Annals of the University of Craiova, the Psychology-Pedagogy series
ISSN 2668-6678, ISSN-L 1582-313X, Year XXII, 2023, no 45, Issue 2

APPLYING LEARNING MODELS IN DEVELOPING GEOGRAPHY-SPECIFIC COMPETENCIES*

Viorel BOCANCEA[1] Alexandra PĂTRAȘCU[2]

10.52846/AUCPP.2023.2.18

Abstract
This study is based on the hypothesis that using different learning models helps students gain school competencies. In this regard, several learning models were chosen, as there is no universally accepted and validated one that contributes to the formation and development of competencies, particularly procedural knowledge. The aim is to use learning models to address educational approaches, methodologies, and assessments. This will help align them with students' needs and adapt to market demands by developing their skills in a creative way.
Key words: *Learning; Model; Competencies; Practical learning activities.*

1. Introduction

The people`s extensive communicative experience and the explosion of information in all fields have generated the need to reorganize school learning in a way that involves not just transmitting content to students, but instead allowing them to independently acquire knowledge, particularly through practical activities because the way we learn and develop school skills, critical thinking, creativity, and attitude formation are vital for adapting to fast-paced changes.

In the specialized literature, numerous theories and definitions of learning have been developed. However, we will mention only a few of them, such as start from the idea that learning is an "active and creative process, consciously or unconsciously adapting to the natural and social environment" (Dulamă, 2009, p. 8), an intellectual and physical effort crafted by students with the aim of gaining knowledge and improving their personal qualities (Meiani, 2008), encompassing any changes in a person's current behavior or the adoption of new behavior through practice.

---

[1] Associate Professor, PhD, „Ion Creangă” State Pedagogical University, Republic of Moldova, e-mail address: bocancea.viorel@gmail.com, corresponding author, https://orcid.org/0000-0002-7055-678X
[2] PhD student „Ion Creangă” State Pedagogical University, Republic of Moldova, e-mail address: alexandraa.patrascu@gmail.com, https://orcid.org/0000-0002-3969-9379

According to D. Kolb (https://ro.sainte-anastasie.org/articles/psicologia/la-teora-de-los-estilos-de-aprendizaje-de-david-kolb.html, 2023), the concept of learning represents the process by which knowledge take shape from lived experiences and transformation. Actually, during geography classes, there is a need to employ a range of traditional and modern techniques, "combined and correlated in various methodological forms" (Codreanu, Roșcovan, Axînti, 2010, p. 53).

However, in this study, we will begin with Stenberg and Williams' definition, which we consider detailed and comprehensive. In this context, learning is seen as a process in which students continuously adapt their emotions and behaviors based on their personal experiences, practices, and observations over a specific period (Dulamă, 2011).

Over time, researchers have identified various learning types based on how our memory functions and the role observation or experience plays in acquiring new knowledge. These types encompass implicit learning, explicit learning, associative learning, habit-based learning, meaningful learning, cooperative learning, observational or imitative learning, experiential learning, and more.

To accomplish this and enhance the educational process, it becomes essential to simplify experiences and well-known practices. Over time, researchers have explored how students learn and have developed various *learning models* to improve the educational system.

Experts define learning models as a reiteration of cognitive processes (such as anticipation, deduction, induction, analogy, etc.), and these models have aspects that differentiate learning. Each teacher has the freedom to choose an appropriate model considering the learning objectives, while each student has their own pace and capacity for reception and learning.

Therefore, it's not always sufficient to apply the same operational learning model to all students to achieve desired outcomes or acquire new skills and knowledge. Instead, it is crucial to comprehend the various learning processes.

Among all the learning models present in the specialized literature, we will consciously choose four dynamic learning models (Figure 1) because we believe they are the most appropriate and efficient for developing geography-specific competencies through practical activities.

Within these models, the needs (which influence the choice of activity types), expectations, and student motivation are taken into account. Hence, the teacher provides activities that guide and encourage the student to explore, develop, and produce (Lungu, Volontir, Boian, 2012).

