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ONE YEAR PILOT IMPLEMENTATION OF THE NEW GREEK GEOGRAPHY CURRICULUM IN PRIMARY EDUCATION

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Abstract

The aim of this paper is to present the results of the Greek primary education Geography Curriculum piloted during the school year 2011-2012. The sample consisted of 43 primary school teachers, from different Greek regions, who piloted the new Geography Curriculum and from whom semi-structured interviews were obtained. Furthermore, 36 lesson plans and worksheets produced by teachers during piloting were analyzed. The results from the interviews showed that teachers were generally satisfied with the new Geography Curriculum, seemingly having captured to a large extent the aims and the objectives; they ascertained absolute correspondence between intended learning outcomes and proposed activities, considered the teacher's guidebook to be highly satisfactory and valued the teacher training accompanying the pilot scheme as being very effective. Moreover, an analysis of lesson plans and worksheets showed that teachers created activities and adopted teaching methods that included the essential characteristics of the Geography Curriculum, both in terms of development of the basic concepts and the use of new technologies.

Keywords: *geography curriculum, primary education, teachers, in-service training*

1. INTRODUCTION

The new Geography Curriculum (GC)[1] for Greek compulsory schools was prepared by the authors of the current article during the school year 2010-2011 and piloted in selected Greek

[1] New Pilot Geography Curriculum available at: http://ebooks.edu.gr/2013/newps.php (in greek)

primary schools during 2011-2012. The authors have undertaken two projects: a) the preparation of the new GC for 5th and 6th grades of primary school, where the subject is taught separately, and b) the preparation of certain components to be included in the of Environmental Studies course offered from 1st to 4th grade. In this course, apart from Geography, various other subjects are taught including social science and natural science. The basic principles followed by the authors in the new GC are: a) the enhancement of the teacher's ability to design and produce his own teaching material, b) the creation of goal-centered rather than book-centered teaching strategies, c) the encouragement of using audio-visual material and especially New Technologies, d) the encouragement to exploit various teaching methods and practices to meet the diverse needs of students, e) the avoidance of verbalism, the activation of working groups, inquiry learning, the student-centered approach and greater emphasis on the experiential approach to learning.

In addition, the new GC is accompanied by the Teacher's Guidebook, which includes a) a brief introduction b) pre-developed teaching plans ready for implementation in 5th and 6th grades (three for each grade) c) possible ways of achieving general outcomes for these grades d) possible ways of achieving specific learning outcomes for the above mentioned grades e) examples for students' assessment with a variety of evaluation forms for each developed section and f) an appendix with accompanying material.

The aim of this article is to present the results of the pilot implementation of the proposed GC in Greek primary schools. The study is in two parts. The first refers to teachers' opinions on the new GC in terms of familiarizing themselves with the goals and objectives, possible matching between learning outcomes and students' activities, the teacher's guidebook and in-service teacher training for the new curricula; the second part examines whether teachers successfully perceived the main characteristics of the new content of the GC, and the activities that were actually implemented during instruction.

The main aim of teaching Geography in primary school is to enable students to construct knowledge of essential concepts so that they can understand the relationships and interdependencies between human and space. In particular, Geography explains where places are, how places and landscapes are formed, how people and environments interact, how places change and how a number of different economies, societies and environments relate to each other. Moreover, through taking the Geography course, students have the opportunity to experience methods of research into issues relating to space from a local to a global scale.

However, it is known that Geography as a school subject suffers from the preconception of being a boring, descriptive teaching subject t- vast in scope - that contains concepts, numbers and names needed to be memorized and identified on maps (Katsikis 2001, Labrinos, Chadzipantelis & Gratsonidis 2002, Katsikis 2004, Klonari & Koutsopoulos 2005). This perception originates from the early school age and, unfortunately, does not soften with time.

However, nowadays more than ever, humanity is facing a variety of issues, with a strong geographical dimension, such as population dynamics, inequalities in alimentation, urbanization, socio-economic disparities, poverty, unemployment, refugee problems, human rights violations, diseases, criminality, racial discrimination, immigration, environmental degradation and depletion of natural resources. These issues, which strongly affect modern life, show the dynamic relationship and interaction between space, human activities and environment. In other words, it is shown that the content of Geography curricula, must be closely linked with the development of spatial thinking and the development of students' spatial skills, as well as with the three-sided approach: Physical Geography, Human Geography and Environmental Geography (Integrated Geography).

