Differentiated Instruction and provisions for students with special educational needs in STEM domains Curricula for Compulsory Education

Papalexopoulos F. Panagiotis
Postdoc Researcher, Dept. of Physics, Univ. of Thessaly, Greece, Lecturer, Univ. of Nicosia
papalex@uth.gr

Verevi Alkistis
Director of Research, Research Center for Greek Society, Academy of Athens, Greece
averevi@academyofathens.gr

Skondra Vaia
Med in Sociology of Education, Primary Teacher
skondrab@yahoo.gr

Dionisios Vavougios
Professor, Department of Physics, University of Thessaly, Greece
dvavou@uth.gr

Abstract

Planning differentiated instruction (DI) aims at creating a learning environment, enriched with appropriate tools and materials, which allows students to pursue their personal, individualized learning path, through their participation in collaborative and interactive learning experiences. In the light of inclusive education catering for the needs of diverse learners, this paper presents how DI is gradually depicted within STEM domains Curricula for Compulsory Education in Greece. We examine the STEM domains Curricula since the Cross Thematic Curriculum Framework (CTCF) for Compulsory Education which came into effect from 2003. More precisely, we quoted any references made to DI in general and to teaching students with special needs and we illustrate how the concept of DI is increasingly represented in policy documents such as the "New Curricula" (2021). The study shows that in some curricula of the CTCF there are references to the special needs of students but not in the New Curricula and vice versa for the Differentiated Instruction, points that we think could be taken into account during the training of teachers.

Keywords: Curricula, STEM, Differentiated Instruction, Special Educational Needs

Introduction

Addressing students' differences entails making changes that will enable students "to learn with their peers in an inclusive schooling system" and delivering the curriculum in various ways (Sherman, W., 2008, 2016: 7). Students may differ in terms of familial background, ethnicity, cognitive abilities, socioeconomic factors, readiness, learning style and pace, and so on (Heacox, 2014: 7-9). Planning the instruction for academically diverse students implicates content, process and product modification, as well as learning environment adjustment. For example, content is differentiated when students are given texts at varying levels of difficulty, or varied topics for research, or materials for several interests, or when the teacher meets small group of low or high achievers, aiming at the same instructional goal. Modifying process involves, e.g., allowing students to express their learning in different ways, encouraging group interaction and creative thinking or "involving students in evaluation of choice of topics, methods, products and environments (Sherman, 2008, 2016: 10). Differentiated instruction (DI) also includes a variation in students' products; for instance, the student can set different

benchmark for success based on class-level readiness or an "audience" that is appropriate for the product in line with "real world criteria", etc. (Sherman, 2008, 2016: 11). Lastly, a differentiated learning environment is flexible so that it incites and supports students' initiatives, it includes "a rich variety of resources, media, ideas, methods and tasks" permitting new people, resources and ideas to be exploited in the learning procedures, etc. (Sherman, 2008, 2016: 9).

Vygotsky's intervention theory, his socio-cultural theory of learning and the zone of proximal development as well as Gardner's theory of multiple intelligence support differentiated learning (Bushie, 2015: 37, Taylor, 2017:57, Sherman, 2008, 2016: 3). However, there are various frameworks within which DI is diversely defined (Black, et al., 2004, National Center on Response to Intervention, 2010, Latz et al., 2008: 28, Betts, 2004, Dunn & Dunn, 1992) so that DI will ultimately "bring equity and quality in education effectiveness" (Valiande, et al., 2011: 3-4).

DI "as a concept evolved in part from instructional methods advocated for gifted students and in part as an alternative to academic 'tracking,' or separating students of different ability levels into groups or classes". And although "in the 1983 book, Individual Differences and the Common Curriculum, Thomas S. Popkewitz discusses differentiation in the context of 'Individually Guided Education'" (Sparks, 2015) it could be said that the term DI started being more widely used at the end of 1990s (Tomlinson 1995). According to Carol Ann Tomlinson (2000), an author and teacher regarded as a pioneer in DI, "differentiation means tailoring instruction to meet individual needs" and it involves differentiating content, process, products, and/or the learning environment.

