2329.

[4] .Zhao H, Li G, Feng W. Research on application of artificial intelligence in medical education. In *2018 International Conference on Engineering Simulation and Intelligent Control (ESAIC)*. 2018. 340-342). IEEE.

[5] .Kaplan A, Haenlein M. Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business horizons*. 2019, *62*(1), 15-25.

[6] .Russell SJ, Norvig P. *Artificial intelligence: a modern approach*. Pearson. 2016.

[7] .Poole DI, Goebel RG, Mackworth AK. *Computational intelligence* (Vol. 1). Oxford: Oxford University Press. 1998.

[8] .Baker T, Smith L, Anissa N. Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. 2019,

[9] .Brynjolfsson E, Tom M. What Can Machine Learning Do? Workforce Implications. *Science*. 2017, *358* (6370): 1530–34.

[10] .Bresnahan TF, Trajtenberg M. General Purpose Technologies Engines of Growth? *Journal of Econometrics* 1995, *65* (1): 83–108.

[11] .Bloom BS. Taxonomy of educational objectives – The classification of educational goals – Handbook 1: Cognitive domain. London: Longman. 1956.

[12] .Anderson LW, Krathwohl DR, Airasian PW, Cruikshank KA, Mayer RE, Pintrich PR, Raths J, Wittrock MC. A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman. 2001.

[13] .Tang S, Peterson JC, Pardos ZA. Deep neural networks and how they apply to sequential education data. In *Proceedings of the third acm conference on learning scale*. 2016, 321-324.

[14] .Marblestone AH, Wayne G, Kording KP. Towards an integration of deep learning and neuroscience, *Frontiers in Computational Neuroscience.*. 2016, 10(5). DOI: 10.3389/fncom.2016.00094.

[15] .Schmidhuber J. Deep learning in neural networks: An overview. *Neural Networks*. 2015, 61, 85-117, DOI: 10.1101/058545. https://doi.org/10.1016/j.neunet.2014.09.003.

[16] .Chen X, Xie H, Zou DH, Hwang GJ. Application and theory gaps during the rise of Artificial Intelligence in Education, *Computers and Education: Artificial Intelligence*. 2020, *1*.100002. https://doi.org/10.1016/j.caeai.2020.100002.

[16]. Winkler R, Söllner M. Unleashing the potential of chatbots in education: A state-of-the-art analysis. Academy of Management Annual Meeting Proceeding. 2018 (1), 11058.

[17]. Chen I, Zhang D, Zheng X. Personalized learning resource recommendation algorithm based on hybrid filtering for online education. Educational Technology Research and Development, 2018, 66(1), 1-23.

[18]. Chen PSD, Lambert AD, Guidry KR. Engaging online learners: The impact of Web-based learning technology on college student engagement. *Computers & education*. 2010, *54*(4), 1222-1232.

[19]. García P, Amandi A, Schiaffino S, Campo M. Evaluating Bayesian Networks Precision for Detecting Students Learning Styles. Computers and Education, 2007, (49) 3: 794-808. doi:10.1016/j.compedu.2005.11.017.

[20]. Tsiriga V, Virvou M. A framework for the initialization of student models in web-based intelligent tutoring systems. User modeling and user-adapted interaction. 2004, 14, 289-316.

[21]. Suchman L. Plans and Situated Actions: The Problem of Human-Machine Communication. Cambridge University Press. 1987.

[22]. Nielsen RD, Ward W, Martin JH. Recognizing entailment in intelligent tutoring systems. Natural Language Engineering, 2009, *15*(4), 479-501.

[23]. Baepler P, Murdoch CJ. Academic analytics and data mining in higher education. International Journal for the Scholarship of Teaching and Learning, 2010, *4*(2), 17.

[24]. Luckin R, Holmes W. Intelligence unleashed: An argument for AI in education. UCL Knowledge Lab: London, UK, 2016.

[25]. Yonezawa S, McClure L, Jones M. Personalization in schools. Education Digest, 2012, *78*(2), 41-47.

[26]. Ventura MD. Twitter as a music education tool to enhance the learning process: Conversation analysis. In New Media for Educational Change: Selected Papers from HKAECT 2018 International Conference (81-88). Springer Singapore. 2018.

