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INTERDISCIPLINARY TEAM TEACHING: OPPORTUNITIES AND CHALLENGES

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ABSTRACT

The study presents the design and implementation of team teaching in high school geography classes and analyzes the students' opinions regarding this type of teaching approach. The didactic activity was carried out in the 9th grade, at the Earth's Atmosphere learning unit. The participants in this activity were high school students, a geography teacher and a physics teacher. The research findings highlight the advantages and challenges of team teaching and suggest ways to improve this approach.

Keywords: *interdisciplinarity, team teaching, curricular integration, Geography, high school level*

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INTRODUCTION

Modern didactics brings up the need to constantly adapt the teaching approach to provide students with in-depth knowledge and understanding of the surrounding reality so that they are prepared for the challenges of a dynamic society, they are easily adaptable to the changes around them and, at the same time, they can use these skills in different life contexts (Dulamă & Roșcovan, 2007). At the level of the educational process, this need can be met by implementing an integrated curriculum in the classroom (Dulamă, 2011). This concept is present in Western education systems and is becoming more visible in the attempts at curricular reform in the Romanian education system, also implying a paradigm shift in education (Dulamă, 2020). Curricular integration can be achieved on several levels of complexity, from simple inferences, and juxtapositions between disciplines at the level of notions, themes, and perspectives, to the total fusion between disciplines and the emergence of a new field of investigation.

Interdisciplinarity is an intrinsic component of the concept of curricular integration around which efforts to change the curricular paradigm in education are currently focused. Interdisciplinarity involves the creation of meaningful connections between themes or skills that are

usually formed disparately within different disciplines, allowing a broader, unified understanding of the processes and phenomena studied within different disciplines (Hansson, 1999, Ciolan, 2003, Chettiparamb, 2007, Casey 2010). In the instructional-educational process, elements of knowledge with new meanings for students are often conveyed, but without a direct link to their cognitive or action experience. Thus, it is necessary to establish a connection between the didactic transposition and the instructional-educational objectives, to introduce elements of relationship, explanation, and motivation, which are not directly attributed to the subjects studied but within the teacher's reach. Interdisciplinarity requires the establishment of integrative approaches by the teacher and not the imposition of an integrated curriculum where the integration process itself has already been established from the outside by the designers of the curriculum, textbooks, or activities (Lenoir & Hasni, 2016).

This approach differs from the multi-disciplinary approach, where subjects from several disciplines are taught in parallel (Dulamă, 2011), and from the transdisciplinary approach, where one discipline crosses subjects from another. Zaman and Goschin (2010) argue that the transdisciplinary approach crosses the boundaries of two or more disciplines, pursuing a holistic approach. Studying the many complex phenomena and processes occurring in the Earth's mantle requires a transdisciplinary approach (Dulamă, 2012) (e.g. pollution, global warming, population growth, alternative energy sources, globalization, and sustainable development).

Interdisciplinarity involves the transfer of methods from one discipline to another (Nicolescu, 1999), the intersection of curricular areas and interdependent content across disciplines, and the interaction between competencies (Dulamă, 2010a). Interdisciplinary techniques allow students to see different perspectives, work in groups, and synthesize disciplines as an end goal (Casey, 2010). Interdisciplinarity requires teaching-learning situations that are meaningful to students. The situation must be contextualized, and such a contextualization must necessarily be multi-dimensional, given that, to be understood the situation requires an interdisciplinary approach (Lenoir & Hasni, 2016).

It has been found that the interdisciplinary approach in teaching is more effective when this direction is reflected in real-life problem-solving and relating to the immediate surrounding reality (Chettiparamb, 2007). Thus, the application of knowledge takes precedence over acquisition and mastery of facts alone, activating a dynamic process of question posing, problem posing and solving, decision making, higher-order critical thinking, and reflexivity (Klein, 2005, Yarker & Park, 2012).

