

DIGITAL AND EDUCATIONAL INEQUALITIES BETWEEN URBAN AND RURAL AREAS IN ROMANIA: CURRENT CHALLENGES AND FUTURE OPPORTUNITIES THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

The gap between urban and rural areas continue to significantly affect educational equity in Romania, and the recent digitization of the school has shifted the discussion from the lack of basic infrastructure to differences in skills, use and capitalization of digital technologies. The article analyzes the evolution of digital and educational inequalities in Romania and discusses to what extent artificial intelligence can become, in the medium term, a tool to reduce these gaps, not just a new source of polarization.

Methodologically, the research combines three components: a critical analysis of the literature published between 2010 and 2026, a Romania-European Union comparative analysis based on Eurostat indicators on the use of the internet and generative artificial intelligence tools and a bibliometric co-occurrence analysis carried out in VOSviewer based on data extracted from Scopus. The selected indicators track both digital access and functional use of the internet for educational, professional and social activities, respectively the use of generative AI for private, professional and educational purposes.

Although the frequent use of the internet is relatively close to the European average, gaps are becoming visible in the area of digital skills, participation in online courses and the use of AI for formal education, which supports the existence of a secondary digital divide and outlines the emergence of a new "AI divide".

In this context, the article argues that artificial intelligence can only contribute to reducing educational inequalities if it is supported by coherent public policies, investments in infrastructure, teacher training and the development of digital and algorithmic literacy among students.

Keywords: digital inequalities, educational inequalities, artificial intelligence, rural, urban, accounting education

JEL classification : I24, O33, R11

1. Introduction and context of the study

The gap between urban and rural areas is one of Romania's oldest and deepest structural problems, with visible implications for the performance of the education system. We can observe how large cities have become hubs of innovation, where schools benefit from modern laboratories and well-trained human resources and rural communities often face material deprivation and geographical isolation (Toc, 2020; Neagu *et al.*, 2021; Stancu *et al.*, 2025).

INS (2025) in the published report provides raw data on educational infrastructure in Romania. In the reports published by it, the decrease in the number of schools in rural areas and the gap in IT equipment can be observed.

This inequality is no longer only driven by the lack of resources of basic educational materials, but has moved into the digital sphere, affecting the way new technologies are used to accumulate knowledge and facilitate integration into the labour market. In contemporary society, which stands out for its rapid transition to the era of artificial intelligence (AI) and automation processes, simply owning a computer or connecting to an internet network are no longer enough to ensure the social integration of young people. The notion of digital divide or gap has transformed from a physical infrastructure problem to one of functional literacy (Tofă, 2010; Keskin & Vermeulen, 2024).

The way we have used technology in recent years shows us that the digitization of schools depends a lot on the geographical area. The digital development of each region directly affects the relations between the country's counties (Munteanu & Goschin, 2026).

Young people from marginalised categories, especially those from the NEETs, risk a double exclusion: on first hand, exclusion caused by limited opportunities in the traditional local economy, and on the other hand, because they lack the skills necessary to succeed in the high-tech labour market.

However, technological progress and artificial intelligence (AI) based systems shouldn't be viewed exclusively as sources of polarization. If intelligently integrated through coherent public policies, these instruments can work as a support for structural gaps in rural areas. By encouraging virtual mobility, technology can provide students and teachers in isolated communities with access to global educational resources, adaptive learning platforms, and virtual tutors, alleviating the financial constraints imposed by physical travel to cities. (Toc, 2020; Neagu *et al.*, 2021).

This paper aims to analyze the dynamics of educational and digital inequalities in Romania, critically assessing both the current challenges and the concrete opportunities that artificial intelligence can bring to support rural communities. We can see how there is an increasingly visible shift from the "digital divide" to the "AI divide" in Europe amid the acceleration of the adoption of generative artificial intelligence, but with major structural differences between regions and social groups. Thus, the main contribution of the study is to combine the analysis of the existing literature with recent data from Eurostat related to the use of generative AI, carrying out a comparative analysis between Romania and the EU average.

2. Literature

The study of educational and digital inequalities requires an integrated approach, capable of capturing the shift from traditional technological barriers to the new gaps generated by artificial intelligence.

Traditionally, the concept of the digital divide has focused on physical differences in access to computers and internet connections. But with the expansion of the use of smart devices, this initial barrier has diminished considerably. Recent research shows that we are facing a secondary digital divide, defined by differences in skills and the quality of network use. (Tufa, 2010; Neagu *et al.*, 2021; Tőkés, 2023)

Keskin & Vermeulen (2024) introduce a new dimension to this problem, defining the AI divide gap. This is no longer just about the use of the software, but about the quality of the data available and the ability of communities to critically evaluate the information generated by algorithms. This new gap is no longer triggered only by basic technical skills, but by the quality of the available data and the level of algorithmic literacy, which consists of the ability of users to understand or critically evaluate the decisions made by systems.