[27]. Dechter R. Learning while searching in constraint-satisfaction problems. University of California, Computer Science Department, Cognitive Systems Laboratory. 1986.

[28]. Arici F, Yildirim P, Caliklar Ş, Yilmaz RM.. Research trends in the use of augmented reality in science education: Content and bibliometric mapping analysis. Computers and Education, 2019, *142*, 103647.

[29]. Kluger AN, DeNisi A. The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. Psychological Bulletin*,* 1996, *119*(2), 254–284. https://doi.org/10.1037/0033-2909.119.2.254.

[30]. Wang FH. An exploration of online behaviour engagement and achievement in flipped classroom supported by learning management system. Computers and Education, 2017, *114*, 79-91.

[31]. Xu D, Wang H. Intelligent agent supported personalization for virtual learning environments. Decision Support Systems, 2006, *42*(2), 825-843.

[32]. Ventura MD. Creating inspiring learning environments by means of digital technologies: A case study of the effectiveness of WhatsApp in music education. In E-Learning, E-Education, and Online Training: Third International Conference, eLEOT 2016, Dublin, Ireland, 2016, Revised Selected Papers (36-45). Springer International Publishing.

[33]. Walkington C, Bernacki M. Personalizing algebra to students' individual interests in an intelligent tutoring system: Moderators of impact. International Journal of Artificial Intelligence in Education, 2019, *29*, 58-88.

[34]. Liu DYT, Bartimote-Aufflick K, Pardo A, Bridgeman AJ. Data-driven personalization of student learning support in higher education. Learning analytics: Fundaments, applications, and trends: A view of the current state of the art to enhance e-learning, 2017, 143-169.

[35]. Burstein J. Opportunities for natural language processing research in education. In Computational Linguistics and Intelligent Text Processing: 10th International Conference, CICLing 2009, Mexico City, Mexico, March 1-7, 2009. Proceedings 10 (pp. 6-27). Springer Berlin Heidelberg.

[36]. Chan KS, Zary N. Applications and challenges of implementing artificial intelligence in medical education: integrative review. JMIR medical education, 2019, *5*(1), e13930.

[37]. Johnson WL, Lester JC, Ritter S. Face-to-face interaction with pedagogical agents, twenty years later. International Journal of Artificial Intelligence in Education, 2013, 23(4),412-430.

[38]. Mostow J, Beck J. Some useful tactics to modify, map and mine data from intelligent tutors. Natural Language Engineering, 2006,*12*(2), 195-208.

[39]. Knapp S. Artificial intelligence: Past, present, and future. VOX of Dartmouth, 1. 2006.

[40]. Burstein J, Chodorow M, Leacock C. Automated essay evaluation: The Criterion online writing service. Ai magazine, 2004, *25*(3), 27-27

[41]. Mozgovoy M, Kakkonen T, Cosma G. Automatic student plagiarism detection: future perspectives. Journal of Educational Computing Research, 2010, 43(4), 511-531.

[42]. Rodrigues F, Oliveira P. A system for formative assessment and monitoring of students' progress. Computers and Education, 2014, *76*, 30-41.

[43]. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – where are the educators? International Journal of Educational Technology in Higher Education, 2019, 16, 39. https://doi.org/10.1186/s41239-019-0171-0.

[44]. Easterby-Smith M, Thorpe R, Jackson P. Management Research. 3rd ed, SAGE Publications Ltd., London. 2019,

[45]. Bardin L. L'analyse de contenu, Paris : Presses universitaires de France, 1997.

[46]. Moliner P, Rateau P, Cohen-Scali V. Les représentations sociales. Pratique des études de terrain. Presses Universitaires de Rennes, 2022.

[47]. Glaser GB, Strauss A. Aldine Transaction. A Division of Transaction Publishers New Brunswick (U.S.A.) and London (U.K.). 1967[1965].

[48]. Strauss A, Corbin J. Grounded Theory Methodology: An Overview. In N. K. Denzin, Y. S. Lincoln (Eds.). Handbook of Qualitative Research (Chapter 17: 273-285). Thousand Oaks, CA: SAGE. 1967. ISBN 10-0202302601.

[49]. Strauss A, Corbin JM. Basics of qualitative research: Grounded theory procedures and techniques. Sage Publications, Inc. 1990.

