Collaborative and Digital Approaches to Content for the Development of 21st Century Skills

Costel Humelnicu[1], Delia Humelnicu[2]

Abstract: This study examines how collaboration can help students and teachers acquire the essential skills needed to thrive in the 21st-century's evolving socio-economic landscape. As society becomes increasingly digitized, our education systems must equip individuals with the adaptability required to navigate and integrate into this new environment. The complexity of national, European or global competences, towards which we tend to adopt in educational systems, is a result of the multitude of the available definitions and classifications. This lack of a unified framework makes it difficult to accurately measure their importance and assess how well they prepare individuals to adapt to societal changes. The study highlights the role of collaboration, which considered an important skill in the current century, especially in a digitized world marked by the rise of artificial intelligence. While education has traditionally prioritized individual performance in a competitive environment, fostering a collaborative world requires a shift in mindset. If a collaborative world is desired, it must also be developed among teachers, who have been trained in competitive systems, and co-teaching activities, which were developed in applied terms. By developing these skills, teachers can serve as powerful role models, passing on the value of collaboration to their students. The study describes the necessary steps in carrying out collaborative activities between teachers, which could generate the right collaboration in the educational system. The results obtained from collaboration highlight seven steps, which, when applied, can help increase these collaboration skills, later transferred to the pupils or students' classes.

Keywords: Co-Teaching; Artificial Intelligence; Transdisciplinary; Skills

[1]Asist. Prof. univ, dr. eng., "Dunarea de Jos" University of Galati, Galati, Romania, costel.humelnicu@ugal.ro
[2]Principal and Teacher in a Secondary School, Emil Racovita Theoretical High School, Galati, Romania, Corresponding author: humelnicudelia@yahoo.com.

1. Introduction

Following 2011, society has entered the fourth economic revolution, driven by digitalization and the widespread use of artificial intelligence (AI), which is why human adaptability is being put to the test. The formation of each person begins in the educational system, and this, more than ever, must change, reform and include novelty at a higher, visionary level, forming a competent citizen, who can easily integrate into the socio-economic system of the twenty-first century.

1.1. Directions in the Current Education System

As education has been (and still is) focused on objectives that put the student (but not the students) at the center, measuring the performance of a school in terms of the results obtained individually (but which give the whole), collaboration was not a target of the Romanian education process. On one hand, this has left teaching staff with limited training in collaborative methods, and on the other hand it has conditioned students to be motivated primarily by personal achievement (and grades are a benchmark) rather than how they collaborate. The competences, as defined in the various regulatory documents of the education system, do not include collaboration as a competence either, even though the word appears in the two laws of pre-university and university education, more than 100 times (142 times in the Law on Pre-University Education (2023) and 112 times in the Law on University Education (2023).

1.2. Features of Collaboration in the Current System

Collaboration between teachers is a goal set out by the laws and policies of university and pre-university education, but often in the form of personal mentoring, in which the student learns and is guided by a teacher with experience in the field (until obtaining the final degree, teaching degrees or doctorate). It is widely described and applied in special education, where there are support teachers. However, collaboration between experienced teachers is important in other education formal settings, because, on one side, it will bring value to professional relationships and support one's progress, and on the other side, it can be carried out permanently, in the form of Co-teaching activities, in mainstream schools, where most of the students are included, therefore it can have the the greatest impact.

Co-teaching is an activity in which two or more teachers collaborate to carry out a didactic activity where each one brings their expertise on the subject of teaching to achieve skills at a higher level (Gallo-Fox & Scantlebury, 2016, p. 191-202). It is a difficult activity to implement, requiring careful planning and coordination between teachers, which incorporates different expertise in the form of different languages (depending on the discipline), different teaching styles, different approaches, but which must be integrated into the lesson in a balanced way. The challenges are multiple and can be related to the time and resources that must be invested in planning and coordinating these activities: the activity can be carried in the class of one of the teachers, with the voluntary participation of the other and therefore it also requires additional time resources.

