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COMPARATIVE ANALYSIS OF THE CURRICULA OF THE "TECHNOLOGY" COURSE IN SECONDARY EDUCATION (2014–2023) IN GREECE: THE 7TH GRADE (1st YEAR OF GYMNASIUM) AS A FIELD OF TRANSITION FROM TECHNOLOGICAL FAMILIARITY TO INTERDISCIPLINARY AND STEAM-ORIENTED LEARNING

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Abstract:
This study comparatively examines two institutionalized Curricula for the Technology course in Gymnasium (grades 7-9), the older Curriculum of 2014 and the newer Curriculum of 2023, with an exclusive focus on the 7th grade (1st year of Gymnasium in the Greek educational system). The analysis focuses on the philosophy, objectives, content structure, teaching approaches and assessment practices, highlighting the pedagogical and epistemological shifts over time that occur in the teaching of the Technology course. The findings demonstrate a clear transition from an introductory and mainly individual-centered model to a modern, interdisciplinary and student-centered framework, which incorporates STEAM education, computational thinking and mechanical design. The 7th grade (1st year of Gymnasium in the Greek educational system)

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emerges as a critical pillar for the formation of technological literacy and the development of 21st-century skills.

Keywords: technology, 7th Grade, gymnasium, curriculum, STEAM, computational thinking, mechanical design, formative assessment

1. Introduction

1.1 The role of Curricula in modern education

Curricula are the fundamental mechanism through which educational policies are transformed into pedagogical practice (Pius, 2024). They are not simply lists of Curricula, but complex pedagogical texts that incorporate social values, scientific assumptions and perceptions of learning and the aim of school (Apple, 2019; Goodson, 2014). In secondary education, Curricula acquire particular importance, as they are called upon to balance between education, specialization and preparing students for a rapidly changing socio-technological world, but also in a constantly changing learning environment with various challenges and issues (Leontopoulos et al., 2024a; Leontopoulos et al., 2024b; Skenderidou et al., 2025). International literature states that modern Curriculum must respond not only to cognitive goals, but also to the development of 21st century skills, such as critical thinking, creativity, collaboration, digital competence (OECD, 2018; UNESCO, 2015) and distance learning application (Harris and Goosen, 2021). Likewise, the successful enhancement and development of Technology education in the future depends on continued research endeavors and subsequent discussions amongst the international community of technology education researchers and educators (Dunbar et al., 2019).

1.2 Theoretical models of Curriculum design and international trends

The theory of Curriculum has been shaped through successive phases (White, 1971; Rennie et al., 1992; Kallen, 1996; Fisser and Thijs, 2015). Tyler's (1949) rational-technocratic model established the logic of design based on clear objectives, content, teaching procedures and assessment. Although this model has been influential, it has been criticized for its linearity and limited pedagogical scope (Pinar, 2012). Later approaches view the Curriculum as a social and cultural construct, influenced by ideologies and historical contexts (Apple, 2019). At the same time, social-constructivist learning theories, inspired by Vygotsky (1978), emphasize the importance of active student participation, which is a common feature for all levels of education (Ancheta et al., 2021), social interaction and reflection, elements that are increasingly incorporated into modern Curricula. At the international level, there is a clear shift from knowledge-centric curricula to skills and attitude-oriented learning frameworks (Gelen and Çetin, 2022). The OECD, through the Learning Compass 2030 framework, proposes a holistic model of education, in which knowledge is inextricably linked to the ability of students to act responsibly and creatively in complex social environments (OECD, 2019). Similarly, UNESCO, (2015) emphasizes that education must promote sustainable development and global citizenship. In this context, secondary education Curricula are being redesigned to incorporate interdisciplinary approaches and digital technologies.

Nowadays, technological education has been internationally recognized as a key component of general education (Sherman et al., 2010; Kotrlik and Redmann, 2009). The concept of technological literacy refers to the ability of citizens to understand, use and critically evaluate technology and its impacts on society (International Technology and Engineering Educators Association [ITEEA], 2007; Asunda, 2012). In secondary education, and especially in Gymnasium, the Technology course functions as an introductory field, where students come into contact with basic principles of design, production and operation of technological systems (Williams, 2011; 2014). International literature reports that early and meaningful contact with technology enhances student engagement and understanding of scientific concepts (Barak, 2018; Pule, 2019).

1.3 The technology course in secondary education

The teaching of the Technology course in secondary education in Greece has long been a field of intense scientific and pedagogical concern. The technology course is not simply a set of technical knowledge or practical skills, but a complex way of understanding and transforming the world, in which science, engineering, society, economy and culture coexist. In this context, schools are responsible for cultivating not only skills in the use of technological tools, but also a critical attitude, creativity and responsibility.

The 7th grade (1st year of Gymnasium in the Greek educational system) holds a special place in the structure of the secondary education system, as it is the point of transition from the learning culture of primary school to a more specialized and conceptually organized Curriculum. The introduction of students to the Technology course at this stage greatly shapes their perceptions of the subject, science and the relationship between theory and practice.

