

MA Special Educational Needs

**Liverpool John Moores University
Faculty of Education, Community & Leisure
Centre For Tourism, Consumer and Food Studies**



Dissertation MA Special Educational Needs

(MASEN7508)

An examination of the views of the science teachers in secondary Greek education with regard to children with dyslexia.

Vasileios Eleftherakis

25 of April 2015

1. Introduction

2. Literature review

2.1 A discussion of the definitions of dyslexia.

2.2 The characteristics of dyslexia

2.3 The theoretical causes of dyslexia.

2.4 Dyslexia and non-literature subjects.

2.5 Dyslexia friendly schools.

3. Special Education Needs in Greece.

3.1 Every day practice

3.2 Assessment procedures in the Greek educational system.

4. Research

4.1 Methodology

4.2 Data collection

4.3 Sample

4.4 Ethics

4.5 Data analysis

5. Data of the research

5.1 The background of the teachers who took part in the research.

5.1.1 Basic data analysis

5.1.2 Postgraduate training

5.1.3 Research's questions

6. Basic knowledge about dyslexia

7. The implications of dyslexia in teaching Mathematics, Economic Science, Physics & Computer Science in Greek secondary schools.

**8. The Greek secondary school as a dyslexia friendly school. Is it?
What has to change? The view of the teachers.**

9. Presentation of findings

10. Discussion

11. References

Abstract

The implications of dyslexia on teaching and learning non-literature subjects like Mathematics are often overlooked as dyslexia is considered a difficulty in reading and writing mainly (Malmer, 2000). In Greece most research about teaching children with dyslexia focuses on primary education teachers and their opinions and efforts (Batsiou et al., 2008; Avramidis and Kalyva, 2007; Koutrouba et al., 2010). This research aims to turn the discussion towards the implications that dyslexia causes to the teaching and learning process of positive science subjects in Greek secondary schools. More specifically with this small scale qualitative study I attempted by using semi-structured interviews to examine the above issue through teachers' point of view. This study revealed that in Greek secondary education' teachers are aware about the obstacles that dyslexia may set them. However the results of this research showed that there are many steps to be done before Greek secondary schools can be characterized as dyslexia friendly. Some suggestions how this can happen are included in this dissertation. Finally references to ethics, limitations and researching practices are also included.

1. Introduction

The laws Nr.2817 of 2000 and Nr.3699 of 2008 of the government of the Greek democracy determine the framework of special education needs in Greek primary and secondary education. According to these laws children with special education needs should mainly be educated in mainstream schools except in some cases which require specialist staff and environments and so special schools, it is considered, are essential for the best result. Zoniou-Sideri et al. (2006) and Koutrouba et al. (2010) put forward the view that the main spirit of the laws Nr.2817 of 2000 and Nr.3699 of 2008 is working and nowadays in Greek primary and secondary education classes children with special educational needs are included. Therefore the teachers in Greek primary and secondary educational system are obliged to be ready to face the challenges which may emerge in a class which includes children with special education needs like dyslexia.

The majority of children with dyslexia have very poor reading skills and moreover they often have difficulties with writing too, and these characteristics are considered to be the key characteristics of dyslexia (Peers and Reid, 2003; Sousa, 2005). Furthermore poor phonological awareness is a common characteristic amongst students with dyslexia (Simmons and Singleton, 2009) and although that there is a debate if this is just a characteristic or the cause of dyslexia it seems that dyslexia would primarily cause problems in learning subjects connected to literature (Peers and Reid, 2003). However Malmer (2000) argues that dyslexia has a great impact on the mathematical skills of the students too and there is a strong connection between dyslexia and mathematics which should not be overlooked. Moreover there are researchers that put forward the notion that dyslexia impairs the learning process in other science subjects too like chemistry and physics (Polatoglou and Gregoriades, 2012; Kaminska-Ostep and Gulinska, 2008). Ward (2010) claims that even if the science subjects are in many cases more practical and therefore easier than literature and language for children with dyslexia they do not manage to do well in science as dyslexia causes difficulties in reading comprehension required for success in science. The difficulties in short and long memory of children with dyslexia often lead them to use ineffective problem solving tactics in science (Peers and Reid, 2003). Furthermore several studies have revealed that children with dyslexia often fail to follow instructions effectively (Learning and Skills Development Agency and NIECE, 2004). The above characteristic in combination to the lack of organization of children with dyslexia reveals why they face great difficulties in generalizing knowledge and in problem solving in science subjects where the students have to follow a strict rule system (Learning and Skills Development Agency and NIECE, 2004)