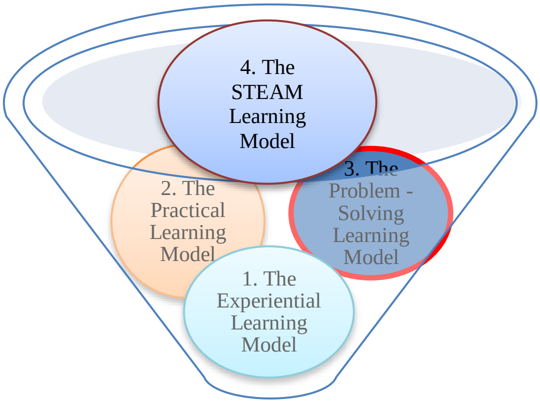

Figure 1. The Experiential Learning Model or David Kolb's Model (Learning through Direct Experience)

David Kolb assumed that we learn continuously resulting in the development of specific strengths, as outlined by the author in 1984. These strengths lead to various preferences in terms of individual learning styles (accommodative or adapter, convergent, divergent, and assimilator). These preferences are influenced by personal experiences, genetic factors, and the demands of our current life environment. Kolb's developed learning styles are based on a learning cycle, which is renewed for each technique or concept taught. This cycle comprises four stages: concrete experience (actual, firsthand experience), reflective observation of new experiences (observations and reflections on actual experiences), abstract conceptualization (building abstract concepts based on observations and reflections), and active experimentation (testing new concepts).

The researcher perceives learning as an integrated process at each stage, rather than in terms of outcomes. Immediate experience is seen as a foundation for observation, during which the student pauses to reflect and continues to formulate hypotheses based on acquired information. Subsequently, they test the consequences of these concepts in new contexts. At the end of this phase, the cycle reverts to the initial stage of the experiment based on or according to the experiment, and the cycle repeats.

These four stages are the essence or basis of a learning spiral (Reflection, Understanding, Decision, Application), which can begin at any point but often starts with the concrete, firsthand experience.

Further, we will present a practical example of the implementation of the experiential learning model in geography lessons, considering the curriculum for General Physical Geography in the tenth grade in the Republic of Moldova (Ionescu, 2000; Neguț, Ielenicz, Apostol, Bălteanu, 2002) and the ninth grade in Romania (Păun, 1991), where the concept of "Terrestrial Magnetism" is studied.

Table 1. Formation of the concept “Terrestrial Magnetism” according with the experiential learning model (adapted from author V. Bocancea (2021)

The stages of the experiential learning	The stages in developing the concept of “Terrestrial Magnetism”	Teaching –learning activities
Effective experience Reflecting and observing the effective experience.	Primary perception, initially, of the process or phenomenon under study.	1. It relies on the student's knowledge and experience regarding magnetism (information from the school book (Ionescu, 2000; Păun, 1991). 2. Explaining the manifestation of terrestrial magnetism. Earth behaves like a giant magnet (due to its rotational motion and its internal structure, primarily composed of iron and nickel), possessing two magnetic poles (which generate a magnetic field). More specifically, two points on the Earth's surface to which the magnetic field lines align, governing the orientation of magnets, compass needles, and the formation of polar auroras (Păun, 1991; Neguț, Ielenicz, Apostol, Bălteanu, 2002).
Constructing abstract concepts based on the observa tions and reflections	Developing the abstract concept of "Terrestrial Magnetism," where the student has learned from their own experience	3. Defining the concept of "Terrestrial Magnetism" as the Earth's permanent magnetic field of low intensity, directed toward its two poles (solar activity influences Earth's magnetism, being altered when high-intensity solar winds occur, and the magnetosphere captures and directs them toward Earth's magnetic poles, giving rise to polar auroras upon contact with Earth's atmosphere).
Trying the new concepts	Developing the concept of 'Terrestrial Magnetism' and incorporating it into the theoretical structure of related concepts (magnet, magnetism, geomagnetic poles, magnetic field, cosmicradiation, magnetosphere polar auroras, etc.), in this way, the modified or newly created concepts stimulate experimentation.	4. In the development of the concept of "Terrestrial Magnetism," we start with the ability of magnets of various sizes to attract bodies and objects containing iron, cobalt, steel, nickel, and stick fast to metallic surfaces. 5. Carrying out and applying the process of observing and measuring the force of the magnet in an experimental activity (acquiring a new experience) by solving a problem related to its attraction force. For this, we will use materials such as a magnet, a cup, water, and a (steel) paperclip. We will pour water into the cup, then insert the paperclip, and using the