Before this valuable 21st century approach to education, curriculum modifications mainly for the inclusion of SEN (special educational needs) students were incorporated in several curricula. We can track the increasing demand for special education regarding SEN students in several formal documents. The Declaration of the Rights of the Child (1959), the United Nations Declaration on the Rights of Disabled Persons (1975), the Sundberg Declaration on Actions and Strategies for Education, Prevention and Integration (1981), the Salamanca Statement and Framework for Action on Special Needs Education (1994) and the World Forum on Education in Dakar (2000) had stated the need to respect diversity and the right of SEN pupils to have access to inclusive education in the sense that all the children would be in the same classrooms and in the same schools. The Greek educational system was gradually adjusted to fit into these ideas. From the establishment of special schools, we moved to the creation of resource rooms in many state schools and to the development of special programs in the ordinary schools. The Directorate of Special Education was founded at the Ministry of Education and Religious Affairs and teacher training programs in special education were enacted.

It is evident that special education in an inclusive classroom is considered part of DI, although differentiation constitutes a broader concept (Tomlinson, 2000); teachers differentiate content, process, products and/or learning environment and adapt instruction to individual needs (cognitive, social, cultural, etc.) Thus, in this paper we will focus on both specific and explicit references to the specific needs of SEN students included in the National Curricula and extracts indicating the broader concept of DI.

Research Questions

Formal education policy is stated explicitly in legislative documents such as laws, ministerial decisions, etc., although we usually do not know exactly how this legislation comes into force in everyday teaching. In Greece the National Curricula for Primary and Secondary Education are published as ministerial decisions at the Government Gazette of the Greek Republic. In this paper we investigate either the standard curricula currently implemented or curricula applied in pilot implementation (curriculum program pilot) nowadays or in the past. We focus on Curricula in positivist STEM domains (i.e. mathematics, technology, physics,

chemistry, biology, computer science, geography, study of the environment, geography-geology) in Primary and Lower Secondary School and our research questions are:

- In which STEM domains curricula for Compulsory Education (Primary and Lower Secondary School) is DI mentioned and what are its characteristics?
- In which STEM domains curricula for Compulsory Education (Primary and Lower Secondary School) are the specific needs of SEN students recorded and which areas of their support are mentioned?
- How these references (to DI and special needs) help the teachers organize their teaching by subject matter?

The processing method of our data

The data of our research are included in the curricula for Compulsory Education (Government Gazette). We examine and compare three types of curricula in STEM domains: a) The currently implemented Curricula, which are in accordance with Cross Thematic Curriculum Framework (CTCF) for Compulsory Education since 2003, stated in our paper as "CTCF", b) the Curricula that were made into law in 2011 for pilot implementation (referred to in our paper as "New School (in pilot implementation)"), and c) the curricula that are being currently in pilot implementation, mentioned as "New Curricula (in pilot implementation)".

To draw our conclusions systematically and objectively we used content analysis (Holsti, 1969); to analyse the Curricula in STEM domains we developed thematic categories (Berelson, 1971) in DI and special needs of students using open-ended coding. Thus, in each Curriculum we identified references to a) DI and its characteristics, and b) the special needs of SEN students and the specific areas of their support.

Results

Differentiated Instruction

Table 1. References to DI in STEM domains Curricula

STEM domains Curricula Ministerial Decisions	Differentiated Instruction		
	CTCF	New School (in pilot implementation)	New Curricula (in pilot implementation)
Study of the Environment, Primary School	x	x	√
Exploring our natural world	x		
Physics		x	x
Geography, Primary School	x	x	√
Geology – Geography, Lower Secondary School	x	x	√
Physics, 1st grade Lower Secondary School		x	
Physics, Lower Secondary School	x	x	√
Chemistry, Lower Secondary School	x	x	x
Biology, Lower Secondary School	x	x	√
Mathematics, Primary School	x	x	√
Mathematics, Lower Secondary School	x	x	√

New Technologies & Computer Science, Primary School	x	x	x
Computer Science, Lower Secondary School	x	x	x
Technology, Primary School	x	-	-
Technology, Lower Secondary School	x	-	√

***** The above table does not include the Physics Curriculum of the 1st grade in Lower Secondary School (Government Gazette 2537, 2013) and Technology Curriculum of the 1st, 2nd and 3rd grade in Lower Secondary School (Government Gazette 2406, 2014), because they are not included in any of the three types of curricula in the teaching subjects we examine.