Mathematics and other sciences are very important not only for the further development of science and our civilization but also nowadays for the well-being of every single individual, therefore any obstacle in the learning process of science should carefully examined and evaluated (Ebiendele, 2011; Malmer, 2000). As it is mentioned above dyslexia at first view seems to mainly cause problems in the acquiring literacy. Consequently the majority of

research studies which have been conducted in Greece have investigated the impact of dyslexia on the learning processes of reading and writing focusing at the same time on primary education. As far I am aware there is no study which investigates the obstacles that dyslexia poses in the learning process of science subjects in secondary education through the eyes of teachers.

Hopefully the insights of the teachers will provide us with valuable data concerning inclusion in Greece. With that data we are going to try to understand if and to what degree Greek secondary education is an inclusive educational system in *reality*. Furthermore the notices of the teaching staff which is the heart of every educational system will might provide to us the starting point for our suggestions for a better, safer and more inclusive Greek secondary educational system.

2. Literature review

2.1 A discussion of the definitions of dyslexia.

The first efforts at establishing a definition for dyslexia began at the end of the 19th century, at that time the term dyslexia was synonymous with the difficulty of reading or reading fluently (Gerson-Wolfensberger and Ruijsenaars, 1997). However up until today there is not a single - generally accepted- definition for dyslexia but there are a number of different definitions which attempt to state what dyslexia is (Gerson-Wolfensberger and Ruijsenaars, 1997; Peers and Reid, 2003).

According to Miles (1995) the reasons which lead to the establishment of a definition can serve multiple purposes; a definition can be a presentation of the causes of a condition, an effort to give a description and reasoning for a phenomenon and finally an effort to explain how a specific word is used. Furthermore Miles (1995) put forward the notion, which still holds today, that in many cases as knowledge in a specific academic field grows a new

definition is formulated so as to improve an older one; this fact partially can explain why there are so many definitions for dyslexia. However the issue of defining dyslexia is far more complicated as dyslexia has great educational and social importance (Buttner and Hasselhoern, 2011). The significance of dyslexia and the potential influence of dyslexia on further development of our society lead Miles (1995) to argue that a definition of dyslexia should have some extra uses and features compared to another definition. Specifically Peers and Reid (2003) claim that a proper definition of dyslexia should be a valuable tool for a government to reform the educational policy of its country. For example in New Zealand in 2007 the government recognized dyslexia for first time and asked for a working definition which would help with the educational restructure which was attempted at that time (Tunmer and Greany, 2009). Moreover a definition for dyslexia can be used as a diagnostic tool and help experts to decide on further support for the individual with dyslexia (Miles, 1995). Hudson, High and Al Otaiba (2011) claim that in many cases teachers do not fully understand what dyslexia is. The teachers in classrooms are the front line in the “war” with dyslexia and a key factor for the intervention, however the confusions that they may have about dyslexia often lead to late diagnosis and intervention (Allen, 2010). Therefore it is very important to formulate a definition of dyslexia which will help teachers to understand more deeply what dyslexia is in order to improve their teaching methods and moreover to identify children in risk so as to the interventions to be as soon as possible (Allen, 2010; Tonnessen, 1997). Finally the proper use of a definition of dyslexia will help us to ensure the equality between children with dyslexia and their peers by providing them with the extra help or benefits they need (Miles, 1995; Tonnessen, 1997). However in the establishment of a definition the researchers and the state must be very careful, as there are circumstances that a definition for dyslexia is used so as to cover other problems. Tonnessen (1997), claims that school personnel had used definitions in the past to justify the total poor achievement of their students which in reality did not connected to difficulties that dyslexia caused. In other cases there are examples where parents have succeeded in obtaining extra help and resources for their children by using definitions (Tonnessen, 1997). Such a example occurred in Greece in 2007: when some parents paid 900

euros to the government committee –which was deciding which children must have oral examinations for the entry to the universities- so that their children have this privilege (oral examination), now the legal system will decide what will happen to all of them (Damianos, 2013).