2. 21st-Century Competencies: A Framework for Lifelong Learning and Professional Success

What is competence? It is the ability to make a judgment about a matter based on a deep knowledge of the problem in question (Dexonline). In the educational system, competences are pursued multidimensionally:

✓ For teachers, they represent integrative sets of knowledge, skills, motivations and attitudes that mediate professional behavior and guarantee expert action in specific fields and contexts of activity specific to the teaching profession, a generally accepted and consecrated definition within policy and studies in the Romanian educational field (Profilul cadrului didactic, 2024, p. 8). Figure 1 shows the seven competences of a teacher.

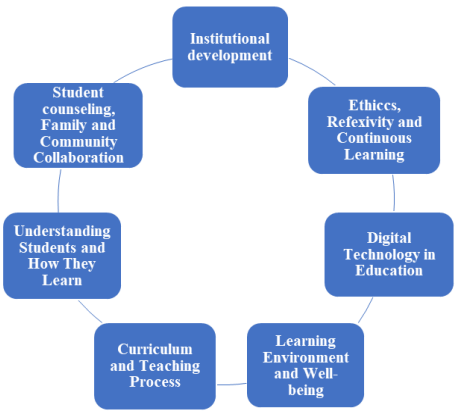

Figure 1. Teacher Professional Profile – Competency Domains

✓ In pre-university education, according to Law 198 (2023): competences represent the multifunctional and transferable set of knowledge, skills and abilities;

✓ According to the European Framework (2018), the eight key competences, for students, are defined as follows: a) competence in reading, writing and understanding the message; b) competence in multilingualism; c) mathematical competence and competence in science, technology and engineering; d) digital competence, including internet safety and cybersecurity; e) personal, social and learning to learn competence; f) civic, legal and environmental protection competence; g) entrepreneurial competence; h) competence of cultural awareness and expression. These were first defined and adopted in 2006 by the European Parliament and the Council of the European Union, later revised in 2016 in the 'New Skills Agenda for Europe' and adopted in their current form in May 2018 and are defined as key competences for lifelong learning.

✓ In university education, according to Law 199 (2023) there are transversal competences, professional competences, scientific research competences requited in order to respond to the subsequent need for competence in the socio-economic environment.

In the development of the modern individual - an adaptable citizen in the educational system - skills are needed to help him navigate the current environment. There is no one single answer to this. It is therefore necessary to highlight other directions:

The American non-profit organization Partnership for 21st Century Learning (P21) (Ohio Department of Education, 2015, p. 4) has developed on a large scale the concept of the 4Cs, which include collaboration, critical thinking, communication and creativity. These were developed for all subjects and for each school cycle, highlighting the strategic objectives towards which modern educational systems should aim to achieve (Ohio Department of Education, 2015, p. 61). Shortly after, the World Economic Forum – WEF expanded the framework from 4C to 6C, adding, to the first four, character and citizenship, through the participation of Professor Michael Fullan (2025), a renowned expert in global education, who was involved in the reports published since 2017.

In 2021, UNESCO, in the "Futures of education" Report (Renton & McCrindle 2021): "Reimagining our futures together: A new social contract for education", advocated for a rediscovery of the purpose of education, emphasizing the importance of solidarity and lifelong learning.

In a report published on 6th May 2025 by the United Nations Research Programme focusing the Human Development Report (2025), "Breaking the Gridlock: Reimagining cooperation in a polarized world", emphasis was placed on two aspects that appear to be essential in the coming decades:

collaboration, which must be more important than competition between people;

AI, seen as an opportunity for design and implementation, a path of human development, a way to personalize education and other services, thus generating new jobs.

When human development is centered on individual choice which emphasizes the ultimate goal for a society that is made for people that value what they have together a community, and where AI is seen as a path, not an end, then the imagination the individual will allow the use of AI in favor of economic development. While the use of AI in various fields has raised concerns about job displacement, this fear can be mitigated. If AI is used to automate repetitive tasks, humans will have more time to collaborate and innovate. The resulting economic progress would ultimately surpass the gains from automation alone.