The Technology course in Gymnasium school has always sought to function as a field of connection between theoretical knowledge and practice, cultivating skills of creative thinking, problem solving and understanding of the technological world. The Curricula constitute the basic institutional mechanism through which the educational philosophy of each period is reflected. The comparison between the old 2014 Curriculum and the newer 2023 Curriculum for the 7th grade (1st year of Gymnasium in the Greek educational system), highlights both elements of continuity and important intersections, which are linked to broader pedagogical, social and technological shifts (Government Gazette of the Hellenic Republic ΦΕΚ 406; Government Gazette of the Hellenic Republic-ΦΕΚ 417 B).

1.4 Teaching approaches in the Technology subject and the Greek reality

Project-based learning, which is considered particularly effective in technological education (Bell, 2010), holds a dominant position in the international bibliography. Through authentic problems and design projects, students develop problem-solving, collaboration and creative thinking skills. At the same time, the integration of STEM or STEAM education promotes an interdisciplinary view of knowledge, connecting technology with natural sciences, mathematics and art (Yakman and Lee, 2012). Research shows that such approaches contribute to a deeper understanding of concepts and students' positive attitudes towards learning (Kelley and Knowles, 2016). Accordingly, assessment in modern Curricula is shifting from the final assessment of knowledge to formative assessment and skills assessment. In technological education, assessment concerns not only the final product, but also the process of planning, collaboration and reflection (Black and Wiliam, 2009). According to Hattie (2012), self-assessment and peer-assessment enhance students' metacognitive development and are aligned with the goals of lifelong learning.

Curricula in the secondary education system are dynamic and multi-layered pedagogical tools, reflecting broader social, technological and ideological shifts. In the Greek educational context, they demonstrate a gradual transition from construction-focused approaches to more holistic models, which incorporate inquiry, computational thinking, interdisciplinarity and sustainability (Apple, 2019; OECD, 2019; ITEEA, 2007). Consequently, the Technology Curriculum in Greek Gymnasium school has been revised several times, reflecting international trends and national educational priorities. However, the Greek literature often highlights the distance between the design of the Curriculum and its implementation in practice. Thus, despite the theoretical and institutional redefinition of the Curriculum, the literature systematically highlights the gap between the official Curriculum (intended curriculum) and the implemented Curriculum (enacted curriculum), especially in subjects with a strong laboratory and experiential character, such as the Technology course (Goodson, 2014). This gap makes it necessary to investigate not only the content and philosophy of the Curricula, but also the way in which they are perceived, interpreted and implemented by teachers in educational practice. Thus, today there are various research questions such as: "What pedagogical and didactic concepts for technological education are reflected in modern Technology Curricula in Gymnasium"? This question is directly linked to the theory of Curriculum as socio-cultural texts (Apple, 2019) and seeks to explore the extent to which curricula align with contemporary pedagogical approaches, such as constructivism and project-based learning. Another research question that arises refers to "to what extent do Technology Curricula in Gymnasium incorporate international trends, such as STEM/STEAM education, computational thinking and education for sustainable development". This question draws theoretical evidence from the OECD and UNESCO guidelines (OECD, 2019; UNESCO, 2015) and seeks to examine the convergence of the Greek Curriculum with international educational standards. Also important is the research question of "how do Technology teachers in Gymnasium perceive the goals, content and didactic directions of the Curricula". This investigation is based on the literature that highlights the critical role of the teacher as a mediator of the Curriculum (Goodson, 2014). Finally, for the implementation of the Curriculum in the Technology course, as in all other courses, it is important to investigate "*what difficulties and limitations arise during its implementation in everyday teaching practice*". This question is linked to findings in the Greek and international literature regarding issues of infrastructure, training and available teaching time (Black and Wiliam, 2009; Mahmudi, 2018; Changwe and Mulenga, 2020).

Within the framework of the aforementioned questions, this research aims to systematically study the modern Curricula of the Technology course in Gymnasium, focusing on both their theoretical structure and their pedagogical implications, seeking to contribute to the scientific dialogue on the role and function of the Curriculum in the Technology course in the 7th grade (1st year of Gymnasium in the Greek educational system). In today's era, the need for empirical research that examines the effectiveness of new pedagogies, teachers' attitudes, and students' learning experiences is becoming imperative (Atienoi et al., 2018).

In conclusion, the purpose of this paper is to systematically compare the Technology curricula of 2014 and 2023, with a focus on the 7th grade (1st year of Gymnasium in the Greek educational system) in order to highlight the most profound changes in the philosophy, structure and teaching practice of the subject. This comparison is not treated simply as a historical record of changes, but as a tool for interpreting contemporary trends in the educational process.

2. Pedagogical starting point of the two Curricula

2.1 The perception of the Technology subject in the 2014 old Curriculum

The Curriculum of 2014 is shaped within a framework where the Technology course is mainly viewed as applied knowledge and as a human activity with a practical orientation. The emphasis is placed on familiarizing students with basic concepts, application areas and products of technology, as well as on the development of manufacturing skills. The first year of secondary school, in this particular Curriculum, functions as an introductory stage, where the student is asked to understand what technology is, how it has evolved historically and how it affects everyday life. Knowledge often acquires a descriptive character and is linked to general categories, such as transport, energy, production and communications.