As Table 1 shows, there are no references to DI in CTCF and New School (in pilot implementation) (Government Gazette 2322, 2011· 2281, 2011· 2323, 2011 and 97, 2014) and in the Physics Curriculum of the 1st grade of 2013. However, such references are recorded in most teaching subjects in New Curricula (in pilot implementation). The references to DI in the New Curricula fall into two categories:

Teaching approaches (teaching framework and learning design)

In the Study of the Environment Curriculum in Primary school (Government Gazette 5939, 2021), Geography Curriculum in Primary school (Government Gazette 5815, 2021), Geology - Geography Curriculum in secondary school (Government Gazette 5518, 2021), Biology Curriculum in secondary school (Government Gazette 5286, 2021), Mathematics Curricula in Primary and Secondary School (Government Gazette 5814, 2021 and 5260, 2021) and Technology Curriculum (Government Gazette 5258, 2021), references to DI are made in the context Instructional Design. For example:

Mathematics Curricula in Primary and Lower Secondary School

"…d. Teaching framework - learning design

This Curriculum supports instructional strategies of inclusion and differentiation, as it acknowledges that students differ from one another in the way and pace of their learning, their interests, their prior knowledge and experiences, their culture and language. Therefore, each student, according to his/her cognitive or other needs, is encouraged to participate in learning tasks that lead to authentic mathematical activity. Such activities challenge the student to develop his/her mathematical thinking and contribute to the collective construction of mathematical meaning through his/her participation in classroom activities…"

Technology Curriculum (Lower Secondary School)

"…This Curriculum is also aligned with the principles of responsible research and innovation by linking the activities to the needs of the local community, by addressing contemporary and global issues of interest, and by encouraging inclusion and differentiated learning to include practices that strengthen democracy..."

Study of the Environment Curriculum

"…d. Teaching framework - learning design g) Differentiated learning: it is necessary for the teacher to take into account: i) factors related to students' learning process, such as the rate of learning, readiness, different rate of understanding, etc. and ii) factors related to social aspects and to the values and cultural characteristics of the groups affecting school life…"

Geography Curriculum (Primary School)

"…Nowadays, teaching in a constructive way means that teaching is based on: ... - the principles of differentiated teaching. The Curriculum is not applied undistinguishably to all

students; teaching is differentiated in terms of content, process and products so as to respond to the different students' readiness levels, the different ways they learn and their different interests..."

Geography - Geology Curriculum (Lower Secondary School)

"…Teachers are encouraged to adopt differentiated teaching strategies, experiential learning and to use alternative practices, various teaching tools and creative activities…"

Evaluation

In the Geography Curriculum (Government Gazette 5392, 2021), DI is referred as the basic principle of student assessment, and in the Physics (Government Gazette 5658, 2021) and Technology Curriculum of Secondary School (Government Gazette 5258, 2021) there are references to the use of DI tools and techniques in their assessment. The following quotations are some indicative examples:

Technology Curriculum (Lower Secondary School)

"…Finally, differentiated assessment rubrics will be included, especially concerning the field of structure making in relation to the interdisciplinary approach…"

Geography Curriculum (Primary School)

"…The assessment includes not only the cognitive domain, but also all the other (psychomotor, emotional) abilities (aptitudes) of the student, as knowledge is approached as a whole. Key principles of assessment include: differentiated instruction..."

