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SCHOOL TEXTBOOKS AND THE STUDY OF INDUSTRIAL GEOGRAPHY IN LOWER SECONDARY EDUCATION IN ROMANIA

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ABSTRACT

The first part of the article outlines the place of industry in Romania's official curriculum, starting with early education, continuing through primary education in subjects such as Mathematics and Environmental Exploration, Science, and Geography, and ending with secondary school Geography. The second part of this article suggests learning activities aimed at raising students' awareness of errors in 8th-grade geography textbooks and developing both transversal skills (researching, analyzing, interpreting, and evaluating data, as well as investigating) and geography-specific competencies.

Keywords: secondary school, learning activities, competencies, territory, industrial branches, scientific research

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INTRODUCTION

The primary information about natural resources and their industrial processing is introduced to children in Romania through official contexts in preschool education, within the "Man and Society" domain (Dulamă, 2010b, 2011; Ministry of National Education, 2019). In primary education, during the preparatory year, first grade, and second grade, within the subject "Mathematics and Environmental Exploration" (Ministry of National Education, 2013), students expand their knowledge about natural resources and their processing. In third grade, under the subject "Natural Sciences," the curriculum includes the study of the topic "Natural Resources" (Ministry of National Education, 2014a). In the fourth grade, within the "Geography" subject students learn about certain "natural characteristics, resources, and economic activities" in the region of their local horizon (Ministry of National Education, 2014b, p. 8). Meanwhile, under the "Natural Sciences" subject they analyze aspects related to "Environmental Protection" (Ministry of National Education, 2014a, p. 10).

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In secondary school, under the subject "Geography," only soils are studied in 5th grade, as natural resources. In 6th grade, the curriculum includes the topics: "Natural Resources and Their Exploitation," "Economic Activities on Earth: Agriculture, Industry, Services (General Characteristics)," and "The Impact of Human Activities on the Environment and Quality of Life" (Ministry of National Education, 2017, p. 8).

As part of the unit "Europe - Geographical Identity," the topic "Economy: Natural Resources and Their Use; Economic Activities: Agriculture, Industry, Services" is also covered (Ministry of National Education, 2017, p. 11). In the 7th grade, students explore economic topics on two continents: Asia ("Natural Resources, Economic Activities, Regional Economic Contrasts") and North and South America ("Regional Economic Differences") (Ministry of National Education, 2017, p. 15).

In the 8th grade, the curriculum on Romania includes the topics "Natural Resources and Industry: Natural Resources and Their Exploitation; The Energy and Electric Power Industry; The Machinery Manufacturing Industry" (Ministry of National Education, 2017, p. 19). It also requires "Practical Applications/Case Studies: Economic Activities in the Local Area/County; Exploitation of Alternative Energy Resources" (Ministry of National Education, 2017, p. 19).

As part of the methodological suggestions, the school curriculum identifies the "economic dimension" as one of the "main dimensions targeted through the Geography subject", which should be achieved "by presenting characteristic economic systems and particularities" (Ministry of National Education, 2017, p. 21). However, an analysis of the suggested learning activities within the curriculum shows that there are no examples specifically related to the study of industry.

The analysis of these official documents reveals a fragmented and incoherent approach to studying natural resources and industry, which hinders students' understanding of industry, its branches, and the connections between resources, raw materials, and the products derived from industrial processes. Works on the didactics of geography emphasize the importance of understanding the modern world from a systemic perspective, leading to accurate representations to facilitate optimal adaptation, as well as the efficient and balanced use of resources (Dulamă, 2011).

Over the past two decades, geographers have shown limited interest in studying the status of Romania's industry. In geographic studies, industry is presented alongside other branches of the economy (Efros, 2002), in relation to territory (Groza, 2003), as part of its historical evolution alongside the history of technology (Atanasiu, 2020), and as a standalone subject (Paraschiv et al., 2020). Deacu (2018) addressed the causes, consequences, and perspectives of deindustrialization, using Romania's mining industry as a case study. Dumitrescu (2008) analyzed the industrialization and economic decline of mono-industrial cities in Romania. A series of studies have focused on narrower themes related to Romania's industry, such as the past and present of the wood industry (Paraschiv, 2021), a new economic paradigm for industry (Paraschiv, 2021), fake news related to industry (Paraschiv & Voicu, 2022), tradition, continuity, and industrial resilience in the city of Sebeș (Paraschiv, 2024), and industrial resilience (Paraschiv, 2025).