Interdisciplinarity has innumerable positive valences both in terms of students' understanding of scientific content and in terms of the values and attitudes it shapes: logical and critical thinking (Dulamă, 2004, 2008a), problem-solving ability, ability to understand phenomena in-depth, complex processes, development of scientific curiosity, imagination, etc. These benefits develop lifelong learning skills over time so that pupils 'learn how to learn' (Dulamă, 2009) by becoming independent individuals anchored in the surrounding reality (Duerr, 2008, Dulamă, 2010c).

Often the definition of interdisciplinary integrates team teaching as a technique in which teachers from multiple disciplines work with each other to design learning activities, instruct the class, and grade teams of students (Sandholtz, 2000, Casey, 2009, Murata, 2010). In interdisciplinary education, team teaching is required because solving a problem, addressing a question, or carrying out a project all require complementary processes, and cognitive contents from different disciplines (Applebee et al., 2007, Lenoir & Hasni, 2016). Team teaching encourages multiple perspectives, increases participation, and improves evaluation (Anderson & Speck, 1998, Gono & Moraes, 2023). The strengths of the team teaching component are that it incorporates new aspects into the curriculum and provides a chance to do interdisciplinary teaching (Sandholtz, 2000, Carpenter, Crawford & Walden, 2007).

Interdisciplinary approaches address themes, issues, and problems that belong to disciplines in different fields: humanities, social sciences, natural or life sciences. From this point of view, Geography, with its 'dual' character, both as a science of nature and society, has all the prerequisites for an interdisciplinary approach. Unlike other sciences that study relatively homogeneous objects (e.g., Physics - the relationship between mass/energy and the movement of bodies, Chemistry - the laws of transformation of chemical elements and substances, Biology - living organisms, etc.), geography studies a highly heterogeneous reality. Geographical reality consists of the integration of a very broad spectrum of physical, chemical, biotic, physic-chemical, biochemical, historical, demographic, economic, and cultural processes and phenomena, which combine on the Earth's surface to form the most diverse and original geographical structures. Although Geography is still perceived as an encyclopedic discipline among school subjects, aimed at ensuring the formation of a solid general culture, in recent years there has been an attempt to reconsider the status of geography by reaffirming its unitary character, especially in terms of the problems of the contemporary world, the methodology of investigating reality and the common approaches that Geography has with other disciplines of study (Skole, 2004, Ribeiro et al., 2016, Ivan & Glonți, 2019). Geography has evolved to be a discipline that actively pursues a diverse range of inquiries related to space, place, and interactions, especially the dynamics of interaction within and across spaces (Baerwald, 2010, Harshman, 2015).

Beyond how it is defined, theoretically described as a way of teaching, interdisciplinarity is understood and applied concretely in diverse and surprising ways, demonstrating once again the complexity and difficulties of operationalizing this concept, on the one hand, and the innovative potential generated by dialogue between disciplines, on the other.

Research objectives

Starting with these findings, in this study we proposed the following objectives: a comparative analysis of curricular documents in Romanian high schools to identify common elements of content, concepts, or methods that support the need for an interdisciplinary approach in geography classes; designing a lesson plan from an interdisciplinary perspective using team-teaching as a teaching technique and implementing the lesson plan in a Geography class; analyzing the students' opinions on the lesson taught using the didactic partnership, as well as the challenges faced by the teachers involved.

METHODOLOGY

Participants. The team-teaching lesson design was implemented in a 9th-grade Geography class, with 22 students, from a high school in Timișoara, Romania. The teaching team consisted of the geography teacher, who is one of the authors of the study, and the physics teacher. All participants agreed to use the scientific research results obtained from interpreting the answers from the questionnaire and the interview.