2. FEATURES OF THE NEW GEOGRAPHY CURRICULUM

2.1. Spatial thinking

Linn & Petersen (1985) consider that spatial ability is a general skill in "representing, transforming, generating and recalling symbolic, non-linguistic information", whereas Eliot & Smith (1983) define spatial ability as "the perception and retention of visual and the mental manipulation and reconstruction of visual shapes".

Goodchild (2006) argues that communication is dependent on the spatial literacy of the person i.e. a "set of abilities related to working and reasoning in a spatial world" that allow us to "comprehend maps, pictures and spatial data, the same way we are taught to understand numbers, texts and logic". According to Hespanha, Goodchild & Janelle (2009), learning to think spatially means that someone must have: spatial knowledge of concepts, spatial ways of thinking and acting – including knowing how, where and when to use the various spatial-thinking strategies and spatial capabilities, such as the ability to use tools and technologies to help in problem solving and making decisions.

Lee & Bednarz (2009) consider as spatial abilities the spatial visualization of manipulating information, spatial orientation, the interpretation of spatial distribution and patterns, the connection and correlation of locations and places, the comprehension of spatial hierarchies and orientation in the real world. The spatial abilities of students are equally developed through activities related to cognitive maps, drawing maps, and comparisons of various thematic data layers.

Kastens & Ishikawa (2006) argue that the development of spatial thinking has to do with the ability of students to recognize, observe, record, describe, classify, recall and communicate with two-dimensional and three-dimensional shapes. Furthermore, spatial thinking means the recognition of structures in space, the orientation and location of objects, shapes, structures, orientations and positions and their related properties or processes. Finally, spatial thinking has to do with the ability to interpret the relation between objects, properties and processes and their respective shapes, structures, orientations and positions and with the competence to predict the consequences or implications of the observed shapes, structures, orientations and positions.

Therefore, a key feature of the new GC is the development of students' spatial thinking through specific activities. For this purpose, the new GC is based on a number of key concepts which are reexamined from grade to grade and level to level in education. The concepts that the students should know and understand, and in which they should deepen their knowledge and develop competences are:

1) Location

Located places/data/events on the Earth's surface – 'Where is this…?', 'What is this….?' and 'How this is linked to others…?'

2) Place

The concept of "place" includes: a) Understanding the physical and human characteristics of real places and b) Developing 'geographical imaginations' of places and landscapes.

3) Space

The concept "space" develops: a) an understanding of the interactions between places and the networks created by flows of information, people and goods and b) knowing *where* places and landscapes are located, *why* they are there, *what* patterns and distributions they create, *how* and *why* these are changing and the impact this has on the people.

4) Scale

The perception of spatial scale contributes to a) appreciating different spatial scales-from personal and local to national and global and b) making links between scales to develop understanding of geographical concepts.

5) Region

Regions refer to places on Earth, how they are formed and altered. Areas of land are divided and are examined according to various criteria, such as natural, political, cultural, economic criteria, etc.

6) Interdependence

It is the a) study and exploration of the social, economic, environmental and political connections between regions and b) understanding of the significance of interdependence in change, on all scales.

7) Physical and Human processes

Students' understanding on how sequences of events and activities in the physical and human world lead to change in places, landscapes and societies. Physical and Human processes can be used to explain spatial patterns and spatial distributions, can be supportive in imagining alternative ways in which places and the people living in them may develop.

8) Environmental interaction and sustainable development

These concepts relate to: a) understanding that physical and human dimensions of the environment are interrelated and co-influence environmental changes, b) exploring sustainable development and its impact on environmental interaction and climate change.

9) Cultural understanding and diversity

These concepts refer to: a) appreciating the differences and similarities between people, places, environments and cultures, so as to inform students' understanding of societies and economies, b) appreciating how people's values and attitudes differ and may influence social, environmental, economic, and political issues and c) developing students' values and attitudes towards such issues.

With reference to the above, concepts, teaching topics, goals and objectives were selected, and activities and teaching materials were formulated so as to reflect the level of cognitive development of primary school children.

2.2. The use of New Technologies

Generally, teaching tools such as maps, atlases, photographs, aerial photographs and satellite images which present information related to space, places, landscape and human activities are recommended; so that the students implement a variety of geographical processes through suggested geographical surveys and field work (Taylor 2001, Condie et al. 2007). However, in combination with existing educational material, a new element is proposed for the new GC: the use of various types of applications of information and communication technologies (ICT) such as internet tools, educational software, hypermedia, virtual Globes and other visual environments, simulations-visualizations, etc.