	magnet attached to the outside wall of the glass, in line with the paperclip, we will move the magnet upwards and remove the paperclip without the risk of getting wet. 6. Carrying out and applying the process of observing and measuring the force of attraction caused by terrestrial magnetism in a new experimental activity (acquiring experiences used to explain the force of terrestrial magnetism). In this regard, the didactic materials used are: a bar magnet, a horseshoe magnet, pieces of iron or iron crumbs, and two pieces of cardboard. The following steps will be done: we place a piece of cardboard over each magnet (bar-shaped and horseshoe-shaped), and then sprinkle iron filings over the cardboard. With our fingers, we gently move the cardboard. We observe that the iron crumbs are not evenly distributed; most of them concentrate at the ends of the magnets, at the extremities (i.e., at the Earth's poles), and very little pieces of iron or crumbs are found in the rest of the magnet, which demonstrates that beyond the poles, the intensity of the magnetic field decreases.

2. The problem-solving learning model is a learning approach that engages in more detailed thinking, where past rules are brought together to solve a problem, leading to new learning and the formation of fresh perspectives that enhance the applicability of previous rules.

With the support of problem-solving, learning happens by identifying and creating problem situations (research situations) by the teacher (Cozma, 2020). A problem is "any theoretical or practical difficulty whose solution is the result of the student's own research activity, guided by certain rules, aiming to overcome that difficulty and, through this, gain new knowledge and experience" (Geografie: Curriculum Național, 2020, p. 83). A problem situation requires "heuristic investigation" (Guinepain, 2023, p. 367), and pedagogically, it is a "phrase that designates learning situations in which students' attempts to formulate an answer are blocked by an obstacle, the overcoming of which requires intense intellectual and motivational effort" (https://ro.sainte-anastasie.org/articles/psicologia/la-teora-de-los-estilos-de-aprendizaje-de-david-kolb.html, 2023, p. 45).

In this regard, further on, we present an example of practical application of the stages of the problem-solving learning model in geography (Table 2), according to the curriculum for General Physical Geography for the 10th grade in the Republic of Moldova (Cozma, 2020; Ionescu, 2000) and for the 9th grade in Romania (Păun, 1991), where by creating a problem situation, the first contact is made in acquiring new knowledge, followed by the formulation of a problem, and finally, the identification of solutions for students to clearly solve the problem.

Table 2. Melting of the Polar Ice Cap at the South Pole of Earth

Activities	The learning stages through the problem-solving learning	Steps	Teaching-learning-assessment activities
Activities done by the teacher	Introduction and familiarization with the context of the problem: In the polar region, beyond the 66th degree of southe rn latitude, there are no permanent humansettlements or industrial platforms. How do you explain the melting of the ice cap eve though this area is not permanently inhabited by humans?	Presentation of all educational resources.	The textbook for the ninth grade, General Physical Geography, world physical map, world climate map, atlas, etc.
		Recording the acceptance criteria for he solution.	
Students activities	1. Analysis of the problem situation regarding the accumulation of new information and the restructuring of old data	What are the known facts?	As mentioned in the literature, pollution and greenhouse gas emissions caused by humankind have the capability to trap heat in the atmosphere, leading to an increase in air and water temperatures, resulting in the melting office.
		What are the unknown facts?	How can we explain the continuous and rapid melting of ice in the southern polar region of Earth?
		What is the contradictio, the problem, the mismatch?	If the southern polar region is not permanently inhabited, and there is no industrial interference what is the explanation for the alarming melting of the ice cap?