The deindustrialization process has also impacted major cities in Romania, with the environmental and urban landscape changes caused by the closure of factories and industrial plants, as well as urban regeneration processes, becoming compelling subjects for researchers (Ilovan et al., 2019a, 2020a). Changes in Romania's urban and industrial landscapes during the post-Communist period have been studied by research teams (Ilovan et al., 2020c; Dulamă et al., 2012, 2013) and visualized through digital mapping (Ilovan et al., 2019b). In large urban centers, urban regeneration has incorporated creative solutions (Ilovan et al., 2020b, 2020e; Conțiu & Conțiu, 2023, 2024), such as converting a brush factory into an art center (Ilovan et al., 2020d) and transforming former industrial halls into recreational and leisure spaces (Ianoș et al., 2013). However, certain interest has been revealed in research on representations of territorial development, especially industrial, and the connection of these representations with communist propaganda and education during socialist Romania (Ilovan, 2021, 2022a, 2022b, 2024, 2025; Ilovan & Merciu, 2021; Ilovan & Sabău, 2022).

Students' understanding of Romania's geographical space in geography lessons involves learning about the process of deindustrialization, represented by the closure of production centers, their demolition, and the repurposing of those sites. It also includes the process of industrialization or reindustrialization,

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characterized by the establishment of new factories, plants, and industrial complexes, the development of industrial parks, and the reduction of greenhouse gas emissions (Paraschiv, 2021).

The study of industrial geography should encompass the identification of extraction and production centers (Dulamă, 2010c; Ilovan, 2007), examining the advantages and disadvantages of each location (Ilovan, 2006a). It should also include analyzing and explaining industrial phenomena or processes as part of a production chain (Dulamă, 2010a, d), understanding the impact of industry on the environment and human society (Dulamă, 2010b; Dulamă & Roşcovan, 2007; Ilovan & Mutică, 2024), and exploring strategies for sustainable development (Ilovan, 2006b, 2006c, 2013).

An analysis of the Romanian literature review reveals a limited interest from researchers in studying the industry at a national scale, which would highlight its many transformations and provide a current, comprehensive overview. The existence of fragmented studies and the absence of significant works on industrial geography relevant to Romania's industrial context are reflected in the content of geography textbooks for secondary and high school education (Dulamă, 2009) and in the official framework for developing geography competencies (Dulamă & Ilovan, 2013).

The analysis of the initial test results for 9th-grade students (110-135 students per year) at the Technological High School of Tourism Economics in Iași, conducted during the 2019-2024 school years, reveals that 46-53% of students lack basic foundational knowledge (scoring below 50% on items targeting these concepts), while 13-27% of students exhibit no knowledge at all (zero correct answers) after completing the "Natural Resources and Industry" unit in the 8th grade. These outcomes reflect the influence of geography teaching practices and student learning, both of which are shaped by the content of school textbooks.

An analysis of the 6th-grade geography textbook (Fiscutean et al., 2018a) by Mărculeţ (2018) highlighted errors in the text and visual materials (maps, diagrams), including incorrect information, misclassified data, inaccurate definitions (e.g., "hamlet"), and poorly worded statements. Following these observations, a second edition of the textbook was published (Fiscutean et al., 2018a).

Building on this analysis of the literature, along with our own observations of the content in geography textbooks regarding industry and natural resources, and considering that this topic is not among the favorites for geography teachers and students, this article aims to provide geography teachers with examples of learning activities. These activities are designed based on the issues identified in 8th-grade geography textbooks and the recent changes in Romania's industry.