2.2 The modern epistemological view in the 2023 new Curriculum

In contrast, the 2023 Curriculum reflects a radically renewed understanding of the Technology course, which is directly linked to the developments of the 4th industrial revolution, digitalization and automation. Technology is approached as a dynamic system, where knowledge is produced through investigation, design, experimentation and reflection. The integration of STEAM education and computational thinking enhances the scientific nature of the course and shifts the emphasis from simple construction to understanding complex systems. The 7th grade (1st year of Gymnasium in the Greek educational system) is part of a spiral logic, where basic concepts are introduced in a simple way, but are revisited and deepened in subsequent grades.

2.3 Similarities and differences between the two Curricula (2014-2023)

Both Curricula treat the Technology course as an experiential and laboratory-based subject, which goes beyond the sterile transmission of knowledge. The common goal is the active involvement of students, the development of design skills and the cultivation of a positive attitude towards technology and the production of artifacts. Furthermore, in both Curricula, the intention to connect the subject with the daily life of students as well as with the effort to solve real everyday problems is evident.

However, the previous (2014) Curriculum is based on a more traditional technological pedagogy, where technology is approached mainly as a process of production and construction. By contrast, the new 2023 Curriculum to be implemented clearly incorporates modern pedagogical directions, such as STEM/STEAM education, computational thinking, innovation and sustainability, shifting the focus from the product to the process and context of technology use.

2.4 The role of the 7th grade in the comprehensive Curricula. The 7th grade as an introductory class (Curriculum of 2014)

Regarding the Technology course in the old Curriculum (2014), the 7th grade (1st year of Gymnasium in the Greek educational system) is primarily an introductory class. Students are introduced to the course through the selection and implementation of an individual project, which functions as a central axis of learning. This selection aims to enhance autonomy, responsibility and creative expression. However, the lack of clearly defined thematic units and learning outcomes may lead to inhomogeneity of applications and to differences in the depth and quality of learning not only in the case of teaching a cognitive subject in secondary education but in all levels of education (Vagelas and Leontopoulos, 2023). By contrast, in the new Curriculum of 2023, the Technology subject in the 7th grade (1st year of Gymnasium in the Greek educational system) acquires a strategic role. It constitutes the foundation on which the technological literacy of students is built. This class is not limited to an introduction to science and technology, but lays the foundation for understanding concepts such as system, energy, algorithm, artifact, and human-technology interaction.

2.5 Aims and learning objectives of the two Curricula: From generality to functionality

In the old Curriculum of 2014, the aims of teaching the Technology course are formulated in a general way and are linked to the cultivation of a positive attitude towards technology. The learning objectives, although pedagogically reasonable, are not specified as observable learning behaviours. By contrast, in the new Curriculum of 2023, the objectives are explicitly formulated, functional and linked to specific activities. This clarity allows for better planning of teaching, alignment of objectives, activities and assessment, as well as greater transparency for students and teachers.

3. Content and thematic organization

The content of the Technology course in the 7th grade (1st year of Gymnasium in the Greek educational system) in the old Curriculum of 2014 is characterized by breadth and conceptual diffusion. The 7th grade (1st year of Gymnasium in the Greek educational system) is called upon to cover many aspects of technology, without strict hierarchy or systematic in-depth study. In the new Curriculum of 2023, the thematic organization allows for a focus on key axes, a gradual increase in complexity and a connection between theory and practice through authentic problems. In this way, the 7th grade (1st year of Gymnasium in the Greek educational system) functions as a precursor to understanding basic technological systems.

3.1 Structure and organization of the content of the two Curricula in the 7th grade

In the 7th grade (1st year of Gymnasium in the Greek educational system), the old Curriculum of 2014, the Technology course is organized around the idea of "individual work", which is the central axis of the course. Students are asked to choose a technological object or system, study it and construct it, following the specific stages: a) Research, b) design, c) construction, d) evaluation. The content of the course functions in support of the completion of the individual work. In contrast, in the newer Curriculum of 2023, the Technology course in 7th grade (1st year of Gymnasium in the Greek educational system) is organized into thematic areas and learning units, which are not limited to a single task. The emphasis shifts to the gradual development of skills through a variety of activities, small projects and investigations. The content is more multidimensional and includes digital technologies, systems, and adverse and beneficial impacts of the use of technology on the environment and man-society (Skenderidis et al., 2024).

3.2 Teaching approaches and the role of the teacher

In the old Curriculum of 2014, the teacher mainly acts as a guide and transmitter of knowledge, while in the new Curriculum of 2023 he/she becomes a designer of learning experiences, animator and coordinator of investigative processes. This change requires a higher level of pedagogical training, familiarity with digital tools, and the ability to manage open learning scenarios (Leontopoulos et al., 2024c; Leontopoulos et al., 2025).

3.3 Teaching methodology and the role of the student. Similarities and differences between the two Curricula

In both Curricula, the student is treated as an active subject of learning. Teamwork, investigation and practical engagement are common elements, with the teacher functioning more as a guide and less as a transmitter of knowledge. However, despite the similarities, there are also significant differences between the two Curricula. In the old Curriculum of 2014, the learning process is more linear and oriented towards the completion of a technical project, while in the new Curriculum of 2023, learning is iterative and exploratory, with an emphasis on questioning, experimentation and interdisciplinary connections. The introduction of computational thinking enhances the analytical and reflective role of the student.