Instrument. To analyze the students' opinions on the lesson taught using the interdisciplinary didactic partnership, they filled in an online questionnaire at the end of the lesson, using Google Forms. The questions included in the questionnaire were both open and closed questions, to which the students could answer only using the pre-defined options. Among the open questions we exemplify the following: Do you think that this type of lesson (in partnership) helps you to better understand the topics covered in Geography classes? How often would you like to participate in such lessons during a school year? From which other subjects do you think we could invite teachers to Geography (teaching) classes? The closed questions were formulated to get feedback from students on how they perceived such a lesson overall (challenging, engaging, tiring, boring), on the learning tasks (accessible, confusing, suitable to their level of understanding), and the interaction between teachers and students during the lesson.

A semi-structured interview was also conducted with each member of the teaching team to identify the challenges they faced during the class, how they managed to harmonize their teaching styles, the unexpected situations, the strengths and weaknesses of team-teaching, and the ways to practice and improve the team-teaching technique.

***Procedure*.** This research was organized based on the following steps: the analysis of high school curricula (MEC, 2004, 2006, MECI, 2009) to identify the links between Geography and other disciplines to justify interdisciplinary team teaching. Thus, there were identified similar general competencies, values and attitudes, and content elements with interdisciplinary potential.

Forming an interdisciplinary team of two teachers (Geography-Physics), designing a team-teaching lesson plan and its implementation in a 9th-grade Geography class. The design of the Geography-Physics team teaching lesson took into account the common competencies and contents in the curricula of the two subjects (MEC, 2004a, 2004b). When choosing a partner teacher, some experience in this type of approach was important.

Elaborating the questionnaire for students and its filling-in at the end of the lesson to obtain feedback from them. Conducting a semi-structured interview with the teachers involved.

RESULTS

1. Results of analysis of Curriculum documents: a prerequisite of the team teaching approach

In Romanian current curriculum vision, Geography is part of the Man and Society (ManSo) curriculum area which groups disciplines with a strong connection from a social perspective, namely History, Economics, Sociology, Religion, Psychology, and Philosophy. There are direct references to the acquisition of social, civic, and entrepreneurial skills through the study of these disciplines (Dulamă, 2010a). However, a deeper understanding of natural geographical processes and phenomena requires links with several subjects in the Math and Sciences (MathSci) curriculum area, namely Biology, Chemistry, and Physics.

A comparative analysis of the skills developed in Geography and the subjects of the two curricular areas shows that some of them are oriented towards environmental issues and the use of knowledge in a variety of contexts drawn from real life (Dulamă, 2010b, 2010c). Also, the sets of values and attitudes related to the formation of the student's personality, with interdisciplinary connotations, concern: respect for the environment; problem-solving based on previous learning experiences using methods, concepts from different subjects; awareness and involvement in issues of global interest; critical thinking; tolerance of ethnic, confessional, cultural diversity, scientific curiosity (MEC, 2004, 2006, MECI, 2009). The subjects identified that form competencies, values, and attitudes similar to Geography at the high level are History, Economics, Sociology, Physics, Biology, and Chemistry (Table 1).

The selection of geographic content that can be interdisciplinarily tackled is a laborious process because it involves identifying in the high school curricula of subjects' ideas, concepts, laws, and theories that can be transferred and used in Geography classes, thus creating bridges between Geography and these disciplines.

Table 1

Common competencies, values, and attitudes formed in Geography and the subjects of the ManSo and MathSci curricular areas at the high level

