



## **Computer supported collaborative learning in Greek inclusive secondary education**

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### **Abstract**

Computer-assisted collaborative learning is known to challenge and motivate students with Learning Disabilities. The present paper therefore intends to briefly present the benefits of computer-supportive collaborative learning activities as well as demonstrate specific practices and paradigms concerning the inclusion of students with Special Educational Needs in Secondary Education in Greece. To reach this target, the researchers proceed to an ICT literature review associated with computer-mediated collaborative and inclusive learning methods in Greek Secondary Education. According to literature review findings, these learning methods are considered beneficial in terms of learning purposes directed to students with learning disabilities since they do raise students' interest and engagement in the learning procedure, enhance their cognitive abilities and assist them to develop self-esteem, problem-solving strategies and, finally, a solid collaborative attitude. Therefore, this paper concludes that there has been a lack of significant progress with respect to establishing collaborative inclusive learning environments in Greece.

**Key words:** Collaborative learning; computer-supported education; Inclusive education; Special Educational Needs and/or Disabilities; SEND

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## 1. Introduction

A special category of the new technologies refers to the Computer Supported Collaborative Learning systems which support collaborative learning as an instructional method of Inclusion (Uzunboyly & Gundogdu, 2018). Computer-assisted collaborative learning challenges and motivates students with Learning Disabilities (LD), if it is used effectively, as it offers a wide variety of chances for expression, creativity and interaction among those participating in it during the educational process (Pozzi, 2011; Fetaji, Fetaji, Asilkan & Ebibi, 2020).

The terms "Inclusion" and "Education without exclusions" mean establishing such a framework that all children included in it, regardless of their ability, gender, language, national or cultural origin - can be equally valued, treated with respect and provided with an equivalent number of authentic learning opportunities. Despite the broader meaning of "inclusive education" the focus on Students with Special Educational Needs and/or Disabilities (SEND) remains interesting. In fact, although students with SEND are increasing in education, most of the research findings mainly concern the role of ICTs in General Education compared to Special Education (Catlin & Blamires, 2019). However, there is some evidence that incorporating ICTs in Education can enhance its impact through collaborative learning, knowledge construction, individualized feedback, etc. and can also offer opportunities for school and social inclusion of people with disabilities and learning difficulties as well as for raising their self-confidence (Xanthoulh et al., 2013).

Specifically, ICTs set out the five goals of developing students' computer skill; that is, Information Management, Development of Communication Ideas and Information, Measurement and Control, Modeling, Applications and Results (Al-Bataineh et al., 2019). Students participate in the collection, storage, retrieval and modification of information as well as their simple introduction. Databases become a powerful tool in the hands of students' for investigating the importance of information with categorization and exploration. Besides, the wide range of ICT devices, which allow students with learning disabilities to cope with the constant influx of information, is an ongoing process that never ceases. Therefore, students are expected to become aware of how to recognize, evaluate and apply methods of media persuasion in order to solve practical problems, given that the emphasis is set on the process of Design and Technology rather than on the cultivation of language skills (Ashdown et al., 1991).

To be more specific, upgrading communication methods through ICTs, does create a new "facilitative" educational environment for people with disabilities, although designing of relevant educational software and programs relies more often on the philosophy of practice and less on psychological support (Stefanidis et al., 1994; Ozbey, 2020). This paper presents a brief literature overview in the field of ICT exploitation by the Greek educational system. Additionally, it offers further details on the degree of promoting collaborative learning and teaching via technology channel in Secondary Education without excluding students with different educational needs from current educational procedures of the 21st century.

## 2. Theoretical Framework

Constructivism-based practices in inclusive education settings involve instructional methods and strategies capable of assisting learners to actively explore complex topics, such as presenting multiple perspectives via collaborative learning to develop and share alternative views (Ertmer & Newby, 2013).

Indeed, some decades ago Vygotsky (1962) emphasized the social role of learning because of its great and direct impact on cognitive development through learning and interaction between children and their peers, parents, and teachers (Saricam, Deveci & Ahmetoğlu, 2020). Hattie (2008) has similarly claimed that students in a constructivist inclusive education setting would benefit most through peer tutoring and cooperative learning. Through peer tutoring and cooperative learning, students can interact with each other and actively learn in a real-world setting. Cooperative learning groups, for example, may be formal or informal. Formal groups may be organized based on students' abilities or interests, whereas informal groups may be spontaneously formed within which students are asked to pair and brainstorm on different topics.