2.1. The evolution of the digital divide and the new inequalities in the age of artificial intelligence

Dragomir *et al.*, (2013) shows that communication networks and the internet have expanded the ways in which education is delivered, but the success of this system directly depends on learners' ability to develop skills to search for information correctly and to quickly assess how relevant data is to them.

Tufă (2010) explains that theories of the digital divide are part of the broader sphere of economic inequalities and social stratification. In her analysis, the author shows that the profile of the Romanian user tends to reproduce traditional inequalities related to age, education, background and occupational status, Romania being in the group of states that have a low level of digital skills. The Internet is increasingly used precisely by those who already know how to use it effectively, this means that, over time, the distance between them and the less prepared will become even greater.

This reality is deepened by Tőkés & Velicu (2015), the authors show that young people don't go by themselves from simply consuming the internet to using it for truly creative activities. This step requires direct involvement from parents or the school. When this support is lacking, children from Romania end up discovering technology on their own, through trial and error, which is why they don't get to know the platforms where they could create quality content or collaborate with others. Also, young people's overconfidence in their own abilities can hide the lack of real social and cognitive skills

needed to truly take advantage of the opportunities of the virtual environment.

The research conducted by Tőkés (2023) provides additional information regarding secondary digital inequalities in the Romanian university environment. The results showed that although the students possess good operational skills, they have difficulties in terms of advanced information search and using it to create original and quality content. Within the analyzed sample, digital inequalities were directly determined by the frequency of use of networks, the student's self-confidence and the mother's level of education, the latter functioning as a major cultural factor in the transmission of technological consumption habits.

One of the most influential theoretical frameworks in the analysis of educational inequalities is provided by Pierre Bourdieu, who introduces the concept of cultural capital. Huang (2019) through his study helps us understand 2 important concepts introduced by Pierre Bourdieu: cultural capital and habitus. Cultural capital is acquired mainly through initial learning and is unconsciously influenced by the environment, and habitus refers to knowledge resources.

The family environment influences the acquisition of cultural capital in an essential way, being considered the first and most important educational institution in the process of forming the individual. Parents and family provide initial education, which includes formal knowledge, instruction in behavior, etiquette and tastes, thus shaping children's cultural devices and values. For example, a child is taught to be polite in conversations with adults, and these cultural habits are incorporated into his habit. The family supports the accumulation of cultural capital in all these forms, providing access to cultural resources, support for higher education and the opportunity to acquire prestigious degrees. (Huang 2019).

2.2. Vulnerability of young people and the structural dynamics of the rural environment

Toc (2020) showed how NEETs in Romania are part of an extremely vulnerable category, directly exposed to the risk of poverty and social exclusion. Due to physical barriers, such as lack of transportation or lack of local economic opportunities, the transition from school to the labor market is difficult. Moreover, the social protection system in Romania proves ineffective in reducing these disparities, and social transfers have an extremely low impact on improving the quality of life of young people at risk.

Reay (2017) analyzes how the education system reflects and, at the same time, reproduces social differences. The author highlights the fact that students from disadvantaged social classes often start with a disadvantage, because they don't have the same material, financial, cultural and emotional resources as those from more privileged backgrounds. For example, limited access to tutoring, extracurricular activities, or educational support from teachers and family can directly influence the school path.

Reay also points out that the school doesn't always manage to compensate for these differences, but sometimes accentuates them. The education system often functions as a selection mechanism, in which students are evaluated and differentiated according to the resources and skills already acquired, thus favoring children from more advantaged backgrounds. In addition, students from lower social classes may feel a sense of belonging in the school environment, which affects their trust and engagement.

In Eastern Europe, digital and educational polarisation is most acutely felt at the level of young people in rural areas, especially those in the NEET category (young people who are not employed or in education). A comparative study shows how Bulgaria, Romania and Turkey have high shares of the NEET population, much higher than the European Union average. Their data confirms that simply owning technology doesn't mean that individuals also possess the digital skills necessary to integrate into the highly technological labor market, they use the internet predominantly for entertainment. By using linear regression models, the authors demonstrate that digital inclusion can optimize virtual mobility, giving young people the chance to access education and jobs without being forced to physically leave their rural community (Neagu *et al.*, 2021).

Table 1. Internet use by type of activities, Romania vs EU

Type of activity	Year 2025		
	Romania		EU average
	Rural	Urban	
Individuals frequently using the internet	89.41	94.26	89.54
Internet use: Internet banking	18.40	38.01	69.66
Internet use: selling goods or services	10.23	13.17	23.87
Individuals using the internet for looking for a job or sending a job application	6.33	7.06	16.81
Internet use- participating in social networks (creating user profile, posting messages or other contributions to facebook, twitter,	76.63	81.10	67.26

Source: Author's own research based on data extracted from Eurostat
Internet use [t_isoc_iiu]

Overall, the results suggest that Romania has achieved a high level of basic internet use across both urban and rural areas but the adoption of more sophisticated digital activities such as online banking, e-commerce, and online job searching, remains below the European average. At the same time, social networking is significantly more prevalent in Romania than in the EU as a whole, highlighting a pattern in which internet use is concentrated more on communication and social interaction than on economic or professional activities.