Physics Curriculum (Lower Secondary School)

"…The diagnostic-predictive assessment, at the beginning of the school year or in between large subject areas, can be an important tool for the preparation of teaching practice, as it informs the teacher about pre-existing knowledge, attitudes and perceptions, performance and potential of his/her students, so that he/she can apply more targeted and possibly differentiated instruction tools and techniques in time…"

Biology Curriculum

"…The systematic evaluation of Curricula … should include: ... The recommended teaching methodology in relation not only to providing students with knowledge, but also to developing critical and creative thinking through collaborative group processes, connection with the social environment, differentiated teaching, etc.'.)…"

Special educational needs of students

Table 2. Distribution of references to SEN students at Curricula *

STEM domains Curricula Ministerial Decisions	Special needs		
	CTCF	New School (in pilot implementation)	New curricula (in pilot implementation)
Study of the Environment, Primary School	√	x	x
Exploring our natural world	x		
Physics		x	x
Geography, Primary School	x	x	x

Geology – Geography, Lower Secondary School	√	x	x
Physics, 1st grade Lower Secondary School		x	
Physics, Lower Secondary School	√	x	x
Chemistry, Lower Secondary School	√	x	x
Biology, Lower Secondary School	√	x	x
Mathematics, Primary School	x	x	x
Mathematics, Lower Secondary School	x	x	x
New Technologies & Computer Science, Primary School	√	x	x
Computer Science, Lower Secondary school	√	x	x
Technology, Primary School	x	-	-
Technology, Lower Secondary School	x	-	x

***** The above table does not include the Physics Curriculum of the 1st grade in Lower Secondary School (Government Gazette 2537, 2013) and Technology Curriculum of the 1st, 2nd and 3rd grade in Lower Secondary School (Government Gazette 2406, 2014), because they are not included in any of the three types of curricula in the teaching subjects we examine.

As Table 2 shows most of the CTFC Science Curricula (Government Gazette 303, 2014 and 304, 2014) have references to SEN students which can be grouped into the following categories:

Teaching approaches

The curricula of Study of the Environment and Computer Science refer to students with special needs in the area of planning teaching activities. The following is an extract from the Study the Environment:

Technology Curriculum

"…The teacher should provide opportunities for participation and high-quality educational values to all pupils: boys and girls, people with special educational needs or difficulties, regardless of their social or ethnic origin and cultural background…"

Physics, Chemistry and Biology Curricula refer to flexible and multi-sensory approaches in the section "Teaching Methodology" taking into account the aptitudes and abilities of SEN students. For example:

"…In particular, for people with special needs, [teachers may consider the following]:

Teaching flexibility, so that there is a variety in the proposed activities to approach the [teaching] objective in different ways, which respond to each child's particular way of learning.

A multi-sensory approach to the objectives with a variety of teaching tools and materials. Utilization of the child's potential according to his or her cognitive level, with the implementation of personalised educational programmes, since the exclusive use of a specific teaching tool or method contributes to the creation of associations rather than concepts, drastically limiting the possibilities for generalising and transferring learning. Choosing the scientific model and scientific concepts that students should learn…"

Laboratory activities

The suggestions for Physics and Biology laboratory guide, which are included in the relevant Curricula, take into account accommodations and modifications to support SEN students through an individualized educational plan.

"…In addition to the lab activities that can be completed in the school laboratory, where necessary, [teachers may] include activities that can be conducted in the natural environment. For SEN students the lab guide needs to facilitate the teacher to develop a personalized program to meet the needs of the students, in order to ensure the participation of SEN students in the most effective way. Instructions for performing the experiments must be clear and informative and provide details about the safe use of devices and materials…

[The lab guide needs to make provisions for SEN students so that they could] … carry out alternative lab activities, while using appropriate devices and exploiting the full potential of new technologies…"

Evaluation

In the Computer Science Curriculum there is a reference to the assessment of SEN students:

> "…Students with special educational needs must be assessed with the same criteria and principles as for all students. Among the purposes of the evaluation, in the case of students with special needs, special attention must be paid to the skills acquired and utilized by the student in relation to his/her daily life. Among the basic principles of the evaluation, in the case of students with special needs, emphasis must be placed on:
>
> 1) … the comprehensive assessment of the student's characteristics (profile), so that the evaluation result is not focused only on his/her weaknesses and
> 2) On encouragement (encouraging effort), following the relevant pedagogical principal. The assessment methodology should be flexible. The evaluation of the SEN students' performance should consider the successful attendance of the class by the student; that is the degree of success of his/her integration [into the 'mainstream class']. So, the purpose of the assessment should also be to gather information so that [the teacher may decide] the kind of additional teaching support the SEN students need (for example tutoring courses, communication or language courses)…"