In general, innovative forms of learning within educational settings regard active learning as a prerequisite. That is the type of learning that is related to the preparation, execution, adjustment, control, feedback and retention of learning skills by the students themselves. Its basic characteristics are associated with durability of the educational product over time, with flexibility and global approach as well as the emergence of different perspectives, with adaptability to any new data, with functionality in different space-time contexts and finally with usefulness and application (Krokou, 2007). On this basis, learning does not simply stand for acquiring information, but a continuous process of resolving internal cognitive conflicts. These conflicts arise but are also resolved within the framework of communication and interaction of the individuals with their natural and social environment (Matsangouras, 2000).

Collaborative learning aims at maximizing students' personal knowledge by making it easy for students to interact with the other members of the team with whom they are cooperating in pursuit of a common goal (Johnson, 2001). In such a context, critical thinking can gradually emerge. Its criteria refer to curiosity and search, questioning and re-examination, willingness and perseverance, readiness and determination, regularity, respect for the views of others (Prevezanou, 2007).

In parallel, teachers who take advantage of targeted collaborative techniques look up to prohibit incomprehensible, social and educational prejudices that enhance and support school competition (Pineteh, 2012; Robin, 2008). Another study by Johnson, Johnson and Holubec (1990) describes "Collaborative Learning" as the learning procedure in which the classroom is organized in small groups with the aim of realizing and achieving a creative partnership among pupils. This technique intends to optimize not only all the participants' own pace of learning but also the way all the team members acquire knowledge. Undoubtedly, the allocation of cooperative activities by teachers shows an attempt to promote and establish favorable outcomes for each member individually and all the team members (Manogharan, Karuppanan & Chiong, 2018). They also notice that in a CL setting, there are no signs of competitiveness among pupils, since they work as a group with a common final objective, for which all team members have agreed to work out harmoniously together.

Teamwork spirit on one hand and empowering members' social relations on the other represents the basic philosophy behind this teaching method. Except for these characteristics, this teaching approach depends on the premise that the team's progress lies primarily in the mutual trust and interest among all its members. Therefore, group members should not only participate equally in every single team action, but also bear the responsibility for any expected occasional failures (Johnson et al., 1990).

In this perspective, Alavi (1994) supports the argument that teamwork reinforces learning through problem solving techniques which are a means to extend, test, and refine mental models until they become effective and reliable. According to Slavin (1990), collaborative learning fosters social support

and encourages individual learning. Furthermore, it increases self-esteem because within the learning community, its members cooperate for a common goal and adopt pre-agreed roles. This contributes to not only to developing a sense of shared responsibility and mutual support but also to the cultivation of a friendly climate that indeed encourages learning. Such a working environment favors socialization of its colleagues and can unleash beneficial effects on those engaged. This is because some of them for various reasons (e.g., shyness, reduced self-esteem, aggressive and unfriendly environment), might hesitate to express their views publicly before the others around them. Moreover, through collaboration, students acquire additional learning incentives. In fact, pupil's nature and needs are perfectly in learning communities, when they work together in achieving common intellectual goals. On the contrary, their isolation inhibits their inherent tendency for communication and social interaction. For these reasons, the individuals' work within a predetermined learning community that follows the CL techniques, can by itself be a powerful and unprecedented motivation for learning, given that it helps students develop organizational and work-related skills within groups. It is through collaborative learning (Johnson et al., 1990) that students realize how directly connected they are to each other in such a way that no one can respond to their role successfully without having been previously supported and sustained by the other team members and that everyone's success after all depends primarily upon the mutual contribution by everyone within the team. This entails development of a sense of shared responsibility, mutual support as well as cultivation of a friendly climate that further reinforces learning. With reference to student collaboration and solidarity, every student contributes to common progress by assisting and offering the best of their capability. Another useful and interesting feature of this learning method is that it arms students with oral explanatory guidelines on how they could solve any sudden problem of theirs, disseminate knowledge to one another, control understanding among the interlocutors, discuss the target concepts and link current knowledge to previous one.

Additionally, teamwork develops a strong sense of responsibility among the members in their attempt to achieve their goal given that every single student feels particularly responsible for their personal contribution to the team progress. Finally, children and adolescents form small groups with common goals (e.g., to play, to have fun) and because of this harmonious coexistence, they are filled with and enjoy a lot of emotional satisfaction. In fact, organizing pupils in learning communities in search of teamwork with a view to realizing common cognitive targets, is fully in line with their nature and needs, whereas an individual way of living and working on their own does violate their innate proclivity for interaction and communication. At the same time, teachers gain a better understanding of their class as well as their students by using contemporary application tools (Papathanasiou & Manousou, 2011).