The use of ICT in teaching Geography is necessary for the following reasons:

1. They concretize abstract concepts and procedures that do not directly attract the attention of students.
2. They enable students to observe the general image and details of a large area, even the whole of the Earth.
3. They enrich teaching, making it more interesting and motivating involvement with various geographical issues.
4. They facilitate students in their search for information on a variety of geographical topics.

5. They facilitate the linking of geographical issues to knowledge in other subject areas and thus promote interdisciplinarity.
6. They enable students to understand directly the impact certain phenomena or facts have on humankind (e.g. the consequences of flooding on our lives).

2.3. Type of activities

The aims of Geography as a subject in general, as well as the objectives of individual units in particular, are achieved through a series of organized events and activities both inside and outside the school. Therefore, the teacher is required to select, organize and support a framework of activities through which learning outcomes will be fulfilled, based on specific criteria. Such constructive teaching of Geography is based on:

1. the student-centered pedagogical model
2. the application of principles of collaborative learning
3. the use of active learning processes (through practices that promote and utilize self-motivated discovery and answer geographic questions through investigation)
4. the utilization of students' experiences
5. the expression, formulation, argumentation and documentation of personal opinions and viewpoints or conclusions
6. the promotion of students' competences in relation to their age regarding the recruitment, organization, analysis and interpretation of geographical space
7. the use of audio-visual material
8. the use of ICT applications available today such as Geographic Information Systems (GIS), remote sensing, various tools and internet applications, educational software, hypermedia applications, virtual environments, simulations, visualizations, etc.
9. the exploitation of observations and data extraction from the immediate environment in field work
10. the acquisition of knowledge from facts and phenomena of everyday life
11. the ability to implement the acquired knowledge and practice in other cognitive areas and the use of interdisciplinary approaches and complex acts to obtain information from other cognitive areas (Gibson & Chase 2002, Barron & Darling-Hammond 2008).

Therefore, as basic methodological characteristics of Geography the authors chose the inquiry-based learning approach, the cooperative teaching (teamwork), the use of a variety of teaching methods (problem solving, role play etc) and the experiential approach including field work.

3. RESEARCH METHODOLOGY

3.1. Research questions

This study has four research questions: a) what is teachers' general opinion held by teachers about the new GC?, b) what problems did teachers face during the pilot implementation and c) what are their suggestions for enhancement and adjustment of this? and d) to what extent were the basic features of the GC perceived and implemented in teaching?

3.2. The Sample

The research sample is consisted of 43 teachers who piloted the new Geography Curriculum throughout Greece, many of them voluntarily created a total of 36 new lesson plans.

3.3. Procedure

The new GC was piloted during the school year 2011-12. Special Geography mentors visited the schools, evaluated the progress made in the implementation of the new GC and supported the 43 teachers on multiple levels. In order to achieve this reliably:
1) teachers were interviewed in a semi-structured manner
2) a follow-up report was prepared for the piloting of the new GC in every school.

With the above as research tools our first three research questions will be examined. With the support of the school advisors and mentors and after attending training seminars, the teachers could voluntarily produce their own lesson plans. Indeed thirty-six lesson plans were produced highlighting the teacher's role as developer of teaching material. Our forth research question will be approached using these as research tools.

3.4. Analysis

The semi-structured interviews and follow-up reports of the mentors underwent qualitative analysis through content analysis (Stemler, 2001; Cohen et al. 2007). Responses were classified into categories and, for the needs of this study, are presented in tables as percentages (%). This allows us quite securely to detect positive and negative aspects of the pilot implementation of the new GC in primary schools, since the study sample is half the number of teachers who piloted the GC throughout Greece. Moreover, about half of the teachers who received the training seminars created their own lesson plans which have been studied in order to assess the adoption of key features of the new GC.