A classification of the definitions of dyslexia was given by Peers and Reid (2003), their taxonomy is divided in three basic classes; descriptive, working and operational definitions. Tonnessen (1997) in another attempt of categorizing the definitions of dyslexia relied on the principle or the combinations of the principles that a definition was formulated upon. The classification that Tonnessen (1997) proposed has three major categories of dyslexia definitions, the definitions which are based on the prognosis principle, the definitions which are based on the causality principle and the definitions that are based on the symptom principle. However he noticed that in many cases the difference between causes and symptoms is not very clear (Tonnessen, 1997). The definitions that were established by the British Dyslexia Association in 2006 and the Adult Dyslexia Organization in 2001 are both descriptive definitions (Peer and Reid, 2003). Although that these definitions are classified in the same category they have an important difference as the second one put emphasis at the uniqueness of every student or adult with dyslexia (Peers and Reid, 2003). The World Federation of Neurology's dyslexia definition-given in 1968- is a definition relying on the causality principle (Tonnessen, 1997). Despite the fact that this definition is widely used in many researches it has limitations as it takes as granted that there are no dyslexic people who grow up in low quality educational setting or with low I.Q. (Tonnessen, 1997). Moreover Tonnessen (1997) argues that there must be solid data and researches for the causes of dyslexia before using causes in order to establish definitions.

Another extensive category of definitions, which are used widely, are the definitions that are based on the “unexpected” difficulty of a child in reading compared to the performance of the child in other subjects (Peers and Reid, 2003). These definitions are called discrepancy definitions and beside their extensive usage discrepancy definitions are also extensively criticized (Lyon, Shaywitz and Shaywitz, 2003; Tonnessen, 1997; Peers and Reid, 2003;

Stanovich, 1996). In circumstances relating to learners with low I.Q. or above normal I.Q. discrepancies may not be clear (Frith, 1999; Buttner and Hasselhorn, 2011). Furthermore Siegel (1992) argues that is very complicated to define what is expected reading level for someone and Frith (1999) claims that often discrepancy definitions confuse dyslexia and poor reading skills which are not linked to dyslexia. Finally another deficit of discrepancy definitions is the risk of late diagnosis and so late intervention (Lyon, Shaywitz and Shaywitz, 2003). The definition which was established by the British Psychological Society in 1999 and the definition which adopted by the Committee of Dyslexia of the Health council of the Netherlands are definitions which called *working* (Peers and Reid, 2003; Gerson-Wolfensberger and Ruijsenaars, 1997) Working definitions seems to an efficient solutions as they are designed to be effective under different social and educational settings, to include as many as possible scientific theory and explanations as possible and finally to be applicable on different groups (Peers and Reid, 2003; Gerson-Wolfensberger and Ruijsenaars, 1997).

It is very reasonable for someone to be worried by the absence of a solid definition of dyslexia. Are Eliot and Gibbs (2008) right who claim that dyslexia is nothing more than a convenient excuse of the weakness of our modern society and educational system or there are objective reasons which make the formulation of “ecumenical” definition of dyslexia too difficult? Dyslexia is a syndrome and the level of difficulties that dyslexia causes is different from person to person (Stanovich, 1996). According to Tonnessen (1997) this is a huge obstacle for a universal definition. Furthermore the researchers with different backgrounds who investigate different fields of dyslexia are unable to agree on a unique definition (Peers and Reid, 2003; Miles, 1995). In addition a definition valuable for the formulation of the educational policy in a country may be useless for the teacher in a classroom, or even unsuitable for the educational system of another country (Miles, 1995).

After 100 years of different approaches in establishing a definition of dyslexia researchers have not agreed on key features that a definition must have (Tonnessen, 1997). Frith (1995) put forward the notion that researchers should stop considering dyslexia at different levels and look it as a whole.

Peers and Reid (2003) more specifically argue that a unique definition of dyslexia must include references to all following characteristics; possible differences in the left brain hemisphere and in the processing style of every dyslexic individual, impaired phonological skills, discrepancies in different educational areas, observable behaviors and practical recommends. A definition which teachers can use in every day practice so as to identify children at risk of dyslexia so as to adjust their teaching strategies as soon as possible would have multiply benefits for the students and learning process for all class. In this dissertation we are going to examine if science teachers in Greek secondary education know and use a definition of dyslexia.