Moreover, the implementation of teaching methods that utilize pedagogically updated educational ICT tools, whose main purpose is to bring school closer to society and real life as well as to boost students' self-esteem, is also remarkable (Sartinaha et al., 2021). This is the outcome from the development and cultivation of communication and collaborative skills that favor a critical-thinking frame of mind as well as decision-making strategies in Cooperative Learning (Fragaki, 2010). The peers' role in these newly emerged learning environments magnify their capacities with respect to the dynamically established relationships among the participants and to the ensuing IC development.

Finally, taking into consideration that technology has paved the way for overcoming any obstacles related to the obligatory physical presence of the teacher-student participants in the same space or time, researchers can safely draw the conclusion that a widespread use of digital tools such as e-talks,

teleconferences, e-mail, whiteboards, chat rooms, HTML-pages, is not only permitted within the contemporary learning settings but highly expected, as well (Pozzi, 2011).

### **3. Computer-Supported Collaborative Learning in Greek Inclusive Secondary Education**

The Greek secondary education system is said to be centrally organized on a national level. In fact, its broader educational policy planning, its resource distribution as well as teachers' employment are centrally controlled and defined by the Ministry of Education. Thus, the settled school system along with its strictly-set timetables and its centrally-imposed educational material, tend to display very similar, if not identical, characteristics, while the applied curriculum not only lacks flexibility but it is also strictly academically orientated (Zoniou-Sideri et al., 2006). Considering these circumstances, such procedures are based on the idea that 'one size fits all' rather than on the concept of 'equality of opportunity', which is a core issue and typical of inclusive education.

Policies re-oriented into integrating ICTs in Greek education, have been implemented in recent decades in secondary education, both at an international and a national level, as well. These redefined policies reflect the transition from a school that merely "provides knowledge" to a school that mainly "develops skills" while being permeated by the influence exerted by the two major currents of cognitive psychology; that is, behaviorism and constructivism. It is therefore interesting to highlight, on the one hand, the use of technology with a "tool logic" where technology is an "object" and not a "means" of teaching. On the other hand, one can approach technology as a shift towards a "technological pedagogy" where Technology, and especially the digital one, helps students to better acquire knowledge and faster develop various skills thanks to its special and empowering features (National digital academy)

The real development of technologically-supported learning methods makes its appearance along with the increasing number of personal computers in Greece during the 90's, the sudden uprising of multimedia technology as well as the rapid proliferation of computer applications that allow multiple ways of representing and accessing information (multimedia systems and computer simulation systems). In the next decade (2000-2010), a systematic connection of ICTs with all school subjects was put forward, due to the development of broadband networks and of course the Internet. This attempt was obvious in the curricula of that time.

Unfortunately, the integration of technology is limited to its users just presenting websites, displaying multimodal texts without the appropriate pedagogical utilization, practicing students through confined and secured software and interactive digital learning environments that focus on vocabulary and morpho-syntactic ability alone (Greek Distance training center, 1996; Hamid & Mohamed, 2021).

Pan-Hellenic School Network (P.S.N.) is the national official network of the Greek Ministry of Education, Research and Religions Affairs. Its aim is to electronically and safely interconnect all Primary and Secondary Education schools, including educational units located in foreign countries, services and supervised sectors of the Greek Ministry of Education on a central and regional level, lifelong learning service providers, students, education executives and other teachers and institutions being under the jurisdiction and supervision of the Greek Ministry of Education. However, the Pan-Hellenic School Network seems to be either limited to simply depositing documents and presentations in an electronic classroom resulting to its users' resentment and their final withdrawal from engagement (Greek school network, 1996).

Among the services it offers to the broader educational community, we can distinguish those digital tools which are accessible free of charge by all registered teachers, and which are of vital importance, one way or another, for what we call “computer teaching and e-learning” (Greek Distance training center, 1996) and can be identified below.