4. Results and Comments

4.1. Familiarity with the goals of the new GC

A significant 30% of teachers who implemented the new GC in schools felt completely familiar with its goals (Table 1). According to the teachers, this is because the training seminars assisted them in forming a clear picture of the learning outcomes, activities and teaching methods proposed in the new GC. They clearly stated that the Geography Curriculum is one of the most "easily understood", as it is clear and detailed. Main reasons for this complete familiarization were the high level of correlation of the content and learning outcomes with the existing school textbooks and the encoding of the goals into achievement keys of the student

Table 1. Teachers' familiarization with the goals of the new Geography Curriculum

Teachers' Familiarization with the goals	**Number of Teachers (N=43)**	**Percentage**
Complete familiarization	13	30%
Gradual familiarization with mentor´s help	17	40%
Partial familiarization	10	23%
No familiarization	3	7%
Total	43	100%

However, 40% of the teachers seemed only gradually to acquire a familiarity with the GC goals because their initial training was not well-organized. In these cases,the Geography mentor's role through in-school training seminars and frequent distance communication, was crucial.

Moreover, 23% of teachers were deemed to have insufficiently familiarized themselves with the goals of the new GC. Some of these did not even manage to find it posted online by an official educational resource, others merely glanced at it. The inclusion of a social dimension in the course of "Environmental Studies", worsened the situation, with the teachers of the first four grades not having the opportunity to familiarize themselves with the Geography units included in the new curriculum of Environmental Studies. As a result, they were unable to obtain a coherent and comprehensive overview of geographic concepts, such as orientation and map making, included in the last two grades of primary school.

However, only 3% stated that they had studied the new GC insufficiently or not at all, were therefore to no extent familiar with its goals.

4.1.1. Correspondence between the intended learning outcomes and activities

The majority of teachers (70%) believe that there is total correspondence between intended learning outcomes and activities proposed by the new GC, while the remaining 30% consider that the correspondence is "great" (Table 2). In the lesson plans that teachers processed during the training seminars, the correspondence was characterized as perfect, as they had the opportunity to use all the material supplied for a lesson plan.

In fact, teachers who implemented specific lesson plans in class studied the teacher's guidebook and enriched the proposed material with their own activities and additional teaching material, mainly related to local aspects of various issues.

Table 2. Correspondence between intended learning outcomes and activities of the new Geography Curriculum according to the teachers who piloted it

Correspondence between intended learning outcomes and proposed activities	Number of teachers (N=43)	Percentage
Total correspondence	30	70%
Great correspondence	13	30%
Partial correspondence	0	0%
No correspondence	0	0%
TOTAL	43	100%

Overall, teachers consider it important that the GC offers a wide range of pedagogical freedom in education, and in particular those who have created new lesson plans actually experienced the intended teacher's autonomy. However, teachers estimate that they need to familiarize themselves more with the requirements of a goal-centered model and suggest that, to this end, particular emphasis is placed on training. Achieving this goal is important for the success of the new GC, as the students' activities have to be targeted to the largest possible learning outcome.

4.1.2. Using the Teacher's Guidebook

The Teacher's Guidebook that accompanying the GC, included six lesson plans ready for implementation in the 5th and 6th grade. As is indicated in Table 3, 93% of teachers were very satisfied with the Geography Teacher's Guidebook, because they believe that it "includes well-organized lesson plans and interesting suggestions". They noted that it "in terms of applicability, [it] contains simple and realistic, lesson plans" which guided them in creating new lesson plans both during the training seminars and during the pilot implementation.

Table 3. Teachers' opinion of the Teacher's Guidebook

Opinion for the Teacher's Guidebook	Number of teachers (N=43)	Percentage
Highly useful	40	93%
Very useful	3	7%
Indicative	0	0%
Unnecessary	0	0%
TOTAL	43	100%

In general, teachers consider that "the clear and organized Teacher's Guidebook with lesson plans greatly supported us in the use of multiple teaching methods". To this end, the collaboration among teachers who taught in the same Grade was also important, as the

personal experience of each adds aspects to the GC and the Teacher's Guidebook which were not directly suggested.

4.1.3. Teachers' training seminars during pilot implementation

The training seminars helped teachers respond effectively to the pilot implementation of the new GC. As is clear from Table 4, 72% of teachers found training seminars very useful for the comprehension of the new GC philosophy. Their practical and purely experiential nature, the active participation of teachers, the realization of lesson plans in groups, the design of new lesson plans, the positive atmosphere, the encouragement, the suggested resources and the inquiry approach to learning contributed to the comprehension of teamwork teaching and the use of differentiated teaching methods.

Furthermore, differentiated teaching, activities of graded difficulty, and emphasis on active student participation, increased the interest of teachers in implementing the GC in practice. In particular, teamwork is a practice that the majority of teachers have rarely experienced in other training seminars, thus, it was enthusiastically welcomed in these ones.