Instructional Material

In the Physics, Chemistry, Biology and Computer Science Curricula there are references to teaching materials easily accessible to students and teachers to compensate for SEN students' difficulties. Such material facilitates a multi-modal approach that includes auditory, visual, kinesthetic, and tactile strategies. The following excerpt is quoted from the Chemistry Curriculum:

"…More specifically, the students with special needs must be provided with:

The option to use appropriate accessible teaching materials to overcome difficulties in processing visual or auditory stimuli (sign language, Braille, etc.).

Help to compensate for visual, auditory, etc. difficulties…

[SEN student should have] access to technologies to compensate for his/her inability to practice mental or abstract mathematical operations… Specific help to recall and interpret data provided by graphical – tactile representations, tables, columns, etc…"

Teaching Subject Specialties

Table 3. Distribution of references to the DI and the SEN students in the Curricula in terms of the teaching subject specialties

STEM domains Curricula Ministerial Decisions	Subject Teaching Specialties*	Special needs: CTCF	DI New Curricula (in pilot implementation)
Study of the Environment, Primary School	Teachers	√	√
Exploring our natural world	Teachers	x	
Physics	Teachers		x
Geography, Primary School	Teachers	x	√
Mathematics, Primary School	Teachers	x	√
New technologies & Computer Science, Primary School	Teachers	√	x
Geology - Geography	Science Teachers, Geology Teachers	√	√
Physics, Lower Secondary School	Physics Teachers	√	√
Chemistry, Lower Secondary School	Chemistry Teachers	√	x
Biology, Lower Secondary School	Biology Teachers	√	√
Mathematics, Lower Secondary School	Math Teachers	x	√
Computer science, Lower Secondary School	Computer Science Teachers	√	x
Technology, Lower Secondary School	Technology Teachers	x	√

* In Greece primary school teachers have no specific subject area and they teach most of the subjects included in the Curricula (Language, Math, Science, Geography, History, etc.). Secondary Teachers teach certain specialized subjects mainly based on their undergraduate studies. On occasion teachers are asked to teach a domain affiliated to but other than the one studied. This has been termed “supplementary assignment”.

According to the data presented at table 3 teachers who teach in Primary schools that implement the education policy of the last two decades have to use provisions for students with special educational needs only in the domains of Study of the Environment and New Technologies & Computer Science that is in 40% of the courses. On the contrary teachers of STEM domains in Lower Secondary School have to use provisions for these students in all the courses except Mathematics and Technology that is in 71% of the courses. As for the teachers who serve in schools that implement the current pilot education policy it seems that both in

Primary Education and Lower Secondary Education, they have to follow the DI, respectively 60% and 71% of the courses in each level.

Discussion

Our research suggests that the current STEM domain curricula, either to a small or to a larger extent in Primary and Secondary Education, have references to the difficulties of students with special needs, while they do not have corresponding references to differentiated teaching. In contrast, the curricula in pilot implementation, while they have references to differentiated teaching to the most STEM domain teaching subjects of Primary and Secondary Education, they do not have references to addressing students with special educational needs. Regarding the current curricula, we assume that in the proposed teaching strategies for dealing with students with special educational needs, differentiated teaching is also indirectly presented. In addition, we assume that regarding the curricula in pilot implementation provisions for students with special educational needs are covered through the approach of differentiated teaching as a teaching approach that includes all children without exception. In any case, we postulate that in any training –whether it was planned in 2018 (Institute for Education Policy, 2018) and is in progress (Institute for Education Policy, 2021) or it will take place in the immediate or distant future and in whatever form it is implemented– the approach of differentiated teaching and coverage of the special educational needs of students should be highlighted so that teachers take into account both factors when planning and implementing their daily teaching practice.