Subject	Curricular area	General competencies	Values and attitudes
Geography	ManSo	1. "Relating significant elements of society, science, and technology to the environment as a whole and its component systems" (MEC, 2004a); 6. "Acquiring social, interpersonal, intercultural, civic, and entrepreneurial skills based on the study of geography" (MEC, 2004a).	"Positive attitude towards education, knowledge, society, culture, and civilization (MEC, 2004a); "Respect for natural and human diversity. Conservation and protection of the living environment" (MEC, 2004a).
History	ManSo	5. "Use historical sources of appropriate historical methods and techniques for problem-solving" (MEC, 2004d).	"Positive relationships with others. Assuming ethnic, religious, and cultural tolerance" (MEC, 2004d).
Economics	ManSo	1. "The use of concepts specific to the social sciences to organize approaches to knowledge and explanation of facts, events, and processes in real life" (MEC, 2006b).	"Rationality in the use of resources. Active and responsible economic behavior" (MEC, 2006b).
Sociology	ManSo	"The use of concepts specific to social sciences to organize approaches to knowledge and explanation of facts, events, and processes in real life" (MEC, 2006c).	"Spirit of observation and interest in objective knowledge of a sociological type" (MEC, 2006c).
Physics	MathSci	1. "Understanding and explaining physical phenomena, technological processes, and the operation and use of technical products encountered in everyday life" (MEC, 2004b); 4. "Protecting oneself, others, and the environment" (MEC, 2004b).	"Caring for yourself, others, and the environment" (MEC, 2004b).
Biology	MathSci	5. "Transfer and integration of biology-specific knowledge and working methods in new contexts" (MEC, 2004c).	"Caring for yourself, others, and the environment; Interest in applying knowledge of biology in everyday life" (MEC, 2004c); "Involvement in solving problems of global interest" (MEC, 2004c).
Chemistry	MathSci	1. "Explanation of phenomena, processes, and procedures encountered in everyday life" (MECI, 2009); 5. Evaluate the consequences of processes and the action of chemicals on oneself and the environment (MECI, 2009).	"Caring for yourself, others, and the environment" (MECI, 2009).

Note. For the subjects mentioned, general competencies, values, and attitudes have been selected from the school curricula for the high level (Source: www.edu.ro).

The Geography curricula for 9th and 10th grades (MEC, 2004a) are part of a cohesive system for lower high education, concentrating on the analysis of both natural and human environments (Physical Geography and Human Geography), which aims to be synthetic and open up new horizons for further education. The Physical Geography concepts studied in the 9th grade provide interdisciplinary cognitive bridges with the subjects in the MathSci curriculum area, in particular with Physics (physical properties of the Earth, genetic factors of climate, determinants of water circulation in nature, etc.), Chemistry (chemical substances in the Earth's crust, chemical processes in shaping the Earth's crust, chemical elements in the composition of the atmosphere, chemical/mineralogical characteristics of groundwater, the salinity of ocean waters, chemical pollutants of the atmosphere, soil, etc.), Biology (abiotic and biotic geo-ecological factors, biocenosis/biotope/biome/ecosystem) and Mathematics (calculating time on the globe, measuring distances on the map by applying mathematical formulae).

The 10th-grade Geography curriculum (MEC, 2004a), focusing on Human Geography, involves an approach to information in the social domain, both spatially and developmentally, highlighting the need for interrelationships of Geography with the ManSo disciplines in particular. Issues such as urbanization and the urban explosion, industrialization and exploitation of resources, population explosion, and analysis of the carrying capacity of the environment provide the student with the opportunity for integrative explorations and investigations, involving numerous interferences of Geography with History, Economics, and Sociology.

Compared to the General Geography studied in lower high school, the 11th-grade curriculum (MEC, 2006a) focuses on the issues facing contemporary society (deforestation, desertification, and pollution; regionalization and globalization; contemporary geodemographic developments; resource management; economic development and sustainable development; current global economic and geopolitical frameworks, etc.) aiming to achieve a system of general and specific competences linked to other competencies of the ManSo curriculum area, but also of MathSci. Geographical contents have an obvious interdisciplinary character, with many content and methodological interferences especially with History and Economics.

The content of the 12th-grade curriculum (MEC, 2006a) builds on the skills developed in the lower cycle, with a particular emphasis on those gained in the 11th grade. The structure of the subject emphasizes its integrative character through analyses carried out at various scales within the Europe - Romania - European Union system. In dealing with topics such as the evolution of the settlement system in Europe and Romania, the political map of Europe; the formation of the European Union and the evolution of European integration; specific features of the economy of Europe and Romania; internationalization and globalization from a European perspective, etc., disciplinary interconnections with History and Economics can be made.