Moreover, the direct implementation of various methods and tools, instead of theoretical presentation, in seminars was evaluated by the teachers as an excellent choice. Additionally, the approach of concepts and teaching techniques with which the majority of teachers are not yet familiar, such as the development of group dynamics, the emotional learning activities, the interdisciplinarity and the development of goal-centered lesson plans, contributed to the success of the training seminars.

Table 4. Teachers' opinion of the Geography training seminars

Opinion on Geography training seminars	Number of teachers (N=43)	Percentage
Highly useful and experiential	31	72%
In-school training (by the mentor) more effective	12	28%
Little value	0	0%
TOTAL	43	100%

In schools, where there had been insufficient or no Geography training seminars (28%), teachers received significant support and feedback through communication with the Geography mentors. The seminars with the mentors were in the form of in-school training and encouraged teachers to become involved with the programme, despite their initial doubts, enabling students to welcome the new approach and establishing positive learning outcomes.

4.1.4. Creating new lesson plans

Teachers considered the uninterrupted distance communication they had with their trainers from the seminars to be important support offered for the pilot implementation, in the form of additional teaching materials and instructions. Through this kind of support, teachers felt part of a learning community and contributed to achieving common goals. As an outstanding result of the pilot implementation, the authors consider the fact that teachers have created, submitted and exchanged 36 new lesson plans for all grades of primary school: one for the 1st

grade, three for the 2nd grade, two for the 3rd grade, one for the 4th grade, seventeen for the 5th grade, and twelve for the 6th grade. The new lesson plans originated from 16 primary schools and 39 different teachers, with many having created more than one new lesson plan. These 36 lesson plans are already accessible to the educational community at https://www.dropbox.com/sh/d1wzi6e1v2zsv6s/yMy8URvGnS in order to enhance the exchange of learning material. Moreover, these lesson plans constitute a useful research tool, which will reveal the extent to which the key features of the new GC have been grasped by the teachers

4.1.5. Students' impressions

From their point of view, students recognize and endorse the difference in the proposed changes in the new GC. Specifically, during the discussions held with Geography mentors, they strongly expressed their pleasant surprise and joy they received through the playful assessment procedures, interactive exercises, map creation and completion, and the quizzes/games: "although we played games we learned a lot", "we liked matching the symbols with the map and learning the legends", and "we tested our knowledge through nice games". This kind of student statement demonstrates how the teachers' enthusiasm for the new approach towards Geography was transformed into teaching practice. Students claimed that they really enjoyed it and they are looking forward to continuing: "the lesson was fun", "we refreshed our memory about things we'd learned by playing games", "we liked the videos we watched, the computer quiz, through which we tested our knowledge and we saw the results…", "Geography stopped being boring…", and "it would be nice to do such activities in other subjects too".

4.1.6. Problems and concerns

The capacity for teacher autonomy in planning and teaching, pursued by the new GC separately for every teacher, increases educational freedom and broadens teacher's horizons. What really worries the teachers, however, is that the variety of teaching methods, tools and materials lengthens the time needed to deliver the course, with consequent pressure imposed on them and on students. For example, the units that were piloted required about 25%-100% more time than anticipated. While the application of multiple teaching methods a would appear to promote teaching and lead to better learning outcomes, an overall rearrangement of the daily school timetable and a reduction of the GC's contents are required for its successful application. Additionally, the use of innovative teaching methods increases the teacher's preparation time, creating even more pressure in addition to that imposed by the sensitive educational working environment. This could perhaps could be overlooked if the existing infrastructure in schools supported the requirements of all teachers to implement the new GC; unfortunately, however, there are significant inequalities in the distribution of equipment in Greek primary schools.

Finally, a point of concern expressed by teachers is the attitude of parents towards the new GC. Specifically, teachers said that most parents are not properly informed about the basic characteristics of GC and tend to think that school should be teacher-centered and book-centered, as it was when they were students. They would appear to ignore the goal- based approach of knowledge and its benefits, degrade affective and psychomotor learning objectives, and consider that Geography is about memorizing cities, islands, capes, bays and mountains, etc, of Greece. Therefore, they easily doubt the teachers' work concerned with the

modern requirements of GC expressing contempt for the triple approach Physical Geography - Human Geography - Environmental Geography and an obsession with traditional forms of teaching and student assessment. Nevertheless, in a school where they were invited to observe teaching, parents were impressed by the new approach.