[50]. Havârneanu G. Stimularea creativității prin predarea matematicii. [Stimulating creativity through teaching mathematics]. Institutul European. România. 2013. https://search.worldcat.org/title/895395180

[51]. Havârneanu G. Didactica matematicii și informaticii pentru învățământul primar.[Didactics of mathematics and informatics for primary education]. 2020. Editura Polirom, România.

[52]. Phillips BN. School Anxiety Scale (SAS). 1978. https://psycho-tests.com/test/school-anxiety-scale

[53]. Duranti A. Linguistic anthropology. New York: Cambridge University Press. 1997. ISBN 978-0-511-81019-0. OCLC 191952948.

[54]. Jakobson R. Linguistics and communication theory. Selected Writings II. Word and Language. The Hague: Mouton, 570–579. 1971[1961].

[55]. Mucchielli R. Opinions et changement d'opinion ; connaissance du problème, applications pratiques, Paris, Entreprise moderne d'édition Librairies techniques, 1988, ISBN 2-7101-0726-0.

[56]. Mucchielli A. Dictionnaire des méthodes qualitatives en sciences humaines et sociales. Paris: A. Colin, 1996.

[57]. Vygotsky LS. In Mind in Society-The Development of Higher Psychological Processes, eds M. Cole, V. John-Steiner, S. Scribner, E. Souberman, Harvard University Press, Cambridge, MA, USA, 1978.

[58]. Jaccard P. The distribution of the flora in the alpine zone. New Phytologist, vol. 11, issue 2, pp. 37–50, 1912, Doi: 10.1111/j.1469-8137.1912.tb05611.x.

[59]. Szymkiewicz D. Une contribution statistique a la geographie floristique. Acta Societatis Botanicorum Poloniae, 1934, pbsociety.org.pl.

[60]. Simpson G. G. Notes on the Measurement of Faunal Resemblance. American Journal of Science. Vol. 258-A, pp. 300–311, 1960.

APPENDIX

Table 1. Categories, themes, and their occurrence inferred from responses written by participants regarding students' opinion regarding the advantages of online study compared to on-site

Categories/ Themes	Number of occurrences (relative frequencies)	**Formulated statements**
A. Facilities that enable participation and engagement in online courses and seminars on the WebEx platform using AI and ChatGPT	101 (53.72%)	
1. Accessibility of participation in courses from anywhere	19 (10.1%)	1. The possibility of accessing the course from other localities. 2. It provides access to courses and those from a distance. 3. It allows everyone to learn even remotely, as I can't be physically present much because of my job. 4. Students can access the courses regardless of where they are. 5. Online learning is more straightforward for those out of the country. 6. You can connect wherever you are. 7. Ability to connect to courses from different locations. 8. You can do classes from anywhere. 9. Lessons can be done wherever I am. 10. You can go online from wherever you are. 11. We can do the time regardless of where we are. 12. It's much easier to log in from anywhere. 13. You can log in from wherever you are. 14. Reduced mobility (you can do the classes anywhere). 15. You can be anywhere. 16. Learners can access the courses from various places. 17. You can attend classes from anywhere in the world. 18. Attending the course regardless of where you are. 19. Lessons can take place from anywhere.
2. Opportunities to participate in courses at any time	3 (1.6%)	1. You can connect at any time. 2. I can always be present at courses and seminars. 3. I can participate in all courses and seminars online.
3. Chall enging environment	3 (1.6%)	1. Online learning is challenging; you can access online platforms like AI or ChatGPT.