It is estimated that 50% of students, 15% of employees and 9% of the elderly (generally for entertainment) already live in a digital world and use AI. The education system must therefore focus on developing those skills that increase the degree of adaptability to the digital world, by stimulating cooperation (Human Development Report 2025). When looking at education studies, a great deal of research focuses on how teachers need and can promote collaboration between students in the classroom, and fewer studies explore the need for teacher to learn how to collaborate among themselves. This overlooks the transformative power of modeling behavior. If students witness their teachers actively collaborating, they are far more likely to absorb and apply these skills themselves, becoming more engaged in the collaborative activities designed for them.

3. Implementing co-teaching activities: case study

Based on these limitations - or rather, these opportunities - an experiment was conducted to explore the benefits of co-teaching. The experiment was led by three geography teachers who each partnered with a Romanian language and literature teacher, mathematics teacher and economics teacher to carry out three 1:1 co-teaching lessons. Starting with a common geographical theme, each two-person team developed a unique lesson plan that leveraged their combined expertise. This

resulted in a geography-mathematics lesson, a geography-economics lesson and a geography-Romanian language and literature lesson. All lessons integrated various digital tools and resources: didactic films, the use of AI in making suggestive images, online evaluations, using Kahoot, Quizz, Mentimeter, statistical data taken from specialized websites (Human Development Report, 2025), graphs and online maps; with the traditional (but modern) teaching methods: concept maps, case studies, reading book, bunches, escape envelope. The common teaching lesson focused on geography, but in each activity the expertise of the teachers involved was very well intertwined: there were discussions between the geography teachers in establishing the lesson plan which has a common theme, but also between them and the guests. To maintain a coherent lesson flow, the lesson plan was structured around the standard parts of a lesson. Some activities were designed for both teachers to lead together, while others involved one teacher taking the lead at specific moments.

Three activities were different in content, but were tailored towards developing the same competences which are included in the curricula across the four disciplines. It was observed that the higher-level competences are primarily achieved whereas in a traditional lesson, are develop more slowly or are not achieved. The case study was based on the theme of "Population, resources and sustainable development: Case study: Sustainable Development Index" (Geography, 10th grade).

The geography-mathematics lesson focused on the Human Development Index (HDI). The math teacher's role was to guide students in calculating the index and interpreting its individual components, along with reading and analyzing related graphs, tables, and maps, logical games having as an essential role the development of logical-mathematical skills and the applicability of the discipline in the real world. The geography teacher then explained the geographical factors and territorial distribution that account for the differences in the calculated HDI values.

The geography-Romanian language and literature lesson transposed the delivery of the geographical subject into different communication styles – scientific, literary and non-literary, publishing, through comics. This contributed towards developing students' creativity in a collaborative and efficient way. The use of the lesson theme resembled a scientific text often found in the baccalaureate exam. The Romanian teacher explained the difference in using the specific connectors when building the text, which alternated with the scientific explanations brought by the geography teacher.

The geography lesson-economics combined the geographical element – reading and interpreting statistical socio-economic data and comparing them with the explanations in the sphere of economics, such as GDP, GNP, inflation, budget, gross income, net income, percentage of GDP for education. The latter engaged a discussion using geographical understandings to understand the correlation with other indicators.

4. Stages of the Study

Characteristics, Role and Relevance in the Success of a Collaboration

By applying the principles of collaboration during the three months of preparation, discussions about the theme that was the basis of the collaboration, several steps and characteristics related to the way in which six teachers can collaborate for a successful delivery, are recognized. It is possible to distinguished some aspects related to the role, characteristics and relevance of some attitudes, highlighted after the meetings between the six teachers involved and the way in which they interacted during the preparation of the activities to the way they were carried out as a co-teaching activity. These elements are summarized in Table 1.

Table 1. Stages of Collaboration

Co-teaching	Steps in collaboration
Stages of collaboration	**I** Start with a break, so you can tackle real challenges. **II** Use paraphrases to encourage critical thinking. **III** Ask questions but be flexible/malleable. **IV** Propose ideas to value individual expertise and collective creativity. **V** Exemplify and analyze for effective co-teaching. **VI** Pay attention to yourself and others and emphasize the human aspects. **VII** Trust your colleagues: they have good intentions.