4.1.7. Suggestions for improvement

Although ultimately teachers accept the need for change in Geography teaching, it is noted in many cases that there is incompatibility between the Greek educational reality and primary school infrastructure and the requirements of the new GC. All teachers agree that technological equipment (PCs, video projector, internet connection) is necessary in all classrooms and that schools should be enriched with books, magazines, brochures and digital material to be used either by students or by teachers. The more open, exploratory and productive we want the GC to be, the more this need grows. Certainly, for better utilization of multiple teaching tools, teachers consider that a well-organized school library accompanied by sufficient funding for its maintenance and enrichment with a variety of magazines, CD-ROMs, maps, atlases and encyclopedias useful in implementing the new GC, is necessary.

The most important drawback of the new GC is the excessive time required for the teacher to locate and select appropriate teaching material. This is the reason why teachers would find the existence of an additional reference book, extremely helpful, even more than the proposed activities in the Teacher's Guidebook. This need not be a textbook exactly, but something more open and flexible: an educational file/portfolio containing material such as proposals, activities, software, photos, videos, maps and recommended reading. Such material, which does not require advanced reading skills, is useful for motivating students with learning difficulties or different educational needs. Teachers also find the idea of creating a digital repository with activities and lesson plans that would be digitally available throughout the educational community very helpful.

At the same time, teacher training in the GC should be continued with emphasis on new concepts, methods and teaching practices that it requires (collaborative research, creating spreadsheets, concept mapping, new ways of evaluation, integration of the arts, sustainability dimension, etc). A main requirement is laboratory type training, which should focus on group dynamics and strengthening members' relations. In order for theory to be put into practice, teachers also consider in-school training to be an important form of training, through demonstration of practical applications, and discussions addressing specific educational and learning issues. Many educators believe that this form of training is much closer to the experiential approach, better simulates the teamwork teaching method, reduces possible resistance - as it is implemented in a familiar environment - and can include sample lessons. Moreover, ICT training seminars would have a very positive impact on the implementation of the new GC. Finally, special effort should be made to reach teachers in small villages and towns who lack opportunities for training.

Generally, the development of financial resources for schools, the upgrading of the technological infrastructure, the continuous cooperation of all teachers, and the flexibility of the timetable throughout the school year are the necessary preconditions for the effective implementation of the new GC and for the achievement of the intended learning outcomes. Should these requirements be met, teachers admit that they would feel more confident about incorporating innovative teaching methods into their daily teaching practice.

4.2 Highlighting the main features of GC

4.2.1 Development of spatial thinking

The most important goal of the new GC in primary school is the avoidance of the memorization of names and numbers and the development of students' spatial abilities. Due to the young age of students, this goal is becoming more difficult and requires the design of appropriate activities. This is demonstrated by our sample, as only 50% of the lesson plans produced took care to specially develop the spatial thinking of students (Table 5). Classifications are made, and to a great extent, but patterns are not always sought in these classifications. The place is always a subject of discussion, but the reason of spatial planning is not always sought. The map is almost always used as a research tool, but not always as an inquiry tool for interpretations of distributions of census data, landforms, man-made structures, species, economic factors, etc. The lesson plans that do promote spatial thinking consist of issues mainly related to places or cities, rivers or lakes, population and climate zones. These lesson plans involve students in discovering possible data correlations, in order to provide explanations for the dispersion, the distribution patterns and the classification of places, regions or phenomena, using satellite images, maps and data tables as tools.

Moreover, these seems to be a lack of development of activities in three areas - Physical Geography, Human Geography and Environmental Geography - in spite of the educational requirement for an interdisciplinary approach. In fact, only 55% of the lesson plans produced satisfy this dimension (Table 5). These contain activities that explore the interdependence of the natural environment and human activities, record environmental problems and include possible solutions. Their topics deal mainly with ecosystems, rivers and lakes, cities, transportation, tourism and weather/climate.

Table 5. Identification of characteristics of spatial thinking and triple approach to Geography in the new lesson plans

Features of the GCP	**Number of lesson plans (N=36)**	**Percentage**
Spatial thinking	18	50%
Triple approach	20	55%

4.2.2. Use of multiple teaching materials and ICT

All teachers acknowledge the opportunities offered by the use of multiple audio-visual teaching tools, especially ICT in teaching Geography. The effort to use ICT was a great success, as ICT capabilities were integrated into 92% of new lesson plans. Lower frequencies were found in the use of maps (72%), images and photos (33%), accompanying texts (33%), blank map for completion (17%), magazines and newspapers (11%), cards with symbols (11%), the globe (6%), tables & charts (6%) and others (Table 6).