2.2 The characteristics of dyslexia

The characteristic which is mainly connected with dyslexia-in almost every study-is the impaired reading skills of people with dyslexia (Peers and Reid, 2003; Baddeley, Logie and Ellis, 1998). It is very common amongst individuals with dyslexia to face difficulties in reading or in reading fluently (Miller-Shaul, 2005; Shaywitz and Shaywitz, 2005). Although a good reader it is not always a good speller, Sousa (2005) claims that in many cases the poor reading skills of a person impair the spelling skills too. Consequently it follows that poor spelling is also a characteristic highly associated with dyslexia (Peers and Reid, 2003; Miller-Shaul, 2005; Shaywitz and Shaywitz, 2005). Moreover Peers and Reid (2003) argue that children with dyslexia misspell even very commonly used words and in many cases change the order of the letters inside a word. Furthermore students with dyslexia in many cases use badly formed letters or use capital letters inside words (Peers and Reid, 2003).

The process in which a person connects the letters to sounds is called decoding and the level of the decoding ability of a person define the level of his phonological awareness and therefore the level of his reading skills (Sousa, 2005). According to a number of researchers another key characteristic of dyslexia is the poor phonological awareness of people with dyslexia (Simmons and Singleton, 2009; Bishop and Snowling, 2004). Peers and Reid (2003) argue that is a clear fact that people with dyslexia are

characterized by poor phonological awareness which leads to impaired reading and spelling skills. Nicolson (2008) and Stein and Walsh (1997) also argue that people with dyslexia have poor phonological skills, however they claim that is a result of other underlining biological reasons (cerebellar dysfunction, impaired magnocells).

People with dyslexia often face difficulties in long and short term memory (Peers and Reid, 2003; Jeffries and Everatt, 2004). Although that in most cases they manage to adopt strategies which help them to memorize and retrieve information research have shown that problems in memory causes dyslexic individuals complications in tasks like reading comprehension where adequate working memory is key for success (Sousa, 2005; Bishop and Snowling, 2004; Stalmpotzis et al., 2010). Moreover problems that are related to poor short or long term memory in children with dyslexia may lead to the use of unproductive procedures in mathematics (Key and Yeo, 2003) the inability to follow instructions efficiently (Learning and Skills Development Agency and NIECE, 2004) and finally to failure in subjects where the memorization of great amount of information is required (Peers and Reid, 2003).

A number of other characteristics of dyslexia have been observed (Learning and Skills development Agency and the NIECE, 2004); obstacles in organization and time management, poor motor skills, inefficient level of automaticity and problems in orientation. Additionally Stalmpotzis et al. (2010) argue that children with dyslexia face great difficulties in processing information promptly, to organize, to put things or facts in order and to acquire high level motor skills. The weakness of children with dyslexia in sequencing and in organization, according to Peers and Reid (2003) explains the fact that dyslexic children are characterized also by the inability to connect the previous to the new knowledge. Furthermore, very often people with dyslexia are unable to follow timetables or they tend to miss appointments as they cannot manage their time efficiently (Learning and Skills Development Agency and NIECE, 2004). In other cases they fail to reach a new place even if they have clear and satisfactory written directions or a map (Learning and Skills Development Agency and NIECE, 2004). Yang and Hong-Yan (2011) argue

that children with dyslexia are uncovered to risks connected to coordination deficits like untidy letters, poor performance in sports or in every-day life impaired skills like using scissors (Learning and Skills Development Agency and NIECE, 2004; Peers and Reid, 2003). Finally people with dyslexia seem to have also great difficulties in multitasking as result of their low level automaticity (Learning and Skills Development Agency and NIECE, 2004).

All above mentioned characteristics of dyslexia have a great impact on the educational and social life of children with dyslexia. In many cases these children are hard workers but the difficulties that they face e.g. in reading comprehension lead to exam failure or in failure in other subjects like mathematics (Malmer, 2000) and the coordination problems may lead to bad performance in sport (Learning and Skills Development Agency and NIECE, 2004; Peers and Reid, 2003). As a result children with dyslexia very often have low self-esteem, poor motivation and even in some cases they misbehave in an attempt to hide the difficulties that they face, to earn the acceptance of their peers or the attention of their teachers or their parents that they need (Peers and Reid, 2003; Nicolson, 2008). However beside the obstacles that dyslexia sets to children in several circumstances children with dyslexia show impressive strengths (Learning and Skills Development Agency and NIECE, 2004). Dyslexic children have shown advanced problem solving skills and ability to capture the whole picture of a problem as result to the hard work they have to do to face their difficulties (Learning and Skills Development Agency and NIECE, 2004; Shaywitz and Shaywitz, 2005). Moreover in other cases they have made unexpected connections between aspects that seemed to be irrelevant (Learning and Skills Development Agency and NIECE, 2004; Peers and Reid, 2003). Therefore we can assume that an individual with dyslexia does not have only difficulties but strengths too, moreover every person has his unique profile which includes strengths and weakness in a different level of the profile of another dyslexic individual (Learning and Skills Development Agency and NIECE, 2004; Peers and Reid, 2003; Everatt, Weeks and Brooks, 2007).