		What is the requirement?	Please specify the cause of the increase in air tempera ture at the South Pole, which triggers the process of ice cap melting, even though there are no permanent settlements
	2. Looking for ways to resolve the problem and choosing an effective solution (problem-solving).	Investigation	Observe: The lessons during which the formation of, iceglaciers worldwide, and the origin of pollution were studied and learned (9th-grade textbook (Ionescu, 2000; Păun, 1991). Identify previous knowledge and bibliographic sources related to these topics (journals, maps, books,textbooks, etc.). It has been noted that humanity is not afraid of the natural, gradual melting of the ice caps over geological eras and history. Instead, it is more concerned about the accelerated and intensified phenomenon caused by irrational human activities and actions.
		Updating and examining the new knowledge through their selection and organization.	Human activities result in immense emissions of greenhouse gases capable of trapping heat in the air. The accumulation of these gases leads to an increase in average temperatures, causing ice to melt. At the South Pole, the melting is more pronounced compared to other terrestrial regions due to air circulation, which carries warm air from the equator to the poles through conveyor belts, and the reduction of albedo, reduction of albedo.

	Solutions proposed by students to solve the problem	To reduce the level of atmospheric and Oceanic pollution generated by human settlements and industrial platforms, students will develop some solutions: the use of purification, treatment, and sealing facilities, especially those in coastal areas; rational exploitation and cleaning of resources; the recovery and utilization of used waste materials; - the use of systems, facilities, and means of transportation that cause very little pollution; - intensive reforestatio and a decrease in deforestation.
3. Obtaining and evaluating the general result	Searching and making a logical argument for confirming or disproving it regarding the rapid melting of the ice cap.	When the conveyor belts bring more greenhouse gases, when the albedo decreases, and the ocean waters become warmer, the concentration of green- house gases and pollution in the cold region of the Earth increases, even if they are not emitted directly from the South Pole.
4. Personalization and integration of the new acquisitions.	Validation or disapproval of the solution.	It can be consented by the teacher or by the students who independently conclude the appropriate solution. Thus, by learning problem-solving strategies in various fields, students are opened up to a truly creative and dynamic learning experience (through investigation and discovery).

3. The Practical Learning Model

Practical activities are an educational method focused on nurturing practical skills and competencies in students. It is a dynamic process that seamlessly combines both theoretical and hands-on knowledge, converting foundational information into functional and applicable know-how. Practical learning is particularly oriented towards the acquisition of procedural knowledge, the development of positive attitudes, and the enhancement of practical skills in students (Codreanu, Roșcovan, Axînti, 2010).

To carry out this type of lesson, we will provide a practical learning model (see Table 3) within the field of Geography. This model is designed to impart methods, techniques, skills, and effective work practices. It aligns with the curriculum for General Physical Geography in the 10th grade in the Republic of Moldova (Ionescu, 2000; Neguț, Ielenicz, Apostol, Bălteanu, 2002) and the 9th grade in Romania (Păun, 1991). It encompasses the following stages:

Table 3. The Water Transformations

Stages of the Practical Learning Model	Aspects Addressed in the Research Project	Teaching-Learning -Evaluation Activities
Preparation stage conducting practical work carried out by the teacher	1. Setting the Theme: title of the topic, the purpose of the topic, and the operational objectives of the topic.	*Topic Title*: Water Transformations; *Topic Purpose*: Developing specific geography competencies, practical geographical skills, and knowledge for students; *Operational Objectives*: To identify water transformations based on direct observations and the study of relevant bibliographic resources.
	2. Assignment of tasks to students (research, active involvement in the activity, etc.)	Creating task sheets and providing instructions for each team, followed by group discussions.
	3. Presentation of the working task environment	*Duration:* 2 hours; *Information sources*: textbook, poster displaying the water cycle in nature, world physical map, atlas, etc. *Working tools*: glasses of the same size, water, plate, marker, pot, stove or water boiling appliance, steel lid, work sheets, evaluation sheets.
The stage of preparing the practical work conducted both by the teacher and the students.	Carrying out group activities under the supervision of the teacher (presentation of objectives, working tools, worksheets)	*Teaching methods and techniques*: direct observation, investigation, interdisciplinary study; *Grouping* students into two working teams; Each team will receive a specific topic, the necessary instructions for carrying out the topic/practical work, and the required working tools.
The stage of carrying out the practical work	1. Developing and implementing of the operating plan	*Team I*: The students will take two same-sized glasses, pour the same amount of water into them, and mark the water level on the outside of the glasses using a marker. One of the glasses will be covered with a plate,