3.4 Assessment: From the final product to the learning process

The transition from a final assessment (old Curriculum of 2014) at the end of the year to a systematic formative assessment (new Curriculum of 2023) is one of the most essential points of differentiation of the two Curricula. Assessment in the new Curriculum of 2023 functions as a learning tool and not simply as a means of grading. In the old Curriculum of 2014, assessment focused mainly on the final deliverable of individual work, as well as on the observance of the implementation stages. Although formative assessment was foreseen, the emphasis remained on the final result, i.e. the construction of a creation. In the new Curriculum of 2023, assessment acquires a more multidimensional character and is aligned with modern assessment theories for learning. It includes self-assessment, peer-assessment, assessment of processes and skills, while the emphasis on the final constructed artifact is reduced.

3.5 Pedagogical and didactic implications

The implementation of the new Curriculum of 2023 in the Technology course in the 7th grade (1st year of Gymnasium in the Greek educational system) creates new challenges regarding the need for teacher training, adequate logistical infrastructure, and time for collaborative planning. At the same time, it offers significant opportunities for meaningful learning, enhancing creativity, and connecting the school with society.

4. Discussion - Critical Assessment

A comparison of the two Curricula regarding the Technology course for the 7th grade (1st year of Gymnasium in the Greek educational system) reveals a clear evolutionary path of the subject. The old Curriculum of 2014, although structured and pedagogically consistent for its time, reflects a perception of technology that focuses mainly on construction and manual skills. This approach has the advantage of clarity and practical application but may limit the understanding of technology as a social, cultural and dynamic phenomenon (Apple, 2019; Goodson, 2014; ITEEA, 2007). In contrast, the new

Curriculum of 2023 appears as a more holistic and modern approach, incorporating issues of digital transformation, sustainability and innovation. The shift from "what I build" to "how and why I design" constitutes significant pedagogical progress, since it is consistent with project-based learning and integrated STEM/STEAM approaches that emphasize inquiry, design, collaboration and authentic problem solving (Bell, 2010; Kelley and Knowles, 2016; Yakman and Lee, 2012). However, the increased complexity of the new Curriculum of 2023 raises questions about the readiness of school units regarding infrastructure and teacher training, a challenge also highlighted in curriculum implementation studies (Atienoi et al., 2018; Changwe and Mulenga, 2020). Critically, it could be argued that the ideal teaching model for the Technology course in the 7th grade (1st year of Gymnasium in Greek educational system) lies between the two Curricula, maintaining the clear structure and tangibility of the old Curriculum of 2014 individual work, but integrating it into a broader framework of investigation, reflection and interdisciplinary nature, as proposed by the new Curriculum of 2023 and by international policy directions for 21st century learning (OECD, 2019; UNESCO, 2015). Such a synthesis could maximize the learning benefits and enhance the educational role of the course. The following Figure 1 illustrates the distribution of thematic fields and the relative emphasis on core learning dimensions within the 7th grade (1st year of Gymnasium in the Greek educational system) Technology course curriculum. The curriculum promotes an interdisciplinary STEM-oriented approach, integrating technological knowledge with computational thinking, design processes and sustainability principles. The balanced allocation across thematic fields highlights the curriculum's aim to develop both conceptual understanding and practical technological skills.

The two Curricula (old-2014 and new-2023) constitute two different pedagogical and epistemological approaches to teaching the subject of Technology in Gymnasium (7th grade). The old Curriculum of 2014 maintains a clearly more traditional and "emancipatory" orientation towards individual construction, the gradual presentation of a personal project and the cultivation of general technological knowledge through lectures and practical work. This model is closer to objective-based and product-oriented curriculum traditions (Tyler, 1949; Pinar, 2012). The subsequent new Curriculum of 2023 radically reformulates the Technology course as a field of STEAM, computational thinking, engineering design and interdisciplinary connections, with a structure organized into thematic areas, expected learning outcomes and formative assessment (Kelley and Knowles, 2016; Black and Wiliam, 2009).