2.3 The theoretical causes of dyslexia.

Snowling (2009) argues that there is much research which support the notion that behind the difficulties that dyslexia causes there are several causes. The long range of the characteristics and the comorbidity of dyslexia have made the establishment of a causal theory a very complicated issue (Ramus, 2004). Some theoretical approaches locate the causes of dyslexia at the biological level and others at the cognitive level (Learning and Skills Development Agency and NIECE, 2004). However Frith (1995) presented a theoretical framework which can include more than one theoretical approach and so explain the connections between the biological, cognitive and behavioral level:

E N V	BIOLOGICAL LEVEL (e.g. impaired cerebellar theory)
I R O	COGNITIVE LEVEL (e.g. poor phonological awareness theory)
M E N T	BEHAVIORIAL LEVEL (e.g. poor reading skills)

More specifically Frith (1995) claims that there are biological factors that lead to dyslexia, these factors impair the cognitive ability of the individual with dyslexia and the final result is the characteristics we can observe like poor reading skills. The framework of Frith is a useful tool so as to understand dyslexia and to establish a solid theory which is essential element of a well-designed and effective intervention program for children with dyslexia (Snowling, 2009).

Nowadays there are strong indications that the roots of dyslexia are neurobiological. Hudson, High and Al Otaiba (2009) revealed with their study that the brains of dyslexic people are less active during reading compare to their peers. Furthermore Ramus (2004) argue that there are many researches which found differences in brain activation between dyslexic and non-dyslexic individuals, however he adds that more studies should be conducted before we assume that these differences are caused only by dyslexia. Magnocellular deficit theory of dyslexia is a theory based on the biological level. According to this theory large neurons of the brain which called magnocells are not fully developed (Stein and Walsh, 1997). In a person with magnocellular dysfunction the control of the eye movement is difficult so when he tries to read the letters seems to move and jumping around (Stein and Walsh, 1997). Furthermore Stein and Walsh (1997, p.151) put forward the notion that “there is an auditory subsystem, characterized by large neurons, responsible for analyzing acoustic transients”. Therefore the poor phonological awareness of children with dyslexia can be explained as a result of weak auditory transient due to not fully developed auditory magnocells (Stein and Walsh, 1997). Magnocellular deficit theory is extensively criticized by the scientific community as there is not enough evidence to confirm this theory (Nandakumar and Leat, 2007). Moreover Nicolson (2008) claims that input difficulties that not fully neurons cause cannot explain other characteristics of dyslexia like bad spelling. Finally Ramus (2004) claims that Magnocellular deficit theory cannot explain why motor difficulties are less observed in dyslexic population compare to poor phonological skills.

The cerebellar deficit theory is another causal dyslexia theory based on the biological level too. According to this theory cerebellar- a part of human brain- seems to have different structure or to work differently in people with dyslexia (Learning and Skills Development Agency and NIECE, 2004; Nicolson, 2008). Nicolson (2008) claims that the unimpaired function of cerebellar-which is the part of brain responsible for the execution of advanced motor skills- is also the key so as to someone to be able to achieve higher levels of automatisation. Reading is a very complicated skill which requires advance automatisation (Sousa, 2005). Therefore it is reasonable to assume that bad reading and

poor phonological skills of children with dyslexia can be explained as a dysfunction of their cerebellar (Nicolson, 2008). Furthermore more characteristics of dyslexia like bad coordination can be explained by the same dysfunction (Learning and Skills Development Agency and NIECE, 2004). However Nicolson (2008) argues that more research is needed before we reach to final conclusions. Moreover a study which conducted by Wimmer, Mayringer and Landerl (1998) revealed not significant differences in high automatized motor skills between dyslexic children and their peers.