		and then the glasses will be placed in the sunlight. *Team II*: The students will fill a pot with water and place it on the stove. When the water boils, a lid is placed over the pot (over the steam above the pot).
	2. Obtaining the results	*Team I*: The students will observe the next day how the water level in the uncovered glass is lower than in the covered glass, where it is almost the same as at the beginning of the experiment. This result is due to the evaporation of water from the uncovered glass, as at high temperatures, liquid water turns into water vapor and mixes with the air, a phenomenon called evaporation. *Team II:* The students will immediately observe how steam (vapor) rises from the pot, and upon contact with the cold lid, it condenses into water drops. This happens because the vapor loses temperature and returns to a liquid state, a phenomenon known as condensation.
	3. Supervision and guidance of the activity	Students review their knowledge under the careful monitoring and guidance of the teacher.
Stage for evaluating the quality and results of practical work	1.Oral presentation of the results of the practical activities.	The results of the work carried out will be presented orally by three students from each team in front of the other students in the class.
	2. Assessment of the achieved outcomes, assessing the accuracy of task completion, and evaluating the quality of students' performance.	Discussion for checking and assessment of the practical process (what they did well or wrong, what issues and misunder standings they encountered, and how they can be addressed and overcome).
	3.Assessing the achieved results, ascertaining the accuracy of task completion, and evaluating the quality of students' performance.	Review discussions to identify what was done well or incorrectly, pinpoint challenges and misunder standings, and explore ways to address and overcome them.

4. The STE(A)M Project-Based Learning Model

STEAM is an interdisciplinary learning model that integrates and leverages the natural connection between five domains (Science, Technology, Engineering, Arts, and Mathematics) to creatively address real-life problems, fostering collaboration and critical thinking skills in students. Its aim is to promote innovation through the synergy of a scientist's or technologist's mind with that of an artist or designer. For the effectiveness of this learning model, teachers should collaborate, share hypotheses, as these different ways of explaining learning practices significantly contribute to improving students' result.

As a result, we will implement a STE(A)M project-based learning model. To carry out this project, based on the curriculum for General Physical Geography for the 10th grade in the Republic of Moldova (Cozma, 2020) and General Physical Geography for the 9th grade in Romania (Păun, 1991) the 9th-grade students have identified a real issue for the city of Pitești, related to the pollution of the Argeș River due to household waste.

Table 4. Pollution of the Argeș River Water

Stages of the STEAM Project-Based learning model	Aspects Addressed in the Research Project	Teaching-Learning and Evaluation- Activities
Problem identification	*Problem:* Water pollution levels have risen due to the disposal of household waste in some parts of the Argeș River floodplain.	Prior to the project's start students were encouraged to identify a real environmental issue in their living environment and create a STE(A)M project based on the identified problem, with geographic content.
Design/planning	*STE(A)M Project Title*: Argeș River Water Pollution *Project Type*: practical-application *Activity Type*: Integrated within the STE(A)M project framework *The aim of the STE(A)M Project*: To create STE(A)M products that highlight the geographic content's value, confirm the status of the Geography discipline and related disciplines in maintaining a healthy living environment.	Engaging students in the project by developing a plan, an activity schedule, and division of tasks. Project-involved students took an assessment test (before and after the activities) to measure their understanding of the concept of pollution.

The objectives of the STE(A)M Project	At the end of the project, students will be able to: research and distinguish accurate information about water, recognizing its significance for life and the consequences of increased pollution; deepen their knowledge of water and apply it in various contexts related to pollution sources and purification methods; use and create interesting products based on their accumulated knowledge, einforcing the importance of clean water and a pollution-free environment.
The rationale of the project	This deals with understanding how to maintain the water quality of the Argeș river by focusing on forming and developing practical skills in students through: connecting theory with practice, solving real problems through a critical approach, and fostering responsibility for preserving water quality.
The outcomes of the project	The project's products include a poster, PowerPoint presentations, a model of the Argeș river valley, drawings or paintings of the river valley, tables, and graphs. All of these materials are presented in the form of a mini-exhibition showcasing the products created by the teams involved in the STE(A)M project
Human resources	Were involved The IX-a B, C geography teachers and students.
Didactic aids	Resources and tools used for the project include a textbook, internet access, laptos/computer a printer, sheets of paper, coloring materials, a Flip Chart, a video projector and LEGO pieces.
Methodological and digital resources	Digital tools (Google, You Tube), digital presentation
Needed time	One month
This project is a didactic unit within the "Waters of	A total of 58 students from 9th-grade classes B and C at