METHODOLOGY

Research material

The content (lesson texts, illustrations, tests, and practical applications) of the learning units "Natural Resources and Industry" and "Natural Resources and Their Use" from the three alternative geography textbooks for the 8th grade, approved and published in 2020, were analyzed. These textbooks are as follows:

Mărculeț I., Popescu, M., Lungu, M., & Mărculeț, C. (2020). Geografie - manual pentru clasa a VIII-a [Geography - Textbook for 8th Grade]. Editura Didactică și Pedagogică.
Neguț S., Rădulescu, C., & Popa I. (2020). Geografie - manual pentru clasa a VIII-a [Geography - Textbook for 8th Grade]. Editura Art Klett.
Săndulache, C., Rașcu, M., & Săndulache, I. (2020). Geografie - manual pentru clasa a VIII-a [Geography - Textbook for 8th Grade]. Editura Sigma.

Additionally, I also analyzed the items included in the tests aimed at evaluating the knowledge and competencies of eighth-grade students in a paper published in 2016:

Cheval, D., Șerban L., Dincă C., Paraschiv V., & Enache I. (2016). Teste de geografie pentru gimnaziu - clasa a VIII-a [Geography Tests for Secondary School - 8th Grade]. Editura Didactica Publishing House.

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Data Analysis and Interpretation

Content analysis was the primary method used to evaluate the lesson texts, exercises, problems, and other practical applications in the textbooks and test collections, aiming to assess their quality and identify incorrect or irrelevant information. The analysis focused on the structure of the textbooks and the integration of the two learning units into their framework, the accuracy and rigor of scientific data, the relevance of the information and illustrative materials, as well as the context provided by the textbooks to facilitate the development of general and specific competencies associated with the learning units targeted in the research.

Visual analysis was employed to evaluate maps, diagrams, schematic drawings, and photographs in the four materials mentioned.

The results of these analyses serve as a foundation for designing learning activities.

RESULTS AND DISCUSSIONS

Since the textbook is a key tool for students (Iacubițchi, 2001), enabling them to achieve learning (Cristea, S., 2001), and given that it serves an informational function (Dulamă, 2008), students should view it as a reliable source. However, some students express dissatisfaction with textbooks (Cristea, N., 2001). An analysis of the learning units in the three textbooks reveals that much of the information about the location of industries and production centers is, in some cases, inaccurate or unrepresentative. As a result, certain elements of the textbooks inaccurately reflect the current state of scientific research, and the content only partially meets the requirement for scientific accuracy and relevance (Dulamă, 2008).

To support students in developing the general competency "4. Designing an investigative approach for lifelong learning and everyday life" and the specific competencies "4.1. Conducting an investigative approach," "4.2. Analyzing elements, phenomena, and processes from directly or indirectly observed reality," and "4.3. Comparing spatial systems and structures based on a given algorithm" (Ministry of National Education, 2017, p. 21), students can be assigned tasks that require them to analyze and evaluate information from both textbooks and online sources to determine whether it is accurate or false. These tasks help students practice and enhance their critical thinking skills (Dulamă, 2004, 2007).

An example of such a task that can be proposed to students is presented in Table 1.

Task: Look at the maps in the geography textbooks showing the location of Romania's underground resources. Search the internet for information about the deposits and their exploitation mentioned in Table 1, and suggest their status in the second column, either as of 2020 (the year the textbooks were published) or the present.

Table 1

The information from the textbooks and the information available online about certain deposits

Textbook information	Reality
Brown coal deposits in the Comănești Depression, Brad Depression (Țebea-Mesteacăn), Almaș Basin	Economically exhausted deposits; mining operations have been closed for over 25-30 years
Hard coal and brown coal deposits in the Banat Mountains	Closed during the 1990s-2000s
Hard coal and brown coal deposits in the Petroșani Depression	Partially closed; still partially operational
Iron ore deposits in the Poiana Ruscă Mountains	Mining operations closed more than 25-30 years ago
Manganese deposits in Delinești (Semenic Mountains)	Depleted for over a century
Iron ore deposits in the Dognecea Mountains	Depleted, mines closed
Copper deposits in Moldova Nouă-Sasca Montană	Closed, mines rehabilitated
Copper deposits in northern Dobrogea	Closed, mines rehabilitated
Deposits in the Obcinele Bucovinei	Exploited through open-pit mining (Mănăila)
Deposits in the Apuseni Mountains	Exploited through open-pit mining (Roșia-Poieni)