		2. Online learning is challenging, and I like it because you can connect to online platforms like AI or ChatGPT. 3. Direct interaction.
4. Financial economy	4 (2.12%)	1. Accessible. 2. It saves costs (I would have to come from 100 km to get to the classes). 3. Avoid travel; there are fewer costs. 4. Those who live in other cities can easily participate online, saving money (transportation).
5. Physical comfort	15 (7.97%)	1. I feel much more comfortable. 2. We feel more relaxed when we stay at home. 3. It can be much more convenient. 4. You can study from the comfort of your own home. 5. You can study from the comfort of your own home. 6. It's more convenient. 7. Comfort. 8. It's easier to focus on your home environment. 9. Lightness, simplicity. 10. Convenience and lightness. 11. Students are in the comfort of their own homes. 12. It's more convenient to log in on Webex and stay on time. 13. Online learning is more comfortable. 14. The comfort of home. 15.You can log in from your laptop.
6. Mental comfort	15 (7.97%)	1. A more comfortable learning environment. 2. Online learning is more easily accessible regardless of the workspace 3. A more comfortable learning environment. 4. There is no risk of being late for classes and seminars. 5. The risk of being late is eliminated. 6. No delay caused by public transport. 7. More freedom. 8. A more comfortable learning environment. 9. Learning takes place in a more pleasant, relaxing environment. 10. You are in a more familiar and comfortable environment. 11. Personally, online learning is easier for me. Having two small children who depend on me makes it difficult for me to physically get to classes. 12. Online learning is more relaxing. 13. The familiar environment. 14. Students feel comfortable. 15. The activity can occur in any space; I am not limited by a particular setting where I must be present.
7. Health benefits	4 (2.12%)	1. For medical reasons, you can be present in class. 2. You can sleep more. 3. Fatigue is reduced. 4. A little more time for rest.
8. Schedule flexibility	13 (6,91%)	1. Flexible, adapted to students' needs, does not require a hall (it is much easier to organize). 2. Flexibility. 3. Schedule flexibility because you can learn at any time of the day. 4. Online learning is more easily accessible regardless of the workspace 5. It is much more flexible. 6. More flexibility. 7. Time flexibility.

		8. You can learn anytime, and the learning schedule can be flexible. 9. Flexibility. 10. Schedule flexibility. 11. Schedule flexibility. 12. Flexibility for busy people. 13. It offers flexibility for people with a busy schedule.
9. Management of learning	9 (4.78%)	1. Learning time management: you can access online platforms like AI or ChatGPT. 2. Task management at will: you can access online platforms such as AI or ChatGPT. 3. Students can organize their learning schedule and access online platforms like AI or ChatGPT. 4. You can access online platforms such as AI or ChatGPT to organize your study program. 5. The student is in the comfort of his home or at work; he manages to attend the course and do other tasks that he would not have had time for if he had been physically at the course. 6. I can enter classes from anywhere and do other things simultaneously. 7. There is a better organization; you can access online platforms such as AI or ChatGPT. 8. Time efficiency. 9. Learning can be done at any time and from any place; online platforms such as AI or ChatGPT can be accessed.
10. Cronokan (χρόνοκάνω)	16 (8.51%)	1. No transport required. 2. Does not require travel. 3. Commuting from the dormitory to the faculty is exempt. 4. It does not require traveling to the classrooms. Don't waste time in traffic. 5. The classes are conducted online, and thus, I save time. 6. No more time-consuming travel. 7. You save time. 8. It is more accessible in terms of time. 9. We don't have to travel to college anymore. 10. It is beneficial for the time gained by the teacher and the student if he does not sit in traffic. 11. Those who live in other cities can also participate easily online, saving time (transportation). 12. Save time. 13. Less time wasted on the road. 14. Saving time that should be spent on college. 15. It saves you time spent in traffic. 16. Travel is unnecessary; we save time with the round trip.
B1. Effective online learning opportunities on the WebEx platform, using AI and ChatGPT	74 (39.36%)	
1. Improving digital skills	2 (1.06%)	1. Improve our digital skills by accessing platforms that give us another perspective on mathematical concepts, such as Google Forms, OneNote, Moand odle, and GeoGebra. 2. Develop technological skills that help us better understand mathematical concepts and train ourselves, such as Microsoft Forms, Coursera, and MATLAB.