This reality is analyzed from a university perspective by Bucea-Manea-Toniș *et al.*, (2022), who explore the potential of artificial intelligence in universities in Romania and Serbia. The authors argue that the current educational transformations, imposed by European requirements, force higher education institutions to create new learning environments that reduce inequalities. In order to meet market demands, universities need to stimulate the acquisition of transversal digital skills that include data analysis (Big Data), the use of cloud systems or virtual simulations, thus helping students to make the transition to the business environment easier.

The study conducted by Munteanu & Goschin shows that the technologization of schools in Romania is directly influenced by the geographical position and economic ties between counties. Although developed counties also manage to stimulate the areas in their vicinity, predominantly rural communities risk remaining isolated in the face of these technological changes. The authors conclude that, in order to reduce these differences, national strategies should no longer be thought of separately, by counties, but at the level of the entire territory (Munteanu & Goschin, 2026).

Dumitru *et al.* (2021) draws attention to the fact that, despite the European funds allocated, villages in Romania continue to face massive depopulation, with young people choosing to migrate to cities due to the lack of jobs and outdated infrastructure. Their research demonstrates that the rural economy is mainly oriented towards agriculture, which limits occupational diversification. The authors propose as a solution the development of a digital tool capable of monitoring local needs and creating a synergy between authorities and the private sector, allowing government funds to be directed precisely towards solving the specific problems of each community.

2.3. Action strategies and educational policies in a regional context

The comparative analysis of education systems in Central and Eastern Europe highlights different paths in the adoption of technology, determined by the way of governance and the prioritization of public policies. Although Romania has adopted important formal strategies aligned with European norms, such as the SmartEDU program, their application in the field remains

fragmented and inconsistent.

Unlike Poland, which has implemented a national broadband plan and a centralized digital textbook platform, or the Czech Republic, where schools benefit from high autonomy and a solid high-speed internet connection infrastructure, although Romania has the fastest internet connection in Europe, it is not available in most rural areas. In the Romanian countryside, the lack of stable connections and the reluctance of teachers due to the lack of continuous training courses block real digitization in the classroom. A distinctive element for Romania, underlined by the author, is the success of initiatives coming from the civil society area, such as the Romanian Science Festival, which manages to partially compensate for the shortcomings of the public system through virtual mentoring programs and practical activities organized directly in disadvantaged communities.

The modernization of the education system and its adaptation to the digital age depend directly on the coherence of educational policies and the quality of governance (Mihăilă, 2021; Stancu *et al.*, 2025).

Iacob *et al.*, (2024) point out that the transition to the new model of Education 4.0 requires the integration of artificial intelligence to personalize learning experiences and optimize the management of educational resources. However, in Romania, the implementation of these technologies comes up against the low level of digital literacy of the population and the major disparities in connectivity between urban and rural. For artificial intelligence to reduce inequalities instead of deepening them, teacher training and the development of resilient infrastructure are mandatory.

This need is supported by Mihăilă (2021), who shows that the year 2020 imposed the radical transformation of education by transposing it into an online format as a result of the health crisis caused by Covid-19. This forced transition has revealed the major deficiencies of the Romanian system in terms of teachers' endowments and digital skills. The strategy on the digitization of education (2021-2027) is an important step, but achieving the objectives set by the 2030 Agenda requires the elimination of access inequalities and the transition from the simple transmission of theoretical knowledge to the development of real practical skills.

Hosszu & Rughiniș (2020) analyzes the transition from the classic model of education to the online one, highlighting how this crisis has deepened the already existing social inequalities.

Before the pandemic, Romania was already facing difficulties such as a high school dropout rate (16.4% in 2018), low PISA test results and minimal investment in education (2.8% of GDP). The implementation of online education has revealed two major problems:

- Lack of basic infrastructure - characterized by the absence of devices and internet connection, especially visible in rural areas.
- Skills inequality – major differences in teachers' and students' digital skills, as well as a lack of tailored educational content.

The students perceived the process as chaotic, as they faced a high volume of homework, lack of motivation and isolation. However, some students in their final years appreciated the extra time for individual study.

Teachers also had to make a considerable effort trying to adapt the traditional content for the online environment, and the lack of visual feedback didn't help. On the other hand, many teachers have improved their teaching methods and discovered new opportunities for innovation.