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By analyzing the information provided in textbooks and conducting online research regarding the accuracy and relevance of the data in school textbooks (Neguț et al., 2020; Săndulache et al., 2020; Mărculeț et al., 2020), students should identify the relationship between underground resources and their exploitation. They should understand that not all written information is accurate, including what is found in textbooks, and should verify it through additional sources, including discussions with their teachers. Geography teachers should ensure that only accurate information is used in lessons (Dulamă, 1996).

For coal, ferrous, and non-ferrous ore deposits mentioned in textbooks (both in texts and maps), students should develop their geographical thinking (Dulamă, 1996) by learning to answer key questions: Do these deposits still exist, or have they been fully exploited? Why are they no longer being exploited? How economically viable was the exploitation of these resources? If these deposits still exist, would their exploitation be economically viable today?

Students can also be assigned a similar task to investigate the current state of industrial units in Romania referenced in the 8th-grade geography textbooks.

Task: Look at the maps in the geography textbooks that show the locations of industries and production centers. For the "processing centers" listed in Table 2, search the internet for information and indicate their status in the second column, either for the year 2020 (the year the textbooks were published) or for the present.

Table 2

The information in the textbooks and the information found online about certain "production centers."

Textbook information	Reality
The oil factory in Iași	Demolished
Non-ferrous and gold-silver ore processing centers in Baia Mare and Copșa-Mică	
Non-ferrous and gold-silver ore processing center in Zalău	Closed, partially demolished
Steel plant in Zalău	
Cement factory in Bicaz	Never existed (possibly confused with the non-ferrous plant in Zlatna, now decommissioned – brownfield industrial site)
Footwear factory in Suceava	
Stânca-Costești hydropower plant on the Prut River	It is the "Silcotub" steel pipe factory, part of the "TenarisSilcotub" group (Italy), producing around 250,000 tons of seamless steel pipes annually (2020–2022), using steel from the Călărași Steel Plant, part of the same industrial group

By conducting online research regarding the accuracy and relevance of information found in school textbooks (Neguț et al., 2020; Săndulache et al., 2020; Mărculeț et al., 2020), students should identify incorrect information (e.g., "steelworks" in Zalău, "footwear factory" in Suceava), information that does not reflect the current situation in Romania (e.g., factories that have been demolished: the oil factory in Iași, the "cement factory in Bicaz," the non-ferrous and gold-silver ore processing centers in Baia Mare and Copșa-Mică that have been closed), possible confusions (e.g., the non-ferrous plant in Zalău instead of the one in Zlatna; "footwear factory in Suceava" instead of the one in Vicovu de Sus, Suceava County), and irrelevant information (e.g., the Stânca-Costești Hydroelectric Power Plant on the Prut River, which is insignificant in terms of installed capacity compared to hydroelectric plants on rivers such as the Someșul Mic, Râul Mare, or Sebeș).

The main purpose of this activity is not for students to memorize the locations of specific factories but to develop key competencies, such as the ability to search for information from multiple sources (Conțiu & Conțiu, 2023), analyze data (enhancing analytical thinking) (Cîineanu et al., 2023), and critically evaluate information from different sources (developing critical thinking) (Dulamă, 2004, 2007). In this way, students learn to think geographically (Dulamă, 1996) and work independently (Roșcovan & Niculiță, 2018), like

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scientists. These skills, as well as others (Andronic & Balmuş, 2013), can also be developed through assignments that involve analyzing coal exploitation in mines and open-pit operations, as well as salt extraction.