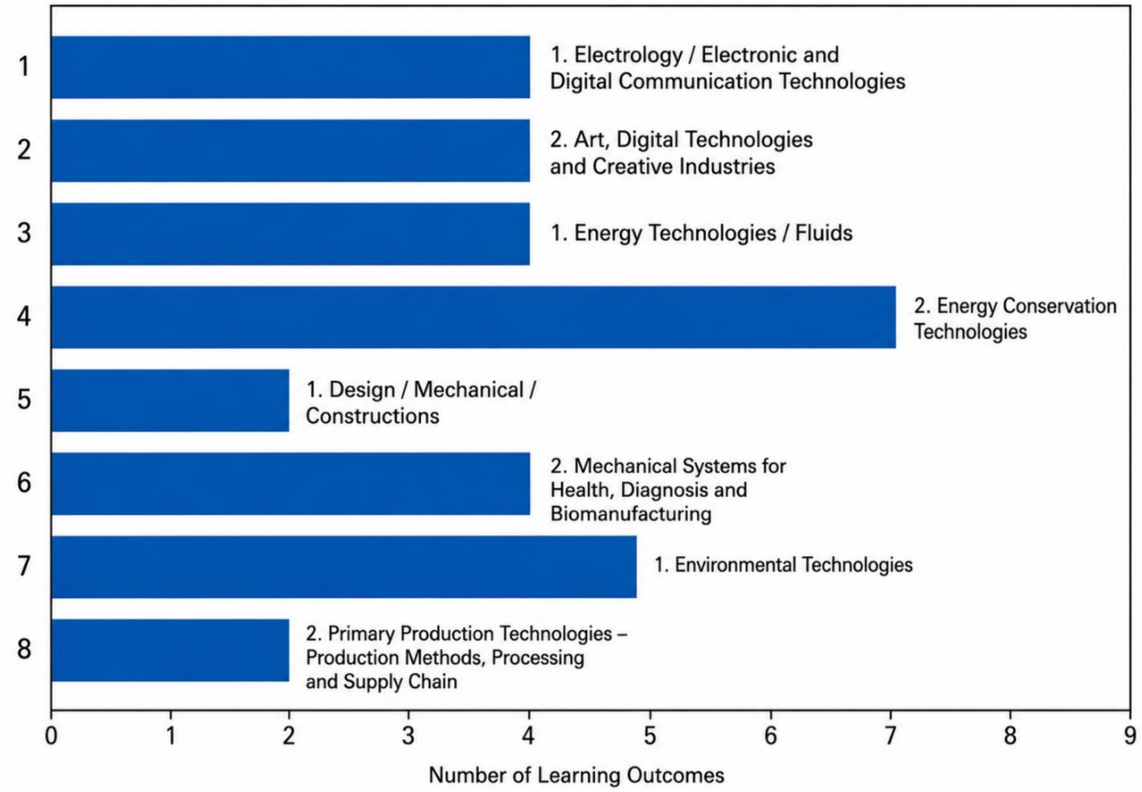

Figure 1: Distribution of thematic fields and learning focus in the 7th grade (1st year of Gymnasium in Greek educational system), technology curriculum

In the old Curriculum of 2014, the 7th grade (1st year of Gymnasium in Greek educational system) is placed at the center of a methodology called "application of the individual work method for the study of technology." The basic teaching idea is that the student chooses an individual project, constructs it, writes a paper and presents it gradually, even in seminars. At the same time, the teacher gives lectures on critical topics, in order to cultivate a broader understanding of technology. The first grade, therefore, is not structured as a list of specific individual learning outcomes, but as an introductory laboratory of technological familiarity and individual creation.

In contrast, the new Curriculum of 2023 treats the Technology course as a field with a clear epistemological foundation. At the beginning of the text, the 4th industrial revolution and the "integration" of technology with the natural sciences, health sciences, engineering, computer science, the arts and the humanities are emphasized. Technology is defined as both a process/activity and a product, while the program is explicitly linked to the logic of STEAM, computational science, computational thinking and engineering design. Therefore, the new Curriculum of 2023 moves from a general pedagogical proposal to a fully structured, theoretically justified and research-based curriculum, consistent with contemporary views of technological literacy and capability (ITEEA, 2007; Asunda, 2012; Barak, 2018).

A first essential similarity of the two Curricula is that both recognize the importance of active learning and the construction of a technological object. The old Curriculum of 2014 describes the "Individual Project", which is constructed and presented gradually, while the new Curriculum of 2023 offers central importance to the production of artifacts, the process of technical design and the solution of real issues. In both Curricula, technology is not taught as simple theoretical knowledge, but as practice, as creation and as a form of student engagement with materials, processes and meanings, a position supported by constructivist and project-based approaches to learning (Vygotsky, 1978; Bell, 2010). However, this similarity stops at the level of the general principle. The old Curriculum of 2014 is based on a relatively linear concept: first lecture, then individual work, then assignment and presentation. In contrast, the new Curriculum of 2023 structures learning around interactive inquiry-based learning activities, around real problems that are often not clearly defined from the outset, and around the collaborative delimitation of the problem by the teacher and the students. Here, learning is more open, more exploratory and more adapted to the logic of problem solving (Barak, 2018; Kelley and Knowles, 2016).

A significant difference also concerns the level of generalization of the content. The old Curriculum of 2014 presents twenty technological axes, from the characteristics and scope of application of modern technology to medical technologies, agricultural biotechnologies, energy technologies, transportation and the production of goods and products. The 7th grade (1st year of Gymnasium in Greek educational system) functions as an introduction to a very broad thematic area, without however being assigned to it a specific internal structure with modules and specific learning outcomes per subfield. In contrast, in the new Curriculum of 2023, the Technology course is broken down into four thematic areas, each of which includes two thematic units and is accompanied by detailed expected learning outcomes. This shift is crucial, because in the old Curriculum of 2014 the organization is more conceptual and descriptive, while in the new Curriculum of 2023 the organization is explicitly learning-oriented, with an emphasis on the interdisciplinary end result and on the progressive development of technological literacy (ITEEA, 2007; Asunda, 2012).