The authors concluded that the forced shift to online education deepened already existing educational gaps and generated new forms of exclusion. Although digitalization has reached the center of the public agenda, access remains uneven, the government data approximated 250,000 students without access to technology but the independent research (IRES) indicated a number of more than 900,000 students without individual devices. (Hosszu & Rughiniș, 2020)

Finally, the impact of these reforms is directly reflected in the quality of services provided by schools. Ion (Stroe) & Barbătoșu (Marinescu) (2024) show that projects financed by European funds play an essential role in modernizing infrastructure and ensuring continuous teacher training. However, the authors warn that the impact of these programmes risks diminishing over time due to the lack of local financial resources necessary to ensure the sustainability of investments and due to the insufficient

use of results in the formulation of long-term educational policies.

2.4. Critical analysis of the literature

For greater accuracy, a bibliometric analysis of the literature was performed using VosViewer based on the data extracted from Scopus. To carry it out, 357 articles published between 2010-2026 were analyzed.

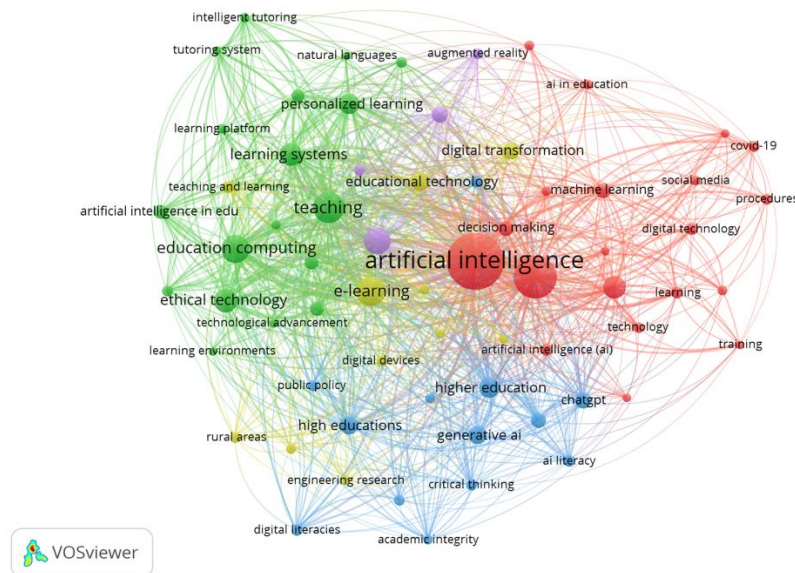


Figure 1. Graphical representation of the co-occurrence of keywords and research directions specific to the analyzed topic

Source: Author's own research conducted in VosViewer based on data extracted from Scopus

The results of the bibliometric analysis show us the factors that influence the digital inequalities between urban and rural areas in Romania.

It can be seen that artificial intelligence is the central theme of current research in the field of education, being closely associated with concepts such as *teaching*, *learning systems*, *personalized learning* and *e-learning*. The links between these concepts suggest that AI is seen as a tool capable of supporting the personalization of the educational process and improving access to learning resources. For rural areas in Romania, where there are still significant differences in access to education and technology, these solutions can help reduce the gaps with the urban environment.

The results indicate that AI offers important opportunities to increase educational inclusion, but capitalizing on them requires investments in connectivity, digital equipment and user training, so that the differences between urban and rural areas aren't amplified, but diminished.

3. Research Methodology

The present research has an exploratory and interdisciplinary character, being built at the intersection of the sociology of education, studies on the digital divide and recent literature on artificial intelligence in education. The methodological design combines the critical analysis of the literature with the secondary analysis of statistical data and with a bibliometric component, in order to capture both the theoretical foundations of the phenomenon and its recent empirical expressions in the case of Romania.

Objectives pursued:

- O1 – to describe the evolution of digital inequalities Romania vs. the EU based on the selected Eurostat indicators.
- O2 – to synthesize the recent literature on the "AI divide" and the secondary digital divide.
- O3 – discuss what realistic opportunities AI offers for rural areas, given the data and literature

The first stage of the research consisted of the analysis and critical synthesis of the specialized literature published in the period 2010–2026, with a focus on three thematic directions: urban-rural educational inequalities, the secondary digital divide and the impact of artificial intelligence-based technologies on educational systems. The selection of papers followed three criteria: thematic relevance, focus on Romania or the Eastern European space and timeliness of the contributions, especially in the context of accelerated transformations after the COVID-19 pandemic. Theoretical works, empirical studies, comparative analyses and contributions oriented towards public policy have been included, so that the corpus captures both the structural causes of the gaps and the new risks associated with the shift to algorithmic technologies.

The second stage of the research aimed at the comparative analysis between Romania and the European Union average based on Eurostat data on the digital behavior of the population. Indicators have been selected to observe the shift from simple access to the internet to its use in activities relevant to educational and professional inclusion.