It is important to note that the map is a significant research tool, in many cases accompanied by texts, which facilitate the triple approach towards Geography. Images and photographs are utilized to make comparisons and classifications between locations or places. The blank map, which was proposed in the lesson plans in the Teacher's Guidebook, was adopted and used both as an application and an assessment tool. Finally, in appropriate units, tables & charts, globes and other experimental material were used as teaching material.

Initially, teachers were particularly concerned that the new GC would depend one-hundred percent on the use of ICT. When they realized that the differentiation of teaching and the adjustment of both the mental level of students and the level of school equipment availability were sufficient to cover the lack of ICT equipment, they relaxed their concern and revealed their creativity. However, the lack of infrastructure and resources, the lack of ICT training and the increased time needed for preparation, were sometimes too great a disadvantage and, as a result, teachers then only used the resources offered through the official textbooks.

Table 6. Identification of visual tools in the new lesson plans

Suggested visual material/tools in lesson plans	Number of lesson plans (N=36)	Percentage
ICT	33	92%
Maps	26	72%
Images-Photos-Satellite images	12	33%
Accompanying texts	12	33%
Blank map for completion	6	17%
Magazines-Newspapers	4	11%
Symbols	4	11%
Globes	2	6%
Tables-Graphs	2	6%
Interactive whiteboard	1	3%
Poster	1	3%
Books-Encyclopedias	1	3%
Thread & Flashlight	1	3%

Teachers who introduced ICT into their teaching demonstrated imagination and creativity. 36% of them utilized special content websites, 33% used Google Earth - Google Maps applications, 33% found or created a presentation, 30% viewed a video or documentary, 21% found appropriate educational software, 12% presented weather forecasts and 9% looked for pictures, interactive games and simulations (Table7). In some cases, the teacher's inability to use ICT actually motivated the students, as many of them being more familiar with technology, brought in visual material that was missing from school and willingly undertook research on the internet not only at school during ICT class time but also at home.

Table 7. Distribution of ICT applications in the new lesson plans

Suggested ICT applications in lesson plans	Number of lesson plans (N=33)	Percentage
Special content websites	12	36%
Google Earth – Google Maps	11	33%
Introductory presentation	11	33%
Video-Documentary	10	30%
Educational software	7	21%
Weather forecast	4	12%
Image & satellite image search	3	9%
Interactive games	3	9%

Simulations	3	9%

4.2.3. Adoption of new forms of teaching

All teachers considered the implementation of multiple teaching methods in Geography as implicit and desirable and they have completely implemented these into the new lesson plans. 86% constructed worksheets for pupils so as to motivate them as much as possible and avoid verbalism (Table 8). 83% explicitly worked in groups, while others suggested this, even if they did not describe it explicitly. 78% put emphasis on the exploratory use of the map, search and presentation of information, reasoning and problem solving, although they admit that sometimes in practice there is a teacher-centred learning. Generally, teachers believe that the multiplicity of means and methods differentiate teaching and shifts the focus to the student's needs stimulating them during the learning process.

Table 8. Identification of methodological elements in the new lesson plans

Features of teaching Geography	Number of lesson plans (N=36)	Percentage
Multiple teaching practices	36	100%
Worksheets	31	86%
Collaborative learning, teamwork	30	83%
Inquiry-based learning	28	78%
Evaluation sheets	8	22%
Suggestions for expansion	8	22%
Field work	1	3%

Teachers generally believe that the subject of Geography is very convenient for implementing multiple teaching methods and a variety of teaching tools and activities. In doing so, they are deliberately trying to avoid from theoretical activities and focus on applied work by students. Nonetheless, while all the teachers mentioned various ways of student assessment, only 22% created specific evaluation sheets. It is worth noting that 22% of them have submitted proposals for the extension of the lesson plans already created. This indicates the teachers' abilities to estimate the teaching time each unit demands more accurately and also to propose a teaching sequence independent of the school textbook.

Field work was very difficult to integrate into the Geography course, since it was suggested in only one new lesson plan. We expected that teachers would adopt this practice more often, as it could contribute to orientation competences and development of spatial thinking. We assume that the limited use of the field work is due to a) the limited teachers' experience in such activities, b) the unsuitability of the units developed, c) the lack of awareness of educational benefits, and d) operational problems, safety issues etc.