Decoding (connecting letters to sounds) is a fundamental skill so as to a child to learn to read (Sousa, 2005). Children with dyslexia although the fact that their hearing is unimpaired fail to recognize and to reproduce the sounds inside the words, in other words they have poor phonological awareness (Learning and Skills Development Agency and NIECE, 2004). The phonological deficit theory is the major causal theory of dyslexia based on the cognitive level and gives a solid explanation for poor reading skills. Furthermore almost all the causal dyslexia theories recognize the phonological deficit in people with dyslexia, however in most cases they consider poor phonological awareness as a result of other underlying biological (Simmons and Singleton, 2008). More specifically Nicolson (2008) face poor phonological awareness as a symptom of the impaired cerebellar of children with dyslexia. Moreover Stein and Walsh (1997, p.148) claim “their problems with phonology do not explain the plethora of other problems that children with specific reading difficulties suffer”.

The theory which proposes that dyslexia has two parallel independent causes: impaired phonological processing and impaired central processing is called the Double Deficit theory (Vukovic and Siegel, 2006; Learning and Skills Development Agency and NIECE, 2004). According to this theory people who have slow naming skills speed in combination with poor phonological awareness face the greatest difficulties in reading (Vukovic and Siegel, 2006). However in some researches the reading skills of children with double deficit compared to children with phonological deficit only did not varied (Ackerman, Holloway and Youngdahl, 2001). Moreover there is not enough evidence that

a deficit in central processing is core characteristic of all individuals with dyslexia (Vukovic and Siegel, 2006).

The comorbidity of dyslexia is a huge obstacle towards a unique causal theory of dyslexia capable of explaining the whole range of the characteristics of people with dyslexia (Ramus, 2004). The borders between dyslexia and other disorders like ADHD (attention deficit/hyperactivity disorder), developmental coordination disorder and other disorders which affect the mental condition are not clear or they may not exist at all (Snowling, 2009; Germano, Gagliano and Cuaratolo, 2010). Moreover it is very common for dyslexia to co-exist with similar disorders like dyscalculia, dyspraxia, dysphasia and others (Learning and Skills Development Agency and NIECE, 2004). Therefore nowadays dyslexia has a place under an “umbrella” term: Specific Learning Difficulties. This term beside dyslexia includes also learning difficulties like dyspraxia, dyscalculia, attention deficit/hyperactivity disorder, dysgraphia and more. Finally before finishing the chapter of the theoretical approach of dyslexia we must add that there are many more causal theories of dyslexia which attempt to reveal the causes of dyslexia: Brain-cortical malformations; thalamic changes, Sub-types theory, visual tracking and others (Learning and Skills Development Agency and NIECE, 2004).

Teachers in mainstream education face the difficulties that dyslexia causes daily in their classrooms. In order for a teacher to be confident and efficient in managing these difficulties s/he has firstly to understand the roots of dyslexia. Although that there is not a solid theory about dyslexia, we are going to examine if the participants of this research are aware of any theoretical approach of dyslexia and how this can influence their teaching strategies.

2.4 Dyslexia and Non-Literature school subjects

The purpose of teaching science subjects in schools is mainly to prepare children for everyday life. Students after graduating should be in position to deeply understand the scientific, economical, technological and social circumstances of their lives so as to be critical and active citizens (Panteliadou, Patsodimou and Mpotsa, 2003). In mathematics and generally in science subjects the problems which eventually will lead to reduced

performance-even for students from general population- are divided in three main categories; inability to fully understand the definitions, inability in programming and poor motivation (Panteliadou, Patsodimou and Mpotsa, 2003). Kay and Yeo (2003) argue that dyslexia is a difficulty known that causes problems mainly in writing and reading however many of the main characteristics of dyslexia are responsible for low achievement in subjects like mathematics. Mathematics are the tools that are used by the most scientists so as to pass from theory to practice and everyday life applications therefore any connection between mathematics and dyslexia which may cause problems in aspect of school life must not be overlooked (Malmer, 2000). A solid indication that dyslexia may also responsible for low achievement in non-literature subjects is the fact that mathematics and other similar subjects are structured in the same way like language- an example of this similarity is the use of rule system (Joffe, 1983; Lundberg and Sterner, 2006). Poor reading skills and low reading comprehension of children with dyslexia can be a huge obstacle, as in science, chemistry, mathematics, economic, computer science and other similar school subjects often very difficult language is used and many new words or words with different meaning from everyday life (Key and Yeo, 2003; Perkins and Croft, 2007; Padeliadou and Mpotsas, 2007). New symbols and equations in mathematics, physics chemistry and other similar subjects which often are needed not only to be used but to be memorized too cause great difficulties in children with dyslexia (Perkins and Croft, 2007). So in many cases students with dyslexia spend too much energy just in reading a problem without really understanding what they read (Malmer, 2000). According to Simmons and Singleton (2008) poor phonological awareness and processing of dyslexic students can cause problems in aspects where the use of verbal code is essential like recalling numbers in multiplications. Furthermore poor short term memory of children with dyslexia combined with their impaired long term memory and the lack of organization skills are barriers which slows down their progression in subjects where adequate fact recall is crucial for problem solving and generalizing knowledge (Kay and Yeo, 2003; Perkins and Croft, 2007, Padeliadou and Mpotsas, 2007). Problem solving is a crucial skill for a student in order to succeed in non-literature subjects however problem solving requires unimpaired organization skills