Table 2. Eurostat digitization indicators

Indicator Eurostat	Indicator code	What does it measure
Individuals using the internet for doing an online course (of any subject)	tin00103	Percentage of individuals who use the internet to attend online courses (of any type)
Individuals using the internet for Internet banking	tin00099	Percentage of individuals who use the internet to access internet banking services
Individuals using the internet for selling goods or services	tin00098	Percentage of individuals who use the internet to sell products or services
Individuals using the internet for looking for a job or sending a job application	tin00102	Percentage of individuals who use the internet to look for a job
Individuals using the internet for participating in social networks (creating user profile, posting messages or other contributions to facebook, twitter.	tin00127	Percentage of individuals who use the internet for entertainment and social media
Individuals - use of generative AI tools	isoc_ai_iaiu	Percentage of individuals using AI-powered tools - generative

Source: Author's own research based on data extracted from Eurostat

In **Figure 2**. You can see the percentage of individuals who use the internet for something other than entertainment, in this case it is the use of the internet to take online courses, of any kind. We can see the considerable difference between the average of the European Union and Romania and the fact that in recent years the number of people who actively use the Internet has been decreasing. From 4.77% in 2021, during the pandemic, to 2.59% currently.

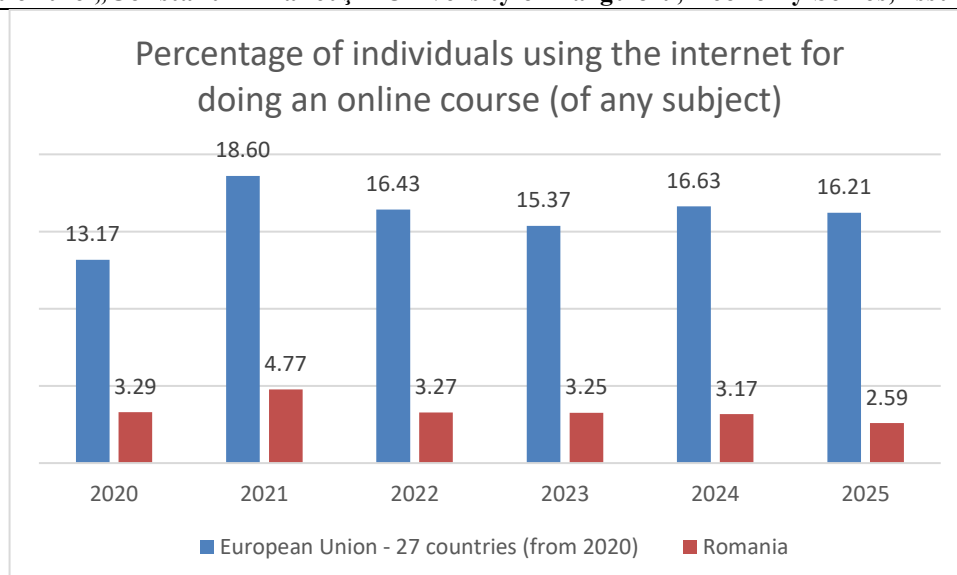


Figure 2. Usage of internet for doing online courses

Source: Eurostat, Individuals who used the internet for doing an online course (of any subject) [isoc_ci_ac_i]

In **Table 3.** We can observe the statistical data on the use of generative artificial intelligence in the last 3 months, they provide a confirmation of the emergence of the AI-based digital divide (AI Divide), highlighting the differences between Romania and the European Union average. Although 17.76% of Romanians have used generative artificial intelligence tools in the last three months, the level remains significantly below the European average. In both Romania and the EU, the use of AI is mainly oriented towards personal activities, but the differences become much more pronounced in areas of educational and economic value.

In the professional environment, the percentage of users in Romania is almost three times lower than the EU average, and in education the use remains low compared to the European level. The results suggest that the adoption of AI in Romania is still limited and insufficiently integrated for professional and educational purposes.

Table 3. Use of generative AI tool and the purpose of use

Indicators	Last 3 months	
	Romania	EU
Use of generative AI tools: in the last 3 months	17.76	32.66
Use of generative AI tools: for private purposes	14.85	25.49
Use of generative AI tools: for professional (work) purposes	5.24	15.36
Use of generative AI tools: for formal education	3.37	9.55

Source: Author's own processing based on indicators extracted from Eurostat, Individuals - use of generative AI tools (isoc_ai_iaiu)

In **Table 4.** The data from 2025 on the reasons why individuals do not use artificial intelligence tools can be observed, they show that in Romania the main barrier is not the refusal of technology, but

a visible deficit of information and basic practical skills. Although the most common reason invoked both in Romania and in the European Union is the lack of a perceived need, Romanians declare in a significantly higher proportion that they don't know the existence of these technologies or don't know how to use them.

Compared to the European average, Romania registers higher levels of ignorance and difficulties of use, which highlights the need for measures oriented towards digital literacy and the development of AI skills. At the same time, concerns about data privacy and security are lower than in the EU, suggesting that low awareness of these technologies also limits awareness of the risks associated with their use.