Thus, there could be identified many geographical topics which can be taught in interdisciplinary teaching partnerships

2. Designing a lesson plan using team teaching

The lesson plan was designed using a Geography-Physics team teaching approach aimed the reinforcing basic meteorological concepts in the Earth's atmosphere learning unit. This lesson aimed to facilitate students' better understanding of the physical phenomena occurring in the Earth's atmosphere through a joint approach from the perspective of the two disciplines.

Team lesson designing was important in ensuring the success of the lesson. Thus, in the lesson preparation stage, discussion sessions took place between the Geography teacher and the Physics teacher to identify the specific skills targeted, to choose the optimal teaching strategy, and to determine the interventions of each teacher and when they take place to ensure coherence and logic in the teaching scenario. Particular attention was paid to time resources by determining the duration of each moment of the lesson.

The specific competencies were selected from the 9th-grade Geography curriculum, in close relation with the contents of the learning unit "Earth's atmosphere", but also with the competencies formed in Physics, to maintain the interdisciplinary character, as follows: “1.1 use of specific scientific and disciplinary terminology (concept, notions) to present relevant information; 3.2 observing sequences of natural phenomena and processes; 4.1 reading and interpreting graphical and cartographic information; 5.4 use simple methods and techniques, specific to different scientific disciplines, to analyze elements of the climate, hydrology, and biogeography” (MEC, 2004a, p.7).

Through the designed learning activities, the Physics teacher tried to make connections between the content covered in the Geography class and the student’s previous learning experiences in the Physics class about fluid statics (pressure, hydrostatic pressure, atmospheric pressure, Charles' law, etc.). Thus, a series of experiments appropriate to the designed learning situations were integrated into the lesson (Table 2).

Table 2
Teachers' interventions during the class

Lesson Stages	Geography teacher	Physics teacher
Getting attention	Introduces students to the topic of the lesson; specifies the lesson's goals.	Explains to students his role as a facilitator in making connections between Physics and Geography in understanding the concepts
Updating of previous knowledge	Ask the class to define atmospheric pressure and specify an instrument for measuring it.	To demonstrate the existence of atmospheric pressure, he suggests an experiment using a glass of water which he turns upside down, showing that the water remains in the glass as a result of the air pressure from outside. Shows the working principle of the Torricelli tube with a schematic drawing
Conducting learning	Explains the formation of areas of high atmospheric pressure (anticyclones) and areas of low atmospheric pressure (cyclones) and how they influence the weather. Presents the elements of a synoptic map and marks the main baric centers acting on Europe. Ask the class to identify the baric centers acting on the territory of Romania.	Presents the second experiment to remind the students of the link between air volume and temperature (Charles' law). Suggests the third experiment to explain hydrostatic pressure to students. Explains the relationship between temperature, density, altitude, and pressure.
Ensuring retention and transfer	Suggests to students a Kahoot game, designed together with the Physics teacher	

3. Students' opinions on team-teaching class

The last step of the research consisted of administering a questionnaire to the students to find out their opinions about team teaching to identify the strengths and weaknesses of this teaching approach. For all the students the teaching approach has been unknown.

Most students described the geography lesson as exhilarating (59.1%), because they had to use the information in different contexts, and challenging (31.8%) because they had to make complex connections between the two subjects to understand the issues in depth. 9.1% of students found Geography class tiring, due to the greater volume of information conveyed during the class

and the high level of concentration and attention required to follow the transitions from one subject to another. None of the students characterized the class as boring (Table 3).

In terms of how the lesson was organized and the learning activities carried out, 77.3% of students found the lesson accessible as the information was adapted to their level of understanding, 32.7% felt that the lesson was too fast-paced, moving quickly from one idea to another, and only one student found the lesson demanding.