In the latest Curriculum of 2023, for example, the 7th grade (1st year of Gymnasium in Greek educational system) includes the area "Analog and Digital World", with electrical engineering, electronics, digital communication technologies and art-digital technologies-creative industry. It also includes energy, mechatronics/robotics and the natural world (Table 1), thus composing a multidisciplinary network that leads the student from the analog to the digital, from the manual to the automated and from the narrowly technological to the broader socio-ecological. More specifically, Table 1 presents the overall structure of the Technology Curriculum implemented in Grade 7 (1st year of Gymnasium in Greek educational system) within Greek lower secondary education. The curriculum is organized around four broad thematic fields: (a) Analog and Digital World, (b) Energy, (c) Mechatronics and Robotics, and (d) Natural World and

Technologies. Each thematic field includes two thematic units, from which one unit is selected and implemented per school year. This modular structure provides curricular flexibility while ensuring balanced exposure to fundamental technological domains.

Table 1: Structure of the technology curriculum in 7th grade
(1st year of Gymnasium in Greek educational system)

Field	Thematic unit	Differentiated learning outcomes
A.	**Digital & Analogue World** 1. Electronics / Electronic and Digital Communication Technologies	4 learning outcomes
A.	**Digital & Analogue World** 2. Technology, Digital Technologies and Manufacturing Engineering	4 learning outcomes
B.	**Energy** 1. Energy Technologies / Flow	4 learning outcomes
B.	**Energy** 2. Energy Conservation Technologies	7 learning outcomes
C.	**Mechanical / Robotics** 1. Design / Mechanical / Constructions	2 learning outcomes
C.	**Mechanical / Robotics** 2. Mechanical Systems in Health, Transport and Industrial Production	4 learning outcomes
D.	**Physical World & Technologies** 1. Environmental Technologies	5 learning outcomes
D.	**Physical World & Technologies** 2. Technologies of Primary Production - Methods of Production, Processing and Food Distribution	2 learning outcomes

Note: The total number refers to the bullet points that are distributed in the Curriculum Framework (CF) for each thematic unit.

On the contrary, in the old Curriculum of 2014, the emphasis is not on specific thematic areas of the 7th grade (1st year of Gymnasium in Greek educational system), but on a pedagogical path that develops technological perception through general axes such as the historical evolution of technology, utility, thinking about study and design, the social function of technology, its impact on the environment and its relationship with transportation, production and communications (Figure 2). The logic is encyclopedic and introductory, and less organized around learning achievements that can be observed and measured. More specifically, Figure 2 illustrates that the 7th grade (1st year of Gymnasium in Greek educational system) Curriculum prioritizes conceptual understanding (40%), underscoring its introductory and foundational role within lower secondary education. Practical activities (25%) support experiential learning, while environmental awareness (20%) reflects alignment with sustainability education and global citizenship priorities (UNESCO, 2015; OECD, 2018). Digital familiarization (15%) remains introductory, consistent with students' developmental stage.

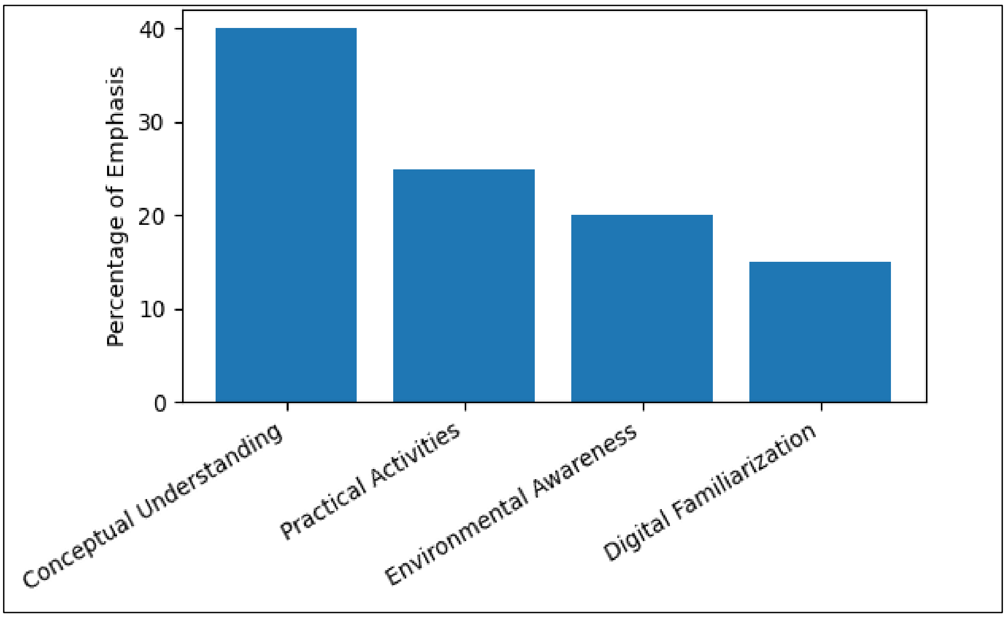

Figure 2: Distribution of learning emphasis in the grade 7 (A Gymnasium) curriculum

Another key point of differentiation between the two Curricula is the role of scientific interconnection. In the new Curriculum of 2023, the Technology course is explicitly defined through interdisciplinary and cross-curricular integration. The program speaks of "common" and "transversal" concepts, of crossing cognitive areas, of connecting with mathematics, natural sciences, engineering, computational science and the arts. The teaching of the subject in the 7th grade (1st Gymnasium in Greek educational system) is thus called upon to function as a hub connecting many sciences and not simply as a technical skills course, which is consistent with integrated STEM and STEAM frameworks (Kelley and Knowles, 2016; Yakman and Lee, 2012). In the old Curriculum of 2014, although there are references to technological developments in the bibliography and on the internet, interdisciplinarity does not have the same clear methodological and structural importance.