Acknowledgments

We used data collected as part of the Research Project "Economic crisis, social suffering and political manipulation: aspects of the 'pathology' of the middle classes" carried out at the Research Centre for Greek Society of the Academy of Athens. More precisely that research focused on the Differentiation of Teaching during the period of the Economic Crisis in Greece (2011-2018). The first version of the research was published in the Yearbook of the Research Centre for Greek Society: Papalexopoulos, P. & Skondra, V. (2021). Differentiated Instruction during the economic crisis, *Hellenic Society. Yearbook of the Centre for the Study of Greek Society*, Academy of Athens, *12*, 159-174.

References

Berelson, B., (1971). *Content analysis in communication research.* New York: Hafner publishing company.

Betts, G., (2004) Fostering autonomous learners through levels of differentiation, *Roeper Review*, 26:4, 190-191, DOI: 10.1080/02783190409554269

Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2004). *Working inside the black box: Assessment for learning in the classroom*. *Phi Delta Kappan*, *86*(1), 8 - 21.

Bushie, C. (2015). Literature review: Differentiation in education. BU Journal of Graduate Studies in Education, 7(2), 35-42.

Cross Thematic Curriculum Framework (CTCF) and Curricula Ministerial Decisions for Primary and Lower Secondary school: a) General Part b) CTFC and Curricula Ministerial Decisions for Modern Greek Language and Literature, Ancient Greek Language and Literature, Culture and Activities, Religious Education, History, Social and Civic Education, Mathematics, Study of the Environment.

Dunn, R. & Dunn, K. (1992). *Teaching elementary students through their individual learning styles*. Boston: Allyn & Bacon.

Government Gazette 2281/vol.B'/ 12 October 2011, Ministerial Decision 113730/C2. Approval of Primary and Secondary Education Curricula for their pilot implementation of Mathematics.

Government Gazette 2322/vol.B΄/17 October 2011, Ministerial Decision 113722/C2. Approval of Primary and Secondary Education Curricula for their pilot implementation of STEM Domains. Learning Objects: Geography (Primary and lower Secondary School), Physics (Primary School), Study of the Environment (Primary School)

Government Gazette 2323/vol.B΄/ 17 October 2011, Ministerial Decision 113719/C1. Approval of Primary and Secondary Education Curricula for their pilot implementation of Technology and Information Technology.

Government Gazette 2406/vol.B΄/9 September 2014, Ministerial Decision 137437/C2. Curriculum of technology for Grades A,B,C of Lower Secondary School.

Government Gazette 2537/vol.B΄/9 October 2013, Ministerial Decision 139605/C2. Curriculum of Physics 1st Grade of Lower Secondary School.

Government Gazette 303/ vol.B΄/13 March 2003. Ministerial Decision 21072a/C2.

Government Gazette 304/vol.B΄/13 March 2003, Ministerial Decision No. 21072b/C2. Cross Thematic Curriculum Framework (CTCF) and Curricula Ministerial Decisions for primary and lower secondary school: Music, Foreign Languages, Home Economics, Computer Science, Technology, Biology, Geology, Geography, Physics, Chemistry, Physical education, Cross Thematic Curriculum Framework (CTCF) and Curricula Ministerial Decisions Preschool education, programs for planning and developing cross – curricular activities (Flexible Zone, Health Education, Olympic Education, Environmental Education) and appendix: Guidelines for textbook authors, Textbook Specifications.

Government Gazette 5258/ vol.B΄/ 12 November 2021, Ministerial Decision 141347/D2. Curriculum of Technology for Grades A,B and C of Lower Secondary School.

Government Gazette 5260/ vol.B΄/ 12 November 2021, Ministerial Decision 141379/D2. Curriculum of Mathematics for Grades A,B and C of Lower Secondary School.

Government Gazette 5286/ vol.B΄/ 12 November 2021, Ministerial Decision 141359/D2. Curriculum of Biology for Grades A,B and C of Lower Secondary School.

Government Gazette 5392/ vol.B΄/ 19 November 2021, Ministerial Decision 145460/D2. Curriculum of Geology - Geography for Grades A and B of Lower Secondary School.