Table 3
Students' responses regarding team teaching class

Items		N	%
Geography class with a guest teacher was	exhilarating	13	59.1
	challenging	7	31.8
	tiring	2	9.1
	boring	0	0
Depending on how it was conducted, the class was	accessible	17	77.3
	confusing	0	0
	fast-paced	5	32.7
	demanding	0	0
I liked geography class because	the topics covered were interesting and diverse	7	31.8
	the teaching-learning activities were attractive	13	59.1
	I didn't like it	2	9.1
During class, teachers encouraged discussion	at all time	7	31.8
	at certain times	15	68.2
	no	0	0

The reasons why students liked the lesson were diverse: 59.1% found the teaching-learning activities presented by the two teachers attractive, and 31.7% said the topics were interesting and diverse. Only 2 students did not like this way of teaching. The students appreciated that they were engaged in discussions during the lesson: 31.8% of the students mentioned that they were encouraged all the time and 68.2%, only at some moments of the lesson. 90.9% of students felt that the team-teaching approach used during the class helped them to better understand the issues addressed in the Geography lesson and 95.4% of students would like to participate in this type of lesson again. The majority of students (72.7%) consider it appropriate to have a team-teaching class in every learning module or at least once or twice a school year (13%).

Also, to the question "From which subjects could we invite teachers to Geography classes?", students mentioned teachers of Chemistry, Biology, Economics, and History.

DISCUSSION AND CONCLUSIONS

This paper presented a model of interdisciplinary team lesson planning for a class on Geography and analyzed students' feedback on the lesson to highlight the challenges and opportunities of such an approach. The advantages of this teaching technique have been demonstrated by numerous studies that have analyzed interdisciplinary experiences in schools (Anderson & Speck, 1998, Shibley, 2006, Harshman, 2015, Ribeiro, Monteiro & Costa, 2016, Tonnetti & Lentillon-Kaestner, 2023). Putting students in learning situations where they have access to the guidance and explanations of two or more teachers, in the same class, is an element with the potential to stimulate interest in learning (Lattuca & Voigt & Fath, 2004), to contribute to the development of multiple intelligences (Dulamă, 2007b).

The multiple perspectives that teachers offer, the dynamics of the discussions, and the interactive nature of lessons can become a source of intellectual and cognitive stimulation for both students and teachers (Anderson & Speck, 1998). Moreover, the fact that, following the application of the feedback questionnaire regarding the lesson, 60% of the students considered the Geography lesson engaging and more than 30% challenging, leads us to affirm that this teaching method arouses curiosity and, thus, can contribute to increasing motivation for learning. Undoubtedly, this is not possible without designing diverse, interesting learning activities, adapted to the level of understanding and previous learning experiences of the students (Dulamă, 2008b), and good organization of the lesson by the members of the teaching team. The results of this study showed that about 80% of the students found the lesson engaging, with interesting and diverse topics.

Also, it is important to the relationship of trust between teachers and students built over time during the classes of each member of the teaching team, and the fact that the two teachers have accustomed their students to the introduction of elements of interdisciplinarity in their classes, with work tasks based on collaboration between students, and their involvement in investigative approaches. They have created a climate in their classes where ideas are developed, opinions are freely exchanged, and students are exposed to different experiences, values, and sources of information.

The success of team teaching is influenced by several factors, such as the degree of compatibility between the team members determined by their background, personality, and beliefs (Perry & Stewart, 2005), the attention paid to the lesson's design, the clear setting of each teacher's interventions.

Compatible teachers can work together harmoniously, trust each other, and embrace similar views and values about teaching and the teacher-student relationship. This does not mean that teachers necessarily have the same teaching style; on the contrary, different teaching styles encourage students to engage in discussions (Van Orman & Van Orman, 1966). Moreover, when students notice that teachers complement and support each other, and accept each other's ideas and interventions, they can adopt a positive attitude towards team-teaching approaches, and can more easily accept the elements of diversity and novelty around them. Partnerships sometimes simply cannot work because of the teachers' personality. You can't put an extremely flexible person with a rigid person, because a flexible person always wants to do things, change things, create things at the last minute, and this can affect the initial plan that the two teachers had for the smooth running of the lesson (Stewart & Perry, 2005).