Table 4. Reason for not using AI tools

Reason for not using AI tools (% of individuals)	2025	
	Romania	EU
No need	42.76	39.25
Did not know they existed	13.14	5.17
Did not know how to use	13.79	8.41
Concerns about privacy, security, or safety	1.88	4.43
Other	3.82	3.28

Source: Author's own processing based on indicators extracted from Eurostat, Individuals - Reason for not using AI tools

The third stage consisted of carrying out a bibliometric analysis of co-occurrence with the help of the VOSviewer software, based on the data extracted from Scopus, in order to identify the main thematic clusters and recent research directions associated with the relationship between education, digitalization and artificial intelligence. This component had the role of complementing the qualitative analysis of the literature, providing a synthetic perspective on the structure of the research field and on the shift of academic interest from basic technological access to learning personalization, smart tutoring, digital skills and the risks associated with the use of generative AI.

The main methodological objective of the study was to investigate the evolution of digital inequalities in Romania, in particular how they have transformed from infrastructure barriers to gaps related to skills, functional use and algorithmic literacy. Consequently, the analytical approach was structured in two complementary planes: identifying the current challenges of the Romanian educational system and highlighting the opportunities, but also the limits, that artificial intelligence can introduce in reducing these differences.

The methodology used also has some limitations. The Romania-EU comparative analysis accurately captures Romania's relative positioning, but doesn't allow a detailed statistical breakdown exclusively on rural and urban terms for all the indicators used. In addition, the bibliometric component has an exploratory role and maps thematic trends, without substituting the in-depth content analysis of each paper. However, the combination of literature, statistical data and bibliometric analysis provides a sufficiently robust framework for formulating reasoned conclusions on the transformation of digital and educational inequalities in Romania.

4. Results and discussions

The synthesis of the analyzed studies clearly shows that the mere presence of technology in schools is no longer enough to eliminate the differences between students. We can see how the old problems related to the lack of computers have faded and new, much deeper barriers have emerged related to how young people know or don't know how to use these tools.

4.1. Secondary digital gap

Second-tier digital inequality is no longer just about physical access to the internet, but how users use the internet once they are connected (Tufa, 2010; Tőkés, 2023; Keskin & Vermeulen, 2024). This gap risks widening in society because the pace of internet adoption is much faster among those who already possess technical skills and a favorable educational history, while the rest of the users lag behind (Tufa, 2010).

Although the overall internet usage rate in Romania (84%) is relatively close to the European average (89%), basic and advanced digital skills lag far behind. In this context, the transition of young people from simple passive or repetitive consumption to creative and original content generating activities requires active mediation from parents or the school. In the absence of this guidance from adults, children in Romania end up discovering technology on their own, through trial and error, remaining at a level of superficial use, which limits their ability to collaborate or really take advantage of the opportunities of the virtual environment (Tőkés & Velicu, 2015)

4.2. Influence of the geographical area

Digitalization doesn't happen in the same way everywhere, it depends very much on the region where the school is located and the level of development of the local community.

The technology of schools in Romania is directly influenced by the geographical position and economic ties between counties. Although developed counties also manage to stimulate the areas in their vicinity, predominantly rural communities risk remaining isolated in the face of these technological changes. (Munteanu & Goschin, 2026).

In Romanian villages, inequalities are accumulating. Lack of jobs and opportunities, poor academic performance and early dropout create a huge rate of NEETs (neither learning nor working). For them, the internet remains just an entertainment space, as evidenced by the results of the indicator (76.63% of individuals from rural area) are using the internet only for divertisment with no real impact on their professional future. (Toc, 2020; Neagu *et al.*, 2021).

4.3. Artificial Intelligence: practical solutions to old problems

Although it risks creating new gaps, the correct use of artificial intelligence represents a major opportunity to balance the balance between rural and urban. Studies show three clear ways AI can change the current situation.

In village schools where there is a severe shortage of qualified teachers or where simultaneous classes are taught, AI-based platforms can function as a personal assistant for each student. These systems adapt their explanations and pace according to the child's level, providing individualized support that the family wouldn't otherwise be able to afford. (Bucea-Manea-Toniș *et al.*, 2022; Iacob *et al.*, 2024).

A modernized digital infrastructure, combined with smart learning tools, allows vulnerable young people to attend qualified courses and access global resources directly from their commune. This reduces the need for young people to leave for big cities to survive economically. (Dragomir *et al.*, 2013; Neagu *et al.*, 2021).

However, the analysis of recent data on the actual use of generative AI tools shows that the functional adoption of these technologies is just beginning in Romania, with a considerable difference from the average in the European Union. The disparity becomes evident in the area of formal education, where only 3.37% of users in Romania integrate AI into the learning process, as opposed to 9.55% at European level. A similar behavior is observed in the professional environment (5.24% in Romania vs. 15.36% in the EU), the vast majority of interactions with algorithm-based tools being concentrated for private purposes (14.85%).