Government Gazette 5518/ vol.B΄/ 29 November 2021, Ministerial Decision 149118/D2. Curriculum of Physics for Grades A,B and C of Lower Secondary School.

Government Gazette 5658/ vol.B΄/ 3 December 2021, Ministerial Decision 149141/D2. Curriculum of Chemistry for Grades B and C of Lower Secondary School.

Government Gazette 5659/ vol.B΄/ 3 December 2021, Ministerial Decision 152738/D2. Curriculum of Information Technology for Grades A, B and C of Lower Secondary School.

Government Gazette 5814/ vol.B΄/ 10 December 2021, Ministerial Decision 160386/D2. Curriculum of Mathematics for Primary School.

Government Gazette 5815/ vol.B΄/ 10 December 2021, Ministerial Decision 160501/D1. Curriculum of Geography for Grades 5th and 6th of Primary School.

Government Gazette 5928/vol.B΄/ 16 December 2021, Ministerial Decision 160407/D1. Curriculum of Physics for Grades 5th and 6th of Primary School.

Government Gazette 5939/vol.B΄/ 16 December 2021, Ministerial Decision 162465/D1. Curriculum of Study the Environment for Grades A, B, C, D of Primary School.

Government Gazette 5941/ vol.B΄/ 16 December 2021, Ministerial Decision 162496/D1. Curriculum of Information and Communication Technologies for Primary School.

Government Gazette 97/ vol.B΄/22 January 2014, Ministerial Decision 4609/C2. Approval of Secondary Education Curricula for their pilot implementation of science domain Natural Sciences

Heacox, D. (2014). Differentiating Instruction in the Regular Classroom: How to Reach and Teach All Learners, Free Spirit Publishing: Minneapolis.

Holsti, O. (1969). *Content Analysis for the Social Sciences and Humanities*. Reading, Mass: Addison-Wesley Pub. Co.

Institute for Education Policy (2018). Report Institute of Education Policy, 2018 http://iep.edu.gr/images/IEP/Dioikisi_Domi/Ti_einai_to_iep/Apologismos/2018_Apologismos_IEP.pdf

Institute for Education Policy (2021). Report Institute of Education Policy, 2021 http://iep.edu.gr/images/IEP/Dioikisi_Domi/Ti_einai_to_iep/Apologismos/2021_Apologismos_IEP.pdf

Latz, A. O., Speirs Neumeister, K.L., Adams C. M., & Rebecca L. Pierce, R. L. (2008). Peer Coaching to Improve Classroom Differentiation: Perspectives from Project CLUE, Roeper Review, 31:1, 27-39, DOI: 10.1080/02783190802527356

National Center on Response to Intervention. (2010). Essential components of response to intervention. Retrieved from https://rti4success.org/sites/default/files/rtiessentialcomponents _042710.pdf0.

Sherman, W., (2008, 2016). Differentiated Instruction: A Review of Literature, Research Report, Metropolitan Educational Research Consortium, Virginia Commonwealth University: Virginia.

Sparks, S. D (January 28, 2015). Differentiated Instruction: A Primer. In https://www.edweek.org/teaching-learning/differentiated-instruction-a-primer/2015/01

Taylor, S. (2017). Contested knowledge: A critical review of the concept of differentiation in teaching and learning. Warwick, Journal of Education, 1, 55-68. https://journals.warwick.ac.uk/index.php/wjett/article/view/44/238

Tomlinson, C. (1995). "All Kids Can Learn": Masking Diversity in Middle School, *The Clearing House*. 68: 163-166. 10.1080/00098655.1995.9957221.

Tomlinson, C. A. (August, 2000). Differentiation of Instruction in the Elementary Grades. ERIC Digest. ERIC Clearinghouse on Elementary and Early Childhood Education. https://www.readingrockets.org/article/what-differentiated-instruction

Valiande, S. A., Kyriakides, L., Koutselini, M. (2011, January). Investigating the impact of differentiated instruction in mixed ability classrooms. Paper presented at the 24th International Congress for School Effectiveness and Improvement, Limassol, Cyprus