As many teachers stated, their ability to plan activities was developed after the Geography training seminars. Due to the experiential nature of these seminars, teachers were given several concrete examples of the application of multiple teaching methods, making it easier for them to enhance the new lesson plans created with a satisfactory combination of map use, worksheets, experiential activities, software, and the Internet.

The variety of teaching practices featured in the 36 lesson plans is exceptionally wide (Table 9). 28% of the teachers created posters or artefacts, this practice was the dominant form of data presentation in training seminars, following the pedagogical motto "think,

discuss, present". A significant proportion of educational activities were based on painting (19%), the discovery or creation of songs (19%) and dramatized scenes from the lives of people in a place (19%), exactly like they were presented in the training seminars.

Table 9. Distribution of teaching practices in the new lesson plans

Multiple instructional practices	Number of lesson plans (N=36)	Percentage
Posters - Artefacts	10	28%
Painting - Drawing	7	19%
Songs – Music	7	19%
Dramatization - Role play	7	19%
Classification of cards or pictures	4	11%
Plasticine modeling	4	11%
Data table completion	4	11%
Problem Solving	4	11%
Concept map construction	4	11%
Colour stickers (post-it notes)	3	8%
Vocabulary exercises	3	8%
Creation of digital display	3	8%
Text completion	3	8%
Experiment - Measurement	2	6%
Interview	2	6%
Experiential games	2	6%
Comics	2	6%
Collage	2	6%
Creation of bar graphs	2	6%
Map drawing	2	6%
Study of literature - poetry	2	6%
Text production – Articles	2	6%
Connection to History	1	3%
Use of visual artworks	1	3%
Board Game Construction	1	3%
Eco-code Formulation	1	3%
Formulating arguments	1	3%
Brainstorming	1	3%
Advertisement creation	1	3%
Maquette – Scale modeling	1	3%

Generally, teachers adopted many of the educational practices implemented in training seminars, such as the construction and use of concept maps (11%), completion of data tables (11%), the use of colour stickers (post-ist) to record similarities and differences (8%), sentence completion (8%), interviews (6%), experiential learning games (6%), construction of board games (3%). However, the requirement for spatial ability development was met most successfully in activities such as plasticine modelling (11%), classification of cards or images (11%), map drawing (6%) and construction of models (3%). Moreover, the requirement for connection of the natural environment with human activities and environmental problems led to the adoption of practices so far seldom seen in the teaching of

Geography, such as problem solving (11%), experiments (6%), comic construction (6%), collage construction (6%), bar graph construction (6%), the study of literature and poetry (6%), creation of advertisements (3%) and the formulation of eco-codes (3%)

5. CONCLUSIONS

The results of the pilot implementation of the new GC are the familiarization of teachers with the goals of the GC, the largest possible correspondence between intended learning outcomes and proposed activities, the evaluation of training seminars, the utilization of the Teacher's Guidebook, the production of 36 new lesson plans and the complimentary impressions of students. Additional improvements could be made regarding the management of teaching time and in a variety of educational materials. General improvements that would contribute to the optimal implementation of the new GC would be the improvement of the school infrastructure, with new teaching tools and materials, the improvement of ICT equipment and more information for parents.

The creation of 36 new lesson plans revealed that teachers clearly understood the differentiation of their role as the developers of teaching material, put into practice a variety of innovative teaching strategies, enriched the learning process through supplying diverse visual material and digital resources, and promoted inquiry-based instruction, increasing students' active participation by creating a rich learning environment, engaging students in the scientific process, in order to develop students' competences rather than solely the memorization of facts and information. They successfully encouraged the active participation of students, applied team work, created the necessary conditions for the development of critical and creative thinking, gave students opportunities for practical work and used traditional and innovative teaching tools from the perspective of inquiry-based learning. Considerable room for improvement still exists in terms of the development of spatial thinking and the triple approach to Geography topics through interdisciplinarity.

In conclusion, the reception of the new Geography Curriculum in Greek primary schools was very enthusiastic. Safer conclusions could be provided from a possible expansion of the pilot implementation to a greater number of schools and for a greater length of time, provided that training seminars and support to teachers are continued. In any case, changes in education prevail, when we focus on people, either students or teachers, and allow them to show initiative.

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