2. Accessibility of study materials	12 (6.38%)	1. Accessibility of learning materials anytime and anywhere. 2. Accessibility: You can access AI and ChatGPT. 3. Access to materials sent by teachers. 4. Easy access to necessary materials, AI and ChatGPT can be accessed. 5. Access to resources and facilities on campus. 6. We can access many learning materials as long as we have an internet source. 7. Materials are available to students. 8. Much faster and easier access to information, including AI and ChatGPT. 9. Lessons are posted on various platforms that students have access to. 10. Allows access to materials and resources at all times, including AI and ChatGPT. 11. Course accessibility. 12.You can find information more efficiently, including online platforms such as GeoGebra, Microsoft Forms, OneNote, Moodle, Coursera, and MATLAB.
3. Creative and easy to present the study materials	3 (1.6%)	1. 1. You can access several sources (GeoGebra, Khan Academy, Google Forms, Moodle, MATLAB). 2. 2. It makes digital materials much more accessible to present (GeoGebra, EdTech, Microsoft Forms, OneNote, Moodle). 3.3. Online platforms often provide access to various educational resources (GeoGebra and Desmos Microsoft Forms and OneNote, Moodle, and Coursera).
4. Access to a large volume of information	4 (2.12%)	1. Unlimited volume of information on platforms such as Moodle, GeoGebra, and Coursera. 2. Access to a wide range of educational resources, such as Google, Microsoft Forms, Moodle, GeoGebra, and Coursera. 3. Online platforms often provide access to a wide range of educational resources, such as Microsoft Forms, OneNote, Moodle, GeoGebra, Coursera, and MATLAB. 4. Wider range of course materials. Google Forms, Moodle, GeoGebra, Coursera.
5. Quiet learning environment	3 (1.6%)	1. 1. Reduced background noises. 2. The hum that would be made in the lecture hall is significantly reduced. 3. You can learn from anywhere, take pictures of the content to recap later, and not be distracted by colleagues.
6. Speed and ease in delivering information in real-time	9 (4.8%)	1. You get materials easily and quickly. 2. Online learning comes with documents at your fingertips faster and more efficiently. 3. The transmission of information is high-speed 4. Enables real-time information dissemination. 5. Rapid distribution of materials. 6. Quick access to any information. 7. Rapid distribution of teaching materials. 8. Rapid distribution of teaching material. 9. Speed.
7. Organization of the didactic activity for a better understanding of the information	3 (1.6%)	1. Effective communication. 2. Attractive, creative character. 3. We can work interactively.
8. Accessibility of learning in the online	5 (2.66%)	1. Online learning allows students to access course materials and attend lessons anytime.

environment		2. Ability to connect to learning from anywhere. 3. Learning can happen anywhere, at any distance 4. You can quickly and easily connect to any learning task. 5. Flexibility in learning, including access to courses, seminars, AI platforms, and ChatGPT.
9. Efficiency in learning	9 (4.8%)	1. It is understood quite well online as well as on-site. 2. Learning is easier online because everything is done at a slightly alert pace, so it is faster. 3. The learning materials are diverse (Desmos, EdTech, Khan Academy, Moodle, GeoGebra, Coursera, MATLAB), which leads to a better understanding of the information. 4. Greater attention to materials. 5. It is a more diversified and attractive learning method because it offers access to AI and ChatGPT platforms, while on-site learning is always organized similarly. 6. Personalized learning. 7. Instant access to resources and experts. 8. The teacher has immediate access to the digital information he wants to transmit. 9. Make additional information available to students in addition to the courses on platforms like AI and ChatGPT.
10. Possibility of tutorials in online learning	4 (2.12%)	1. It is possible to enter mini-sessions with the teacher. 2. In the case of online classes, I received consultations in Webex sessions separated by groups, which made me feel safer and allowed me to clarify my concerns. 3. It helps accomplish tasks much easier and faster than on-site learning, where you have to go to the library or get materials from teachers. 4. I appreciate that the teacher-student is discussed individually in a separate session in the online environment. It helps to save time, and you have a teacher to help you when you have doubts.
11. Varied student's learning activities	7 (3.73%)	1. It is more diversified and attractive learning through online platforms such as AI and ChatGPT, while on-site learning is always the same 2. We understand, especially when working in teams and sessions. 3. Online learning can be done using online applications (GeoGebra, Khan Academy, Moodle, MATLAB), and it is much easier to do group applications. 4. There is the possibility of teamwork. 5. I feel that I am more efficient when I work in an online team. 6. With just a simple click on Webex platforms, meetings can be created only between the teacher and a group of students so as not to disturb the others while they are working. 7. We can work in teams through collaboration.
12. Learning at your rhythm	4 (2.12%)	1. Personalized learning. 2. You set your own work pace, and your colleagues don't bother you. 3.The resources used in learning, such as courses, seminars, AI platforms, or ChatGPT, can be accessed at any time, which encourages learning at each person's rhythm 4. From my point of view, in-home learning offers more time than on-site learning. You can access several