Task: Look up information, photos, and maps online about lignite mining in the Motru-Rovinari basin, Gorj County. Compare surface mining (open-pit extraction) with underground mining. Check the accuracy of the information in Table 3, and update or correct it as needed. Select photos, illustrations, and block diagrams that showcase all aspects of lignite extraction, transportation, and storage.

Table 3
Comparative Analysis of Coal Mining

	Surface Mining/Open-Pit Extraction	**Underground Mining/In Mines**
Mining description	Removing the layers above the coal seams Extracting coal using large-scale excavators Transporting coal via conveyor belts Depositing waste materials in dumps Conducting maintenance and ecological restoration activities	Constructing horizontal galleries and vertical extraction shafts Extracting coal using smaller machinery Transporting coal through galleries with small carts Storing waste materials in dumps Carrying out maintenance and ecological restoration work
Advantages of mining	Utilizing large machinery Higher productivity levels Lower technological risks	Minimal impact on the landscape
Disadvantages of mining	Taking land out of agricultural use for mining operations and waste storage	Lower productivity levels Risk of gallery collapses Risk of flooding in the galleries
Ecological restoration of sites after mining ends	Covering dumps with soil Reforesting the dumps Developing artificial lakes in former mining sites Anthropogenic reshaping of the terrain	Ecological restoration of waste dumps Securing the galleries

Task: Complete the tasks in the four quadrants (Dulamă, 2008 a, b) and write down your solutions: (1) Identify in the text and on the map (textbook, school atlas) where salt deposits currently being mined are located, (2) Describe the technological process of salt extraction through brine, (3) Describe the technological process of solid salt extraction in salt mines, (4) List the products obtained from salt

Table 4
The completion of tasks within the framework

(1) Salt Deposits in Operation	(**2) Liquid extraction using drilling wells**
Salt deposits have formed in the Transylvanian Depression (along its edges: Turda, Dej, Praid) and in the Subcarpathians (Târgu Ocna, Slănic Prahova, Ocnele Mari). A smaller deposit is being mined in the Suceava Plateau at Cacica.	Water is pumped into specially designed underground chambers within the salt deposits. The brine formed by dissolving the salt is extracted through drilling wells. On the surface, the brine is transported via pipelines, known as "saleducts," to chemical processing or recrystallization facilities.
(3) Solid Extraction in Salt Mines	(**4) Salt-Derived Products**
Salt deposits are mined in solid form underground in salt mines through horizontal galleries and vertical shafts.	Chlorine-sodium products (caustic soda, soda ash, sodium hypochlorite) are manufactured in chemical plants. Rock salt is directly used for human consumption, livestock farming, and maintaining icy or snow-covered roads.

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Using short case studies, students can understand the principle of causality and the connection between salt extraction and its processing into chlorine-sodium products at chemical plants: Tg. Ocna-Borzești ("Chimcomplex" Onești) and Ocnele Mari-Govora (Rm. Vâlcea) ("Oltchim"). To grasp the current state of former chlorine-sodium chemical complexes, students should investigate the reasons behind the closure of factories in Ocna Mureș, Turda, Târnăveni, or Giurgiu. This activity creates a context for exploring concepts such as salt (NaCl), "sea salt," and "Himalayan salt," highlighting their similarities, differences, and the rationale behind their higher prices. In discussions with the teacher, students should explain why salt, a food preservative, has an expiration date printed on its packaging.

Some 8th-grade students may already be aware of the closure of various factories in Romania after 1989. To help develop accurate perceptions and representations regarding the shutdown and dismantling of these facilities, students could be tasked with conducting an investigation (Dulamă, 2008a).

Task: Search online for the necessary information to explain why the complexes and factories listed in Table 5 were closed and dismantled. Work in groups of four students.