which in many cases children with dyslexia do not have (Kaminska-Ostep and Gulinska, 2008). Finally key characteristics of students with dyslexia like low self-esteem and poor motivation impair the academic achievement in non-literature schools subjects too.

2.5 Dyslexia friendly schools.

Inclusion is the educational movement which proposes that the most effective way to teach children with special educational needs is to include them in a mainstream school (Norwich, Griffiths and Burden, 2007). Especially for dyslexia inclusive educational practices are already in the policy of many countries around the world (Coffield and O'Neill, 2004). The notion of the dyslexia friendly schools was developed by the British Dyslexia Association (Norwich, Griffiths and Burden, 2007). More specifically Norwich et al. (2007, p.148) describe dyslexia friendly school as: "one where all teachers are appropriately trained, ware of the impact of cognitive difficulties on teaching their subject and aware of the strengths and weaknesses of individuals with dyslexia".

According to the British Dyslexia Association (2011) the first major step towards a dyslexia friendly school is to adjust teaching in that way that fit to the needs of every child in the classroom. A research study which was conducted by Exley (2003) revealed that children with dyslexia managed to reach their academic targets more easily when teaching methods were designed based on children's preferred learning styles. Furthermore Mortimore (2005) adds that although there is not enough research yet to confirm above idea it is generally accepted that the revising of the preferred learning style when a teacher decides for his teaching methods is vital. However in case of dyslexia adjusting teaching methods is a complicated issue as every child with dyslexia has its unique profile including strengths and weaknesses (Stanovich, 1996; Learning and Skills Development Agency and NIECE, 2004). Therefore in a dyslexia friendly school teachers have the challenging task of designing an appropriate teaching which fits to every children in their classroom- dyslexic and non-dyslexic- without providing often one to one basis lessons (British Dyslexia Association, 2011).

Teachers and students in a dyslexia friendly school should be working together so as to face the difficulties of the students, to discover their strengths and finally to monitor their academic progress (British Dyslexia Association, 2011; Coffield and O'Neill, 2004). Multisensory teaching, different assessment methods and homework for children with dyslexia, group working which fit to the cognitive ability of every children and occasionally one to one lessons are tools which the staff of school can use in order to their school to become dyslexia friendly (British Dyslexia Association, 2011). Finally teachers must expect high performance from every student and find ways to boost their morale so as to in their students to become critically thinking autonomous learners (Coffield and O'Neill, 2004; Polychroni et al. 2006).

Beside the teaching methods the environment of a school should change in holistic way so as to a school can be characterized dyslexia friendly (Coffield and O'Neill, 2004). The principal senior management and governors have to design and monitor the progress of their dyslexia friendly programme and at the same time they must ensure the means and the appropriate training for their staff which is needed for a dyslexia friendly school (Dyslexia British Association, 2011). Finally a key word for the success of a dyslexia friendly school is communication (Coffield and O'Neill, 2004). School staff and the parents of the children should communicate efficiently so as to the interventions programs of the school to be as more as effective as possible (British Dyslexia Association, 2011).