	the Earth" learning module. *Grade*: 9th grade. *Age group*: 14-15 years. *Location:* Outdoors, classroom, geography laboratory. *Project Implementation Forms*: Group, frontal, individual. *Core Subject*: Geography. *Related Subjects*: Biology, Physics, Chemistry, Technology, Engineering, and Mathematics (as shown in Table No. 1)	"Alexandru Odobescu" National College in Pitești were involved in the project. The geography teacher grouped these students into five teams, and each team chose its name based on the assigned task: Team 1 - Scientists; Team 2 - Technicians; Team 3 - Engineers; Team 4 - Artists; Team 5 - Mathematicians.
General description of the project:	The teacher will oversee the students' activities, monitor their progress and attitudes during the activities, and provide support when eve necessary.	According to Table 5, at the end of the project, the students will organize a mini-exhibition where they will present all the products they have created to the jury.
Form of activity	The assessment and evaluation of the students aim to ensure the correct and accurate development of the products.	Each team selects a representative who presents to the jury, in a 10-minute presentation, their experience and the process of creating the product using materials such as brochures, digital posters, Power Point presentations, Lego, video support, and recommendations on keeping water quality.
Presentation and evaluation of the products created, assessment of the team activities and experiences.	Appreciation and evaluation of the students aim at the correct and accurate elaboration of the products.	Each team appoints a representative who presents in 10 minutes, in front of the jury, the experience lived and the way to create the product through materials such as: leaflets, digital poster, presentation ppts video support, legand recommendations relating to preserving water quality.

Table 5. Forms of Learning

1. Science team
*Goal***:** Identifying water pollution based on direct observations from the riverbed. *Materials used:* Camera, mobile phone, laptop, internet, video projector.

Work procedure: Identifying and observing polluted areas with household waste in the riverbed of the Argeș river, in Pitești; Identifying the living organisms and their habitats affected by pollution; Noting the exchange of chemical elements between vegetation-soil-rocks-water-air, while observing the dependence and connection between inorganic and organic matter; Applying previous knowledge from chemistry, biology, geology, and geography regarding the chemical composition of water and organic matter; Taking pictures of polluted areas and, in the end, creating a poster that includes the images and information obtained through research.

2. Technicians team

Goal: Analyzing the components of a flowing water and the anthropogenic impact on it using a PowerPoint presentation.

Materials: Laptop, internet, video projector.

Work procedure: Using images created by the science team referring to the influence and negative effect of household waste on the river water, as well as on all geographical components of the affected areas; Developing a PowerPoint presentation with the collected data.

3. The team engineers

Purpose: Construction of the components of the Argeș river valley.

Materials: Lego pieces.

Procedure: The students' creation of the Argeș river valley based on research and data from various sources of Argeș county, using LEGO pieces, then the reasons for the choices made.

4. Artists team

Goal: Getting colleagues emotionally involved in the environmental condition of the polluted geographical area.

Used Materials: Drawing paper, colored pencils, watercolors, posters.

Work procedure: Creating a drawing or painting depicting the future of the Argeș river valley if measures are not taken to stop this water pollution and riverbed degradation.

5. Mathematicians team

Goal: Determining the surface area affected by pollution and the number of years required for the decomposition of household waste in the Argeș river bed, in the sector of the town of Pitești.

Materials: Paper, pencils, phone, calculator, laptop or PC, measuring tape, physical map of Argeș, and topographic map of Pitești.

Work procedure: Identify the predominant materials within household waste; Gather information on the time required for the decomposition of these wastes; Measure and calculate the surface area affected by pollution out of the total city area; Determine methods to combat pollution; Record the obtained results in a table, and create a graph based on this data.