Table 5
The reasons for the closure and dismantling of some plants and factories

Closed and dismantled plants and factories	The explanation of the closure
The metallurgical plants in Călan (Hunedoara County), Nădrag (Timiș County), Vlăhița (Harghita County), Baia Mare, Zlatna, and Copșa Mică	
The heavy machinery plants in Craiova, Iași, Cluj-Napoca, and Bucharest	
The oil refineries in Câmpina, Pitești, Dărmănești-Bacău, and Timișoara	
The synthetic yarn and fiber plants in Iași, Vaslui, Câmpulung Muscel, Popești-Leordeni, and Lupeni	
The cotton and textile processing, knitting, and clothing factories in small industrial centers such as Scornicești (Olt), Fetești, Abrud, Baia de Arieș, Gura Humorului, Hârlău, and Tg. Frumos, among others.	

Eighth-grade students do not watch the news on television or the internet, but they observe daily the transportation vehicles moving along communication routes. From kindergarten, children learn to differentiate transportation means based on the type of route used. In order for students to classify transportation means by environment and identify factories in Romania, they could be given the task of reading a text and extracting the relevant information to complete a data table. Students will discover that some transportation means are manufactured in Romania, while many others are imported from other countries. This activity stimulates students' curiosity.

Task: Read the following text. Extract the necessary information and complete Table 6.

Table 6
Classification of transportation means based on the environment

Environment	Category of transportation means	Types of transportation means	Centers/Localizations
Terestrial	Road transportation means (vehicles)	Trucks	
		Buses and trolleybuses	
		Electric buses	
		Vans	
		Rescue vehicles	
		Special trucks	
	Rail transportation means	Locomotives Trams Wagons	

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	Agricultural machines and equipment	Tractors Combines Harvesters, etc.	
Aquatic	Maritime vessels	For goods: oil tankers, methane tankers, cargo ships, container ships, etc. For passengers: cruise ships	
	River vessels	Vessels for both goods and passengers	
Aerial	Airplanes	Passenger airplanes Military airplanes Utility airplanes	
	Helicopters	Passenger helicopters Military helicopters Utility helicopters	

In Romania, land transportation means are produced: trucks in Brașov ("Roman"), Baia Mare ("ATP Trucks"), buses and trolleybuses in Bucharest; electric buses in Ciorogârla, Ilfov County ("BMCTruck&Bus"), Baia Mare ("UPCity - ATP Exodus Groups"), Mediaș ("Automecanica-Rheinmetal"), vans in Prejmer and Aiud (rescue vehicles); special trucks in Mârșa-Avrig, Sibiu County, Moreni, and Petrești, Dâmbovița County ("Iveco"), Bucharest.
In Romania, railway transportation means are produced: locomotives in Craiova ("Softronic"), passenger and freight wagons at "Astra" Arad. Rolling stock repairs are carried out in Pașcani, Brașov, Roșiorii de Vede, Caracal, Adjud, and Caransebeș.
Tractors, trailers, and agricultural machinery (including zootechnical) are produced in Reghin, Craiova, the Ghioroc Industrial Park-Arad ("SynTrac-Austria"), Chișineu-Criș, Arad County, Piatra Neamț, and Medgidia, while car batteries are manufactured in Bistrița ("Rombat") and Cernica-Ilfov.
River and maritime vessels are built and repaired in Constanța, Mangalia, Galați, Brăila, Tulcea, Drobeta Tr. Severin, Orșova, Oltenița, Călărași, and Giurgiu.
The aeronautical industry is represented by factories in Craiova, Ghimbav (Brașov County), Bacău, Iași, Moldovenești (Cluj County) (Ernst, 2024), where components for the aerospace industry are produced and maintenance repairs are conducted.

Eighth-grade students are likely familiar with car manufacturing companies in Romania and other countries, with some being passionate about this subject. They should be made aware of Romania's position in the global car manufacturing industry and the contribution of this sector to the country's GDP and the well-being of every Romanian citizen. Students could be given a text and asked to formulate questions based on the text, which they could then ask their classmates. This task could be extended for students with a higher level of knowledge by incorporating a corema, a geographical spatial analysis method applied to industrial phenomena (Dulamă, 2010d; Popescu, 2010; Conțiu & Conțiu, 2010).