4.4. Risk of the emergence of the AI-based digital divide (AI Divide)

Despite the optimism about new technologies, theoretical analysis draws attention to a new danger, represented by the emergence of a digital divide specific to the era based on algorithms. This new division is no longer determined only by the lack of basic technical skills, but by the level of algorithmic literacy and the ability of users to critically evaluate the decisions or responses provided by systems (Keskin & Vermeulen, 2024).

If students in urban areas learn how to use AI for research, programming and solving complex problems, and students in rural areas only use it to generate simple texts or assignments without passing them through a critical filter, the difference between the two environments will increase considerably. Therefore, technology doesn't solve inequality on its own. It acts as a multiplier by amplifying positive effects where there is already an educational basis and guidance from adults, but it leaves even more behind communities that are completely abandoned by administrative public policies. (Tőkés & Velicu, 2015; Neagu *et al.*, 2021; Keskin & Vermeulen, 2024; Stancu *et al.*, 2025;).

The data show that in Romania, beyond the fact that the percentage of individuals who don't use AI is not high (42.76%), there are also cognitive and technical barriers. The percentage of those who don't know about the existence of these tools is almost three times higher than the EU average, and 13.79% of individuals say they don't know how to use them. Concern about data privacy and security is very low (1.88% in Romania compared to 4.43% in the EU), showing that an audience less familiar with the dynamics of algorithms tends to ignore security risks.

5. Conclusions

The analysis shows that the educational inequalities between the urban and rural areas in Romania can no longer be interpreted exclusively in terms of school infrastructure or material access to technology, but must be understood as compound inequalities, in which territorial, economic, cultural and digital factors overlap. If in the past the main problem was the lack of equipment and connectivity, nowadays the differences in the quality of the use of technology, the capacity for critical selection of information and the integration of digital tools in relevant educational and professional activities are becoming increasingly important.

The comparative results between Romania and the European Union average support the idea that the digitization process remains incomplete and unbalanced. Although the frequency of internet use is approaching the European level, Romania registers much lower values in the area of participation in online courses, the use of the internet for productive activities and the integration of artificial intelligence in formal education and professional activity. This pattern confirms the existence of a secondary digital divide and suggests the emergence of a division specific to the algorithmic era, in which the difference is no longer given only by access, but by the skills necessary to use technology in an autonomous and productive way.

In the case of Romania, this issue is particularly relevant for rural communities and already socially vulnerable groups, as there the lack of infrastructure, limited educational resources and insufficient institutional support tend to accumulate. Without interventions, artificial intelligence may become a new polarising factor: students and teachers who already have strong digital skills will use it for research, organising learning and developing critical thinking, while users with low digital literacy risk using it superficially and exclusively for private purposes.

At the same time, the article shows that artificial intelligence shouldn't be seen only as a source of risk, but also as a real opportunity to support educational inclusion. Adaptive platforms, smart tutoring, automated feedback and access to personalised educational resources can partially compensate for the shortage of human and material resources in rural areas, but only if they are integrated into a coherent, equity-oriented public framework. From this perspective, technology doesn't replace the teacher nor does it solve the structural problems of the Romanian school on its own, but becomes useful only when it is accompanied by functional infrastructure, continuous teacher training and digital and algorithmic literacy policies.

The main implication of the study is that educational policies in Romania must shift their focus

from the strictly quantitative logic of equipment endowment to the logic of competent and sustainable use of technology. Investments in devices and connectivity remain necessary, but they need to be supported by teacher training, the development of students' digital skills, curriculum adaptation and the creation of differentiated support mechanisms for disadvantaged schools and communities. Otherwise, technological modernisation will continue to produce selective benefits and deepen existing inequalities.

On a practical level, the conclusions suggest that any future strategy on the integration of artificial intelligence in schools must start from a realistic assessment of local competences and needs, especially in rural areas, in order for AI to function as a tool for inclusion and not as an additional mechanism for social selection.