1. Communication Services: Email, Email Lists, Communication and Collaboration Service,
2. Website Hosting: Web page Hosting, Site Name Hosting,
3. Publishing and Collaboration: Educational Communities and Blogs, Electronic School journals, Collaborative school documents,
4. Sharing Files-Electronic Learning: Teleconferencing, Electronic School Classroom, Telecommunication, Learning Activities Management Service, Practical teacher training service,
5. Multimedia Services: Video Service, Multimedia Presentations and Lectures, Live broadcasts.

One basic factor that may highlight the lack of central planning is the "overlap" of some of the above services with other corresponding ones. These are offered by digital nodes/junctions that have been developed under other Actions-Plans, such as "Collaborate-Participate" Platform to support online collaboration sites and E-me platform, which are digital environment that supports learning, communication, collaboration and networking of school community members. A key feature of this current project is that it fully embraces digital technologies introducing them into education in a holistic way. The main objective behind this, as described on the program's official website, is to turn the Digital School into a tool suitable for the whole school community (both students and teachers included). Its chief target is to play a key role in establishing unanimous and smooth collaboration among its participants as well as promoting sound communication with the rest of the world around through the formation of multiple "digital learning communities" (Digital Education at School in Europe, 2019).

Another important element concerns the effort made to form those conditions necessary for equal opportunities with respect to arriving at digital competence and an easy access to the digital content by all students and teachers. As far as equal opportunities and inclusive education are concerned, the existing digital educational material intended for visually impaired students, have been adapted to enable the unique and amazing possibility of automatic pronunciation of textbooks through an artificial voice. Also, support services have been added for students with hearing difficulties. Additionally, research has demonstrated that when addressing teleconferencing as a means of instruction within the educational procedure, it is likely to generate quite a few satisfactory results in students' overall performance and collaborative learning (Papadimitiou et al., 2007).

Furthermore, as is usually the case, when students work collaboratively in the classroom, they all discuss as equally respected group members the topic they are dealing with and as such they end up creating a holistic and meaningful view of it. After that, at their own pace, they follow a concrete procedure of firstly typing it on the Word, printing it, reviewing it and finally writing down their remarks. Consequently, the outcome is much better than the initial one (Mumtaz & Hammond, 2002). Another interesting research has taken place in schools of secondary education in Greece and investigates the effects arisen by collaborative learning techniques when it comes to integrating ICT's and, more specifically, the Concept Mapping Software on ameliorating the writing skills of ADHD students (Andreou & Riga, 2013). Researchers reached the conclusion that students express an innate tendency and preference to work in groups rather than individually. Furthermore, the researchers pointed out that collaborative concept mapping facilitated and empowered classroom teachers to perfectly meet all their students' individual needs, corresponding to their personal rate of comprehension by

graphically representing their errors and misinterpretations. What became obvious was that in instances where students were asked to concentrate on theory and analyze collaboratively the relevant text, they were assisted by ICTs and CL, being offered, consequently, the opportunity to deductively draw theoretical conclusions regarding writing. In this way, students were in the position to interact, transfer, and exchange their views with the other members of the team (Riga & Papayiannis (2015).

Greece was one of the European countries that participated in the SCOUT project, an interesting European programme which utilized the theatre through Information and Communication Technologies (ICT) to promote the aims of IC. Through that project entitled “SCOUT: Student Collaborative and Open learning for European Theatre and culture” in 2006 (pp. 193-196) the European Community attempted to develop and transfer knowledge and skills to all students of Primary and Secondary Education. Unfortunately, in the Greek educational scene this was unfortunately terminated owing to the lack of technological support in classrooms. Greek teachers attempted to collaborate with their colleagues from Spain and Great Britain, creating a wide variety of learning scenario and activities inspired by Lorka’s act but it eventually did not work out in Greek schools due to technological inadequacies at the time.

There is no doubt that the internet is intricately connected to the breaking of physical and spatial boundaries imposed by natural distances as well as to comprehending, accepting diversity and bringing people of different cultures together. However, in terms of internet-connected laptop computers Greece is again among the bottom group of countries. Accordingly, students of isolated regions do not benefit from the network since these children lose the opportunity to harmoniously cooperate with all other students irrespective of their physical distance and eventually expand their spiritual horizons. In another review by Scanlon and his colleagues, what is explicitly supported is the view that there are computational courses, which offer multiple opportunities for collaborative problem-solving and critical thinking which without any doubt relate to promising learning outcomes (Scanlon et al., 2002). Moreover, groups can work constructively to create posters for various school and local events. By interacting and discussing within the group, students may decide on the context in which they are going to move, record all their ideas and, after all, use their compilation of written records by means of working on a methodologically designed plan.