In terms of didactic logic, the old Curriculum of 2014 remains closer to a teacher-centered modeling. The teacher's lectures are a key element of learning, and the role of individual work is to give the student scope for application and assimilation. Even when it comes to bibliography, online sources, slides and seminars, these function as complementary elements in a structure where guidance from the teacher is clearly central. On the contrary, in the new Curriculum of 2023, the teacher appears as a co-formulator of the problem, as an organizer of the investigative process and as a supporter of collaborative learning. This interpretation is aligned with the view of the teacher as a mediator of curriculum implementation and with evidence on the importance of feedback and visible learning processes (Goodson, 2014; Hattie, 2012). This difference is also linked to the nature of the learning objectives. In the new Curriculum of 2023, the objectives are formulated in terms of "Students should be able to…" and are followed by specific actions: to compose, describe, identify, design, construct, compare, evaluate. In the 7th grade (1st year of Gymnasium in the Greek educational system), for example, students construct artifacts with electrical/electronic circuits, describe the binary system, recognize communication codes, compose computer systems, design climate measurement systems, construct energy measurement instruments and engage in robotic or mechatronic constructions. On the contrary, in the old Curriculum of 2014, there is no corresponding analytical mapping of learning outcomes for the 7th grade (1st year of Gymnasium in the Greek educational system).

Assessment is also a key point of divergence. In the old Curriculum of 2014, assessment is understood mainly through the course of individual work, written work and presentation, that is, through the final product and public presentation of the student's work. In contrast, the new Curriculum of 2023 explicitly incorporates formative assessment, diagnostic tracing of prior ideas, the use of valid and transparent indicators, self-assessment, self-correction and differentiated assessment rubrics. Assessment does not stand at the end of the process but is intertwined with the learning process, with an emphasis on progress through authentic issues and artifacts. This orientation is consistent with assessment-for-learning theory, according to which feedback, self-assessment and peer-assessment can support metacognition and continuous improvement (Black and Wiliam, 2009; Hattie, 2012).

At the level of the social dimension of the Technology course, both Curricula recognize that technology is not a neutral object but a medium with social effects. The old Curriculum of 2014 mentions the cultural, social, economic and political effects of technology, about the role of society in its development and about its impact on history. However, the new Curriculum of 2023 more systematically addresses the social and economic dimension, linking learning to local society, sustainability, energy, climate change, public goods and the role of the active citizen. This emphasis is compatible with critical curriculum perspectives and with international frameworks that connect education to responsible action, sustainability and citizenship (Apple, 2019; OECD, 2019; UNESCO, 2015). Thus, in the new Curriculum of 2023, the Technology course in the 7th grade (1st year of Gymnasium in the Greek educational system) shifts the emphasis from general social awareness to targeted, authentic, locally integrated action.

Equally important is the position of computational thinking, which in the old Curriculum of 2014 is not a central axis. On the contrary, the new Curriculum of 2023 explicitly integrates it into every basic thematic unit. Students are asked to recognize patterns, decompose problems, visualize data, create algorithms, design models and use computational platforms. These processes correspond to the broader educational meaning of computational thinking as a way of formulating problems and organizing solutions that can be supported by digital tools (Wing, 2006). This means that the 7th grade (1st year of Gymnasium in the Greek educational system) no longer treats technology only as a construction material, but also as digital logic, as a form of computational reflection and as a field of data and model manipulation.

It is worth underlining that the new Curriculum (2023) is not limited to engineering or digital technologies, but also incorporates art as a synthetic element of technological culture. The new Curriculum of 2023 explicitly includes the integration of art through the module "Art, Digital Technologies and Creative Industries", where students categorize art forms, construct artifacts for different art forms, describe visual phenomena and recognize the dual relationship between art and science. This dimension strengthens the STEAM orientation of the course, because it connects creativity, representation and design with scientific and technological inquiry (Yakman and Lee, 2012). In the old Curriculum of 2014, art does not have such an organic position; it is, at most, an indirect reference to broader cultural associations.

The very concept of "construction-artifact" changes from one Curriculum to another. In the old Curriculum of 2014, the artifact is mainly a personal work, an object of individual construction and presentation. While in the new Curriculum of 2023, the artifact becomes a carrier of knowledge between fields since it can be a simple circuit, a computing system, a measurement system, a robotic vehicle, a hybrid RES system, a meteorological station or even a "smart city" prototype. In this respect, the artifact becomes part of an engineering-design and problem-solving process, not merely a final object (Rennie et al., 1992; Barak, 2018). So, we are no longer talking about a single individual project, but about a rich family of learning objects that allow for differentiation, scaling and spiral development.