		sources of information (Desmos, EdTech, Khan Academy, Moodle, GeoGebra).
13. Opportunities for students with disabilities	1 (0.53%)	1. We see everything closer and better.
14. Opportunities in personal development	8 (4.24%)	1. It also encourages introverts to provide answers, given that they are not in a situation where they are being looked at directly by the rest of their colleagues. 2. More discipline. 3. If you want to present a project online, it will help you. 4. Combating shyness. 5. I am more relaxed, I concentrate better. 6. Shy people can be noticed by the conscientiousness with which they do their homework or answer the class. 7. You feel more comfortable talking. 8. The external environment does not pressure you. 9. From my point of view, in-home learning offers more time than on-site learning. You can access several sources of information (Desmos, EdTech, Khan Academy, Moodle, GeoGebra).
B2. Disadvantages of online learning on the WebEx platform, using AI and ChatGPT	13 (6,92%)	
Weak or no internet connection	5 (2.66%)	1. Not all students have devices to facilitate the learning process. 2. Internet connection makes learning difficult. 3. Risk of connection interruption due to lack of signal. 4. Sometimes, poor visual and auditory quality. 5. Connection problems.
Reduced digital skills	2 (1.06%)	1. Lack of digital skills. 2. Not all students have developed digital skills
Risk of diseases, stress	3 (1.6%)	1. It affects health because students and teachers have to sit in front of the screen for many hours. 2. Affects vision. 3. You can have more emotions in online classes.
Inefficiency in receiving and acquiring information	3 (1.6%)	1. From my perspective, I can't concentrate at all in online lessons. 2. I cannot keep up with what is being communicated, which causes me to fall behind and have to take the courses from 0 afterward. 3. In the on-site environment, you understand the information better and are more motivated to learn.

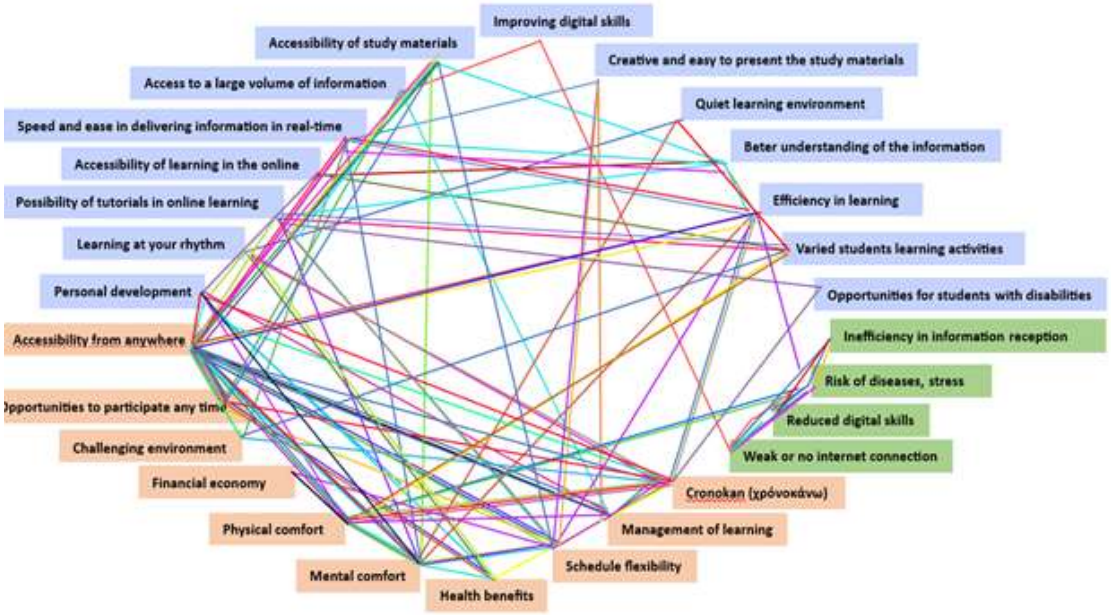

Figure 1. Map of co-occurrences between the analyzed themes (Author: Geanina Havârneanu)