Eventually, another intriguing aspect of ICTs in the field of education is associated with the well-known simulation programmes. To be more specific, simulation systems are based on theories and applications which need to be used by students to boost their learning performance by getting involved in a real-life situation (Zulfiqar et al., 2018). With the aid of the specific educational software students can gain control over Physics or Math principles and experiment with scientific processes. Jimoyiannis and Komis (2001) conducted a research to investigate the role of computer simulations in the development of functional understanding of the concepts of velocity and acceleration in projectile motions. The results presented that Greek students working with simulations exhibited significantly higher scores in the research tasks and managed to confront their cognitive constraints and develop functional understanding of physics. In fact, in relation to international literature, it is underlined that students perform better in academic terms when they collaboratively learn with the help of simulation systems as compared to non-simulation ones (Ke & Carafano, 2016; Otting et al., 2009; Zulfiqar et al., 2018).

#### 4. Conclusion

Overall, the rapid development of new ICTs in the first decade of the 21st century creates new data in the field of open and distance learning, significantly changing the environment of learning, communication and interaction with the introduction of Open Educational Resources (OERs) and Massive Online Open Courses (MOOCs).

More particularly, in the case of Greece, most actions, and especially those associated with integrating ICTs in education, called for adequate tools and efficient technical infrastructure of schools, for the need of developing suitably upgraded software and educational applications as well as digital spaces as a means of enhancing the expected educational outcome. Indeed, in Greece there are considerable fewer computers available for all grade students than the EU average and provision is consistent at all grades. Moreover, all the necessary processes occur without making any provisions for all the necessary steps towards a vital "reconstruction" of the Greek educational system, such as the administrative structure of Education, Curricula and textbooks. In short, the idea of setting a framework in incorporating ICTs in education, where ICTs are systematically and meaningfully introduced in high school education has rather been out of the question in recent years.

The Greek Educational System needs to make sure that all students enjoy equal access to the appropriately chosen and implemented digital technologies and resources. Moreover, this system should select and employ digital pedagogical strategies capable of responding to all learners' own digital context, like contextual constraints to their technology use (e.g., availability), competences, expectations, attitudes, misconceptions and misuses. Furthermore, employing digital technologies and strategies, e.g., assistive technologies, specially designed for learners in need of special support e.g., learners with physical or mental constraints or learners with learning disorders is another challenge for the Greek Educational System. Also, it is expected to consider and respond to potential accessibility issues when selecting, modifying or creating digital resources as well as to provide alternative or compensatory tools or approaches for learners with special needs. Finally, it is recommended that this educational system employ design principles to further facilitate accessibility to the various web resources and digital environments used in teaching.

In this way, teachers are certainly provided with a unique technical opportunity in their anticipation and anxiety to integrate as much a larger number of students with special needs into the educational process and learning environments as possible, knowing that such an approach to learning is likely to bring about equality in terms of students' education. What is important is that the way teachers use ICTs in classroom is determined, to a certain extent, by their pedagogical practices, beliefs and reasoning which, in turn, influence students' literacy achievement. Appropriate technical support is crucial for the teacher if he or she wishes to use ICTs for students' individual learning needs. They are part of the developments in the learning environment and in combination with innovative pedagogical perceptions, they result in actively engaging both the students and teachers, in developing cognitive skills as well as facilitating continuous and smooth interaction between students and teachers.

Consequently, direct teacher support is a key issue in developing the skills needed to operate ICTs and improve accessibility for all. Additionally, collaborative learning techniques bring Special Education closer to society and aligns it with the modern teaching approaches, which is highly recommended and reported by reliable contemporary pedagogical research.



Finally, future empirical studies are considered most essential in relation to investigating how instructors and tutors could possibly surmount these obvious limitations such as technological, pedagogical, social and organizational barriers, transforming them into the best teaching practices for elevating the teaching methods of the Greek Higher Education.

From the clues, nobody can refuse that ICTs promise new learning experiences and great chances for both students' and teachers' evolution. Indeed, teachers and teaching community of Greek Secondary Education need to become more digitally literate and integrate all digital tools in their teaching philosophy in order to keep up with all those technological and pedagogical innovations. The connection of ideas, communities and networks through ICTs, enhances the development of a collaborative inclusive culture of digital educators and students for a practical approach to learning within the social and cultural context.

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