At the level of educational policy, the new Curriculum of 2023 includes the course in a pilot implementation in Standard and Experimental High Schools and Gymnasia for the school year 2022-2023, which also shows the experimental nature of the renewal. On the other hand, the old Curriculum of 2014 appears as a regulatory regulation that defines the Curriculum without placing it in such an explicit framework of piloting and feedback. This distinction is important because curriculum change is not exhausted in the official text; it depends on interpretation, teacher agency, infrastructure and enacted classroom practice (Goodson, 2014; Dunbar et al., 2019). This is important for the educational importance of the 7th grade (1st year of Gymnasium in the Greek educational system) in the entire educational system. In the newer Curriculum, this grade (7th grade or 1st Gymnasium in the Greek educational system) functions as a testing ground for a new model of technological education, while in the older Curriculum of 2014 as an introductory stage to a timeless logic of technological education.

In summary, the two Curricula (old-2014 and new-2023) share the basic belief that the subject-course of Technology should be taught experientially, linked to the production of work and cultivating problem-solving, communication and creativity skills. However, they differ radically in the way in which they give meaning to this teaching. The old Curriculum of 2014 represents a model of individual work, lectures and general technological axes, while the new Curriculum of 2023 constitutes a modern, multidisciplinary, interdisciplinary and learning-centered framework with STEAM, computational thinking, thematic areas and analytical learning outcomes (Figure 3).

More specifically, Figure 3 depicts the conceptual framework underpinning the 7th grade Technology curriculum. Learning outcomes are structured around project-based learning, inquiry-based experimentation, and real-world problem solving, all of which are central to contemporary technology and STEM education (Bell, 2010; Kelley and Knowles, 2016; Barak, 2018). Central pedagogical dimensions include computational thinking, systems design, collaboration, and responsible innovation, emphasizing students' active engagement with authentic technological challenges relevant to contemporary society (Wing, 2006; OECD, 2019; ITEEA, 2007). In particular, for the 7th grade (1st year of Gymnasium in the Greek educational system), the difference is not simply organizational; it is deeply pedagogical and epistemological, since from technology as an individual construction we move to technology as a complex ecosystem of knowledge, practice, society and digital creation.

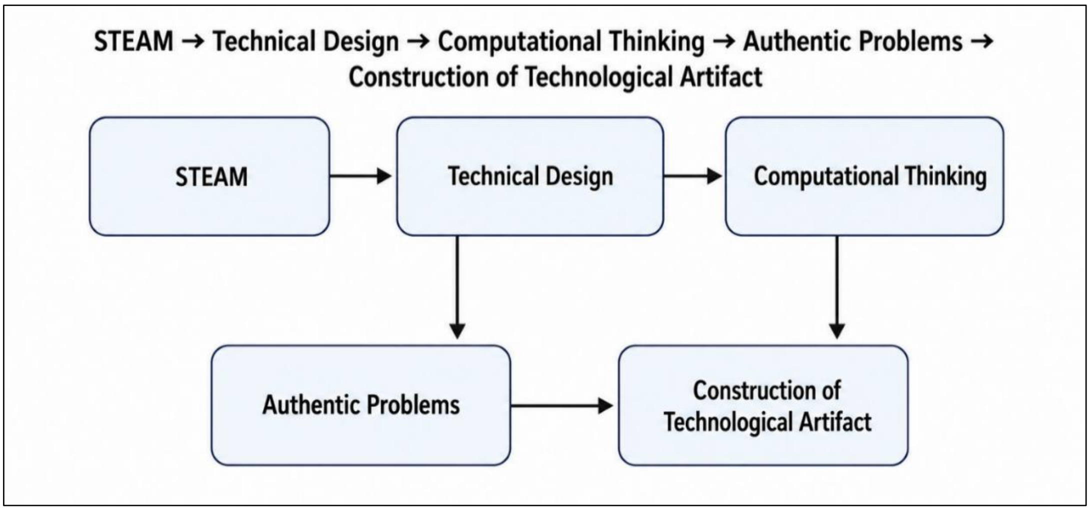

Figure 3: Conceptual framework of learning outcomes in the grade 7 technology curriculum

5. Conclusions

The comparative analysis of the two Curricula demonstrates that the 7th grade (1st year of Gymnasium in the Greek educational system) is transforming from a class of simple acquaintance with Technology into a critical field of development of complex cognitive, social and metacognitive skills. The new Curriculum of 2023 reflects a mature, modern and scientifically documented concept of technological education, which is aligned with international trends and the needs of the knowledge society. The evolution of the Technology Curriculum for the 7th grade (1st year of Gymnasium in the Greek educational system) reflects the changing perception of the role of technological education in the modern school. The Technology subject is moving into a 21st-century skills development framework, without, however, abandoning its practical character. The challenge now lies in the effective implementation of the new Curriculum, so that its theoretical innovations are translated into a meaningful learning experience for all students.

Supplementary Materials
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