4.1. Role and Relevance of Each Stage

I It is a difficult stage, because it is discussed in different communication styles where the expertise of one collides with the other and the communication channel is blocked by many unknowns. This is why active listening and patience will align the different visions. The themes, the directions of documentation and the immediate next steps are proposed. In all discussions, the speaker must be listened to to the end, regardless of the opinion of the interlocutors at that time. Respect for the people in the newly formed group and the management of one's own prejudices and the ability to not look for answers during discussions are essential. It is a moment when, if the steps taken are sincere, the first ideas crystallize, the proposer does not give up, but becomes malleable, and the first changes of the initial plan appear.

II At this stage, even if what has been said is not repeated, the understanding is clarified and validated, through reformulations, through which the common denominator is generated. Everyone's ideas are recognized, so language becomes empathetic so that everyone admits the vision of the others. Everyone involved is on the same page and they feel listened to and understood. Consensus is built. It is important that in the discussions we have the teachers replace "I believe" with "it seems that you felt...". It is good that this stage is documented, and what has been written down (the proposals accepted and not accepted after the first stage) is shared with those involved, thus being validated. From this stage we can see the creation of a common channel in which the visions and skills of all those involved intersect.

III It is the moment in the collaborative activity when the dialogue is constructive and new ideas personalize the lesson, without deviating from the initial vision. Trust between team members crystallizes. The imprint of each expert is integrated into the plans, which begin to differentiate. The specialization of each teacher (the expert) comes into play, details are added that complete the lesson plan that becomes transdisciplinary. The geographical theme, which is central to the lesson plan, up to this stage, incorporates elements from the other disciplines.

IV Statistical data, official sources that can be used as case studies to be included and the methods, procedures and means of work are chosen. The theoretical elements, specific to each discipline, are transposed into specific, harmonious and collaborative didactics. The creativity and ingenuity of each participant generate, in addition to respect, a mutual admiration, through the proposals made, which will significantly enrich the activity. It is a beautiful, relaxing stage in which each member highlights their ingenuity.

V They represent a continuation of the previous stage, by integrating them into the activity, by sharing expertise. It is the phase of personal expertise and effective collaboration, resulting in a common communication channel. It is the peak of co-teaching, each teacher contributing to the shaping and implementation of the activity, bringing value from the perspective of their own discipline and their own experience. The collaboration is maximum and "you can see the light at the end of the tunnel".

VI It is a transversal principle which is applied throughout the entire collaboration. Your own behavior, tone of voice, choosing the most appropriate words in the dialogues are essential. Those who collaborate are specialists in various scientific fields, with different communication styles and a positive atmosphere must be maintained. This stage, and its success, is based on the way in which the people who collaborate have related over time.

VII The last stage starts from the concept of "open mind" with which those who want to collaborate must be endowed, the positive mentality eliminating assumptions and pre/judgments from the start. It is a fundamental attitude of trust and openness, essential in collaborative co-teaching activities. It is essential to organize joint activities with teachers who can and want to collaborate, because the person who is open to collaborating will not make assumptions and will not judge. If the mind is set to believe that the other person also has good, positive intentions, the way of listening and understanding the messages sent will be positive, applied and constructive.

Conclusion

What skills do we need to develop in ourselves as teachers among the young generation? Their variety, from national, European or global, to current or future ones, puts pressure on education systems, which have the purpose to develop the tomorrow's individual: we prepare pupils, students today, for a society of tomorrow. Digital skills are becoming a "must have", so the educational system must integrate it, regardless of the subjects taught, as it is part of current activities, regardless of the field of activity.

Collaboration will be part of the future world through the advantage it has even over digital skills and artificial intelligence, which is used as a way, not an end, to generate socio-economic progress.

In the short term, the advantages of those who collaborate are multiple, generating professional development through created and applied experiences, positive energy,

through which the practice / routine is renewed, the expansion of the curriculum and the diversity of classroom practice, personal growth promoted through reflection on practice, the development of leadership skills, as trainers, teachers and practitioners. Indirectly, these benefits of the teacher are transferred to the classroom activity, to the direct beneficiary of education – the pupil or student.

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