The main challenge for teachers, however, remains the organization of a team-teaching lesson. The idea of having more than one instructor in the classroom can create problems, especially in terms of task-sharing, if there is not good coordination of tasks (Casey, 2009, Yarker & Park, 2012, Decuyper et al., 2023). This stage was the most time-consuming and also the most difficult, as it involved meetings and discussions on the subject of the lesson to identify common and/or different points of content between the two subjects. Thus, the first stage aimed at a comparative analysis of the 9th-grade Geography and Physics curricula. Following the curricular analysis, the objectives were set, the time allocated to each activity was carefully calculated, and the role and interventions of each teacher were determined. If these elements of the lesson are not properly calibrated, there is a risk that the lesson may become tedious, students may have difficulty following the steps of the lesson, may become confused by a too fast-paced dynamic or an onslaught of information coming from multiple sources, all leading to demotivation and poor engagement in the tasks. Also, if activities are not designed correctly, miscommunication can hinder learning and engagement due to potentially mixed messages (Casey, 2009).

Each teacher's interventions were carefully chosen, relevant, and dosed in terms of duration so that the communication was effective and the message was correctly received by the students. Thus, the Geography teacher had the task of introducing the students to the subject of the lesson

and presenting theoretical notions related to the physical processes taking place in the earth's atmosphere and their effects. The theoretical notions were fixed by the punctual intervention of the Physics teacher who, with the help of experiments, demonstrated to the students the presence of certain physical forces and their mode of action (atmospheric pressure, hydrostatic pressure, properties of a column of hot air and a column of cold air). The scientific content was synthesized and structured to avoid overload with irrelevant information, and teachers often drew on students' prior knowledge during the lesson. Although at the beginning of the lesson the students showed some reluctance towards this way of teaching, because, while not being familiar with team teaching, they did not fully understand the necessity and relevance of this partnership, but as they realized that they have a lot of knowledge and skills acquired in Physics classes, which can be used in different contexts, they engaged with interest in the suggested learning tasks. It is therefore important that students understand the purpose of this teaching approach and accept it as something useful in their training, to which they bring their own contribution. Following students' feedback, it was found that only 2 students did not give positive feedback on this experience.

Team teaching was also a professional challenge, for both team members. Until the initiation of the partnership, their experience was limited only to the few teaching partnerships between subjects within the same curriculum areas, ManSo (Geography-History, Geography-Economics) and MathSci (Physics-Chemistry), where the topics that can be tackled interdisciplinary are more obvious. On the other hand, identifying themes common to subjects from different curricular areas is more difficult, given the poor correlation between curricula.

Even if lessons delivered through teaching partnerships seem complicated to design and implement, practicing teaching using this technique can help overcome some of the obstacles and refine the strategy. All these require personal effort, and a desire to improve and innovate one's teaching approach.

Unfortunately, there is little support in schools for developing interdisciplinary approaches in the classroom and for training teachers' skills in this area (Fidalgo-Neto et al., 2014). This is why there is a need for the coagulation of learning communities among teachers in schools, where they could have the opportunity to share their experiences, discuss common problems, and find solutions together to make teaching more effective.

In conclusion, team teaching is a particularly valuable educational practice that supports both the professional development of teachers and enhances the learning experience of students. Its characteristics, such as collaboration between teachers, integrated curriculum approach, adaptability, and focus on the individual needs of students, make this method a powerful tool for quality education. In the context of contemporary education, this model continues to evolve, and emerging educational research and practice will likely bring new dimensions to its application.

* *All authors contributed equally to the development of this study*.

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