In 2019, nearly one-third of Romania's industrial production was represented by the automotive components industry (Paraschiv et al., 2020). After joining the European Union, Romania became an important producer of "parts and components in Europe," with the total value of production "exceeding 30.6 billion euros in 2022, compared to 20 billion in 2015" (Placek, 2023). Global statistics show that, in 2023, Romania produced 513,050 cars, accounting for 0.6% of the global car production, placing Romania in 25th place worldwide (Placek, 2023). In 2024, production in Romania reached 560,102 cars, an increase of 9.17% compared to 2023 (Dogaru, 2025). In 2024, Romania became the fifth-largest supplier in the European car market, following Germany, Spain, the Czech Republic, and France (Dogaru, 2025).
The two major car manufacturing companies in Romania, "Dacia-Renault" in Mioveni and "Ford-Otosan" in Craiova, produce cars and light commercial vehicles for freight or passenger transport (minibuses). In Brașov, Mediaș, Moinești, Câmpulung Muscel, and other locations, companies manufacture vehicle equipment (seats, thermal insulators, cooling systems, etc.).

Students may imagine that all the parts that make up a car are manufactured in the same factory where it is assembled. To help students correctly understand the contribution of many factories to car production, the following task can be proposed (Gardner et al., 2023). By completing this task, students will

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understand the complexity of creating the final product, as well as the importance of other industrial centers through the subproducts they manufacture.

Task: In the third column of Table 7, there are the production centers for the main subassemblies that make up a car produced at the "Dacia-Renault" factory in Mioveni, Argeș County. In the second column of the table, the category of subassembly components manufactured in the locations listed in the third column is specified. Look at Figure 1 and fill in the circles with the number corresponding to each car component.

Table 7
Component elements of a car manufactured at the Dacia-Renault factory in Mioveni

Number	Automotive Components and Subassemblies	Production Centers
1	Body, chassis, doors, fenders, exhaust system, fuel tank, and wheels	Mioveni
2	Engine and gearbox	Mioveni
3	Dashboard, wiring, electronics	Deva, Sibiu, Brașov, Iași, Cluj (Jucu), Arad, Oradea, Brăila
4	Windows (front windshield, rear window, side windows), mirrors	București, Buzău, Călărași ș.a.
5	Headlights and signaling	Timișoara și București
6	Battery, air conditioning, radiators, filters	Bistrița, Brașov și București
7	Exterior plastic decorations	Pitești
8	Interior upholstery (seats, headrests, etc.)	Pitești, Jimbolia, Iași, Craiova
9	Suspensions, brakes, pumps, etc.	Satu Mare, Săcele, Sibiu, Sinaia
10	Tires	Slatina, Florești-Prahova, Timișoara, Oradea

Figure 1. *The diagram showing the origin of the main components of the Dacia car assembled in Mioveni*

(Source of the photograph: V. Paraschiv)

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Eighth-grade students use various household appliances at home, and they may know whether these appliances are produced in Romania or other countries. They may have information about their energy efficiency, electricity costs, and the trend of reducing carbon emissions and electricity consumption by using appliances with high energy efficiency. Geography teachers can start a conversation with the students about the manufacturing of refrigerators or ask them to look up information online about the production centers of household appliances.

In 2022, refrigerator factories exported technical refrigeration products worth over half a billion euros, with Romania producing nearly 1% of the global total and ranking 11th in Europe (Ciobanu, 2024). At the beginning of 2025, after just three years of production, the "Haier" factory announced it would be leaving Romania (Roșca, 2025). Most likely, the factory will be relocated to a country with more favorable production conditions, tax policies, and wages. This is an example of the mobility of capital invested in industry, as modern factories are modular, automated, robotic, and easily relocatable. In 2022, domestic production of household appliances exceeded 2 billion euros, with significant export potential, and Romania ranked in the top 10 worldwide in household appliance production (Roșca, 2023).

Task: Check the information in Table 8 and verify it on the internet. If the information is true, circle the letter A, and if it is false, circle the letter F.