6. Bibliography

- [1] **Bucea-Manea-Toniș, R.; Kuleto, V.; Gudei, S.C.D.; Lianu, C.; Lianu, C.; Ilić, M.P.; Paun, D.** *Artificial Intelligence Potential in Higher Education Institutions Enhanced Learning Environment in Romania and Serbi*, Sustainability 2022, 14, 58. <https://doi.org/10.3390/su14105842>;
- [2] **Camelia-Cristina DRAGOMIR, Stelian PÂNZARU, Roxana STEFĂNESCU**, *REALITIES AND OPPORTUNITIES OF E-LEARNING IN HIGHER EDUCATION SYSTEM FROM ROMANIA*, The 9th International Scientific Conference eLearning and software for Education Bucharest, April 25-26, 2013;
- [3] **Dumitru, E.A.; Ursu, A.; Tudor, V.C.; Micu, M.M.** *Sustainable Development of the Rural Areas from Romania: Development of a Digital Tool to Generate Adapted Solutions at Local Level*. Sustainability 2021, 13, 11921. <https://doi.org/10.3390/>;
- [4] **Elena Cristina Ion (Stroe), Liliana Barbatosu (Marinescu)**, *The impact of implementing European-funded projects on the quality of services provided by school organizations*, Theoretical and Applied Economics. Special Issue Volume XXXI (2024), pp. 113-118;
- [5] **Georgiana Mădălina MIHĂILĂ**, *Digitalizarea educației din România, planul pentru 2021-2027*.
- [6] **Gyöngyvér Tőkés, Anca Velicu**, *Poveștile de dincolo de statistici: despre competențele digitale ale copiilor și adolescenților din România*. „Revista română de sociologie”, serie nouă, anul xxvi, nr. 5–6, p. 431–458, București, 2024;
- [7] *Individuals - use of generative AI tools (isoc_ai_iaiu)*, Eurostat, Disponibil la: [\[isoc_ai_iaiu\]](#) *Individuals - reasons for not using generative AI tools*, Accessed on: June 4, 2026;
- [8] *Individuals using the internet for doing an online course (of any subject) (tin00103)*, Eurostat. Disponibil la: [\[tin00103\] Individuals using the internet for doing an online course](#), Accessed on: June 4, 2026;
- [9] *Individuals using the internet for Internet banking (tin00099)*, Eurostat, Disponibil la: [\[tin00099\] Individuals using the internet for internet banking](#), Accessed on: June 4, 2026;
- [10] *Individuals using the internet for looking for a job or sending a job application (tin00102)*, Eurostat, Disponibil la: [\[tin00102\] Individuals using the internet for looking for a job or sending a job application](#), Accessed on: June 4, 2026;
- [11] *Individuals using the internet for participating in social networks (creating user profile, posting messages or other contributions to facebook, twitter. (tin00127)*, Eurostat, Disponibil la: [\[tin00127\] Individuals using the internet for participating in social networks](#), Accessed on: June 4, 2026;
- [12] *Individuals using the internet for selling goods or services (tin00098)*, Eurostat, Disponibil la : [\[tin00098\] Individuals using the internet for selling goods or services](#), Accessed on: June 4, 2026;
- [13] **Institutul Național de Statistică**, *Sistemul educațional din România 2024–2025*, Accessed on: April 18, 2025, Available at : <https://insse.ro>, 2025;

- [14] **Keskin Tayfun, & Vermeulen Fleur**, *Overcoming the Digital Divide in the Era of Artificial Intelligence*, Proceedings of the 57th Hawaii International Conference on System Sciences, 2024;
- [15] **Munteanu, I.-D., & Goschin, Z.**, *Digitalization and education: modelling spatial interactions in Romania*, Romanian Journal of Economics, (62), 1/2026, 5-16., Z, Digitalization and education: modelling spatial interactions in Romania, 2026;
- [16] **Neagu, G.; Berigel, M.; Lendzhova, V.**, *How Digital Inclusion Increase Opportunities for Young People: Case of NEETs from Bulgaria, Romania and Turkey*, Sustainability 13, 7894. <https://doi.org/10.3390/su13147894>, 2021;
- [17] **Reay, D.**, *Miseducation: Inequality, education and the working classes*, Policy Press, 2017;
- [18] **Silvia-Elena Iacob, Alexandra Constantin, Alexandru Radu Budu**, *Examining the challenges and opportunities of AI integration in the Romanian education system: a case study perspective*, Theoretical and Applied Economics, Special Issue Volume XXX, pp. 9-32, 2024;
- [19] **Stancu, D. F., Munteanu, R. A., & Petrescu, I. R.**, *Comparison of Romania's Digital Education Model with Other Eastern European Countries*, International Journal of Education and Digital Learning, 3(6), 270-277, 2025;
- [20] **Toc Sebastian**, *Vulnerable young people and social inequality. An analysis of the social situation of neets in Roma*, Centrul național de politici și evaluare în educație unitatea de cercetare în educație, Journal of Pedagogy, (1), 7 – 29 <https://doi.org/10.26755/RevPed/2020.1/7>, 2020;
- [21] **Tőkés, G.**, *Competențe digitale avansate la nivel universitar: Dincolo de comunicarea online de bază*, Anuarul de Sociologie, 2023;
- [22] **Tufă Laura**, *Diviziunea digitală. Accesul și utilizarea internetului în România, comparativ cu țările Uniunii Europene*, Calitatea Vieții, XXI, nr. 1–2, p. 71–86, 2010;
- [23] **Xiaowei Huang**, *Understanding Bourdieu-Cultural Capital and Habitus*, Canadian Center of Science and Education, 2019;