5. Conclusions

In a performance and efficiency-oriented system, rote learning and mechanic cal memorization are ineffective. Understanding what we see or read improves our learning when we memorize in real-life situations. The emphasis has shifted towards practical, experiential learning that allows students to not only acquire knowledge but also understand its real-world applications. When students engage in active, problem-based, or project-based learning, they are better equipped to tackle complex issues, think critically, and apply their knowledge creatively.

Moreover, the use of diverse learning models underscores the importance of adaptability in education. No single model fits all situations, but by incorporating various approaches, teachers can create a well-rounded learning experience that caters to different learning styles and needs. This blend in teaching methods contributes to more holistic and effective learning outcomes, nurturing the skills and mindset required for the dynamic and evolving challenges of the modern world.

REFERENCES

1. Bocancea, V. (2021). *Exemplu de transpunere în practică a modelului invăţării experienţiale la fizică*. In: Materials of the *Republican Conference for Teaching Staff. Methodologies for Effective Learning in the Context of New Societal Challenges*. Vol. 6, February 27-28, 2021, Chișinău, Republic of Moldova: Tiraspol State University Printing House, 2021, 26-29. Available in IBN: March 22. [Online] https://ibn.idsi.md/vizualizare_articol/124896
2. Codreanu, I. Roșcovan, S. Axînti, S. (2010). *Geografie. Ghid de implementare a curriculumului modernizat pentru treapta liceală.* Chișinău: Cartier, 1st edition.
3. Cozma, M. (2020). *Learning models that allow learning to be oriented towards skills formation*. Preliminary version [online], [cited 07. 08. 2023]. Retrieved at: https://www.slideshare.net/marianacozma/modele-de-invatare#13
4. Deguet, J. Piolle, G.(2007). *Comment faire un TP ?.* Grenoble, Université Joseph Fourier, Preliminary version [online], [citat 10. 09. 2023]. Retrieved at: https://fr-academic.com/dic.nsf/frwiki/1657637
5. Dulamă, M.E. (2011). *Didactica axată pe competențe - Teorie și aplicații*. Edition 2. Cluj-Napoca: Presa Universitară Clujeană Publishing House.
6. Dulamă, M.E. (2009). *Cum îi învățăm pe alții să învețe - Teorii și practici didactice*. Cluj-Napoca: Clusium.
7. Guinepain, F. (2023). *Strategies for Teaching.* Accessed: August 8, 2023. Retrieved at: https://sti.ac-versailles.fr/IMG/pdf/03_-_strategies_pedagogiques.pdf
8. Ionescu, M. (2000). *Demersuri creative în predare și învățare.* Cluj-Napoca: Universitară Clujeană Publishing House.
9. Lungu, A., Volontir, N., Boian, I. (2012). *Geografie fizică generală. Manual de geografie pentru clasa a X-a.*. Chișinău: Universul.
10. Meiani, A. (2008). *Marea carte despre experimente*. Bucharest: Litera International Publishing House.
11. Neguț, S., Ielenicz, M., Apostol, G., Bălteanu, D. (2002). *Geografie fizică generală. Manual de geografie pentru clasa a IX-a*. Bucharest: Humanitas.
12. Okon, W. (1878). *Învățământul problematizat în școala contemporană.* Bucharest: Didactică și Pedagogică Publishing House.
13. Păun, E. (1991). *Noi dezvoltări în câmpul metodelor euristice de predare*. *Journal of Pedagogy, 2*, Bucharest.
14. *** Ministry of Education, Culture, and Research of the Republic of Moldova. (2020). *Goegrafie. Curriculum Naţional: Clasele 10-12 : Curriculum disciplinar: Ghid de implementare*, coordinators: Cutasevici, A., Crudu, V.

Lungu, C. Working Group: Beregoi E. (coordinator) [*et al*.]. Chișinău: Lyceum, 2020 (F.E.-P. "Central Printing House").
15. https://ro.sainte-anastasie.org/articles/psicologia/la-teora-de-los-estilos-de-aprendizaje-de-david-kolb.html, accessed on August 6, 2023.