Table 8
The household appliance industry

Category of household appliances	**Production Centers**	
Refrigerators	Găești-Dâmbovița ("Arctic-Beko," Turkish capital) A/F Industrial Park in Ariceștii-Rahtivani, near Ploiești ("Haier," Chinese capital) A/F Satu Mare ("Samus - Electrolux," Swedish capital) A/F Sadu-Bumbești-Jiu (production reorganization with the "Fram" brand based on Emag capital investment - Romania) A/FA/F	
Washing machines	Ulmi-Dâmbovița ("Beko") A/F Simeria ("Bosch") A/FA/F	
Dishwashers	"Samus-Electrolux" Satu Mare	A/F
Vacuum cleaners	"Kärcher" and "ElectroArgeș" in Curtea de Argeș „Miele" Brașov „Electrolux" Satu Mare	A/F A/F A/F
Cooking machines (stoves)	Satu Mare („Electrolux-Samus") Oradea („Metalica")	A/F A/F
Coffee makers	Satu Mare („De Longhi") Orăștie, Hunedoara („Philips") Salonta, Bihor („De Longhi") Industrial Park Jucu, Cluj	A/F A/F A/F A/F

Although students have been involved in some learning activities where they analyzed professions and how products available in stores are made, they still lack full information about the raw materials obtained from agriculture and processed in factories to produce food products. Students could be assigned the task of searching online for information about industrial products derived from certain agricultural products, thus helping them differentiate between the roles of agriculture and industry. Students could also be asked to observe the labels on canned goods in grocery stores, identify the manufacturer, and combine this activity with locating the towns on a map where the canning factories are located.

Task: Search online for information about the industrial products made from the agricultural products listed in the first column of Table 9. Fill in the information in the second and third columns.

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Table 9
Agricultural products and industrial products

Agricultural product	Name of the processing center and primary industrial product	Secondary industrial product
Wheat	Mill: flour	Factory: bakery products (bread, croissants, bagels, pretzels, etc.)
		Factory or pastry workshop: biscuits and pasta products, pastry items (pastries, pies, cakes, tarts, etc.)
	Factory: pressed grains	Packaging in a mix with other cereals (e.g., with cornflakes and barley) or with dried fruits.
Rye	Mill: flour	Bakery products (bread)
	Alcohol factory	Food alcohol
Corn	Mill: flour	Pastry products, puffed snacks, cornflakes
	Factory: alcohol	Food alcohol
	Factory: concentrated animal feed	Animal feed and fodder used in animal husbandry
Barley and barley malt	Factory: beer	Beer and yeast
	Pressed grains	Packaging together with other cereals (cereal flakes)
Fruits	Canning factory	Compotes, jams, preserves, dried fruits, or in cold storage (frozen)
	Factory: juices	Juices, nectars
	Winery	Wines (brandy, rum)
	Factory: spirits	Canned goods: peas, green beans, vegetables
Vegetables	Canning factory	Beer and yeast
	Cold storage facilities	Frozen products

CONCLUSIONS

At the end of the study, it is concluded that topics related to industry could be approached with eighth-grade students in a more engaging and useful way. Information from textbooks and online sources about industry, as well as visual materials representing aspects of industry, should be used for analysis and interpretation, allowing students to develop skills in documentation, information processing, analysis, and interpretation of both information and visual materials, research, and the specific competencies outlined in the curriculum.

Within the context of the learning activities in this study, students should be aware that information about industry is perishable, flexible, and mobile, and that a thorough understanding and use of this information requires verification and updating. By studying Romania's current industry, students should understand the changes it has undergone since 1989, the relationship between natural resources and industrial production, the connection between human resources and capital, technological development, industrial development forms, and the impact of social networks on sending information, much of which can be false.

Students' knowledge of a large volume of information, procedures for verifying data, and competencies developed through geography, such as geographical thinking, should prepare them to face fake news campaigns and manipulation in the media and on social networks (Paraschiv, 2021; Paraschiv & Voicu, 2022).

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