However some reasonable questions come up: Why should a government change its schools, its educational program and provide specialized training to all school staff? Why we do not just create some special schools with specialized staff for children with dyslexia? Allen (2010) claims that as long the rate of people with dyslexia is about 10 to 15% of the general population always teachers will deal with dyslexic children in mainstream classes and these teachers should be trained to early identify the difficulty and to adjust teaching strategies effectively. In the schools which applied dyslexia friendly practices there were benefits for non-dyslexic students too (Coffield and O'Neill, 2004). Aristotle said that "there is nothing so unfair as the equal treatment of the unequal people", we as a modern society which dot want to

risk to losing young children in the cracks of an educational system which do not recognize the uniqueness of every single person must try to transform our schools to be dyslexia friendly (British Dyslexia Association, 2011).

In this study I am going to explore the possibility of dyslexia friendly practices in Greek secondary system. I am going to ask if science's teachers use teaching strategies that are dyslexia friendly for all students and how this can affect the outcome of teaching and learning for the whole class. Dyslexia friendly classes is a crucial component for a successful educational system and before I make any suggestion for the improvement of our secondary educational system I want to know if there are at present any dyslexia friendly practices in our schools.

3. Special Education Needs in Greece.

3.1 Every day practice.

The current educational policy in Greece is inspired by the notion of inclusion. The latest law which establishes the framework in which children with special education needs are educated clearly states that all students should attend mainstream education except in cases of children with severe difficulties who must attend special schools (Koutrouba et al., 2010; Zoniou-Sideri et al., 2006). The latest law for special education introduces a new tool in Greek mainstream school -inclusion classes. Children with SEN (Special Education Needs) attend for most hours of the day the general programme of their classes however some hours they attend inclusions classes with special educators who must set out specific targets for every child (Soulis and Floridis, 2010).

Although the intention of the Greek government was to create an inclusive educational system the results in reality show that now we just have special "provision" inside general education and not real inclusion (Avramidis and Kaluva, 2007; Zoniou-Sideri et al. 2006). Teachers in Greek primary education recognize the benefits of inclusion but at the same time they do not feel ready to face the challenges of an inclusive class (Koutrouba et al., 2010). Furthermore there are teachers who support the notion that inclusion

has mainly social benefits (against discriminations) and less educational (Batsiou et al., 2008; Zoniou-Sideri and Vlachou, 2006). The reasons behind the negative feelings of teachers are mainly the lack of proper training and equipment and the lack of specialized personnel to support them in their daily effort (Koutrouba et al., 2010). Moreover teachers claim that the curriculum which is designed by the Ministry of Education and Religion is too inflexible for an inclusive school (Zoniou-Sideri et al., 2006; Koutrouba et al., 2010). In some cases teachers believe that inclusion is responsibility only of the special educators who run the inclusions classes and some researches revealed the disappointing fact that there is almost no cooperation between special educators and teachers so as to establish and monitor an intervention program in common for children with SEN (Vlachou, 2006; Zoniou-Sideri and Vlachou, 2006). Moreover in secondary education special educators do not have specific directions what they should do in the special classes (Panteliadou, Patsodimou and Mpotsa, 2003). This complicated situation in Greek secondary education- in addition to the fact that dyslexia in Greece too is considered as a language difficulty mostly – has as result that the implications of dyslexia at science subjects often to be overlooked. With this study I will try start a discussion about the difficulties of children with dyslexia in science subjects which normally would not exist without dyslexia.

Most changes in the Greek educational system are not designed by people who are directly involved with the educational practice (teachers, special educators, parents etc.) but are imported by politicians from other European countries (Zoniou-Sideri and Vlachou, 2006). But there are differences between Greece and other European countries: Greek language is a complicated language with special characteristics, the way that Greek society thinks and value education and the way that Greek family deals with educational system and school staff is also different. Therefore in many cases in Greece there are policies which are not suitable for our educational system and society, therefore the target of an inclusive school is almost unreachable (Zoniou-Sideri et al., 2010). However Greek society now recognizes the benefits of inclusion for all children and more importantly understands the ethical issues behind inclusion and this is very positive sign

for the future as society will push government to make more effective steps towards inclusion (Kalyva, Georgiadi and Tsakiris, 2007).

3.2 Assessment procedures in the Greek education system.

The law for Special Education in Greece is the 3699 of the year 2008 (Title of the law; “Special Upbringing and Education of individuals with disabilities or with special education needs.”). A state agency of the Ministry of Education, which called Center for Differential Diagnosis and Support (KEDDY), diagnoses dyslexia in students up to the age of 22 years old (Anastasiou and Polychronopoulou, 2009). Moreover law 3699 of 2008 states that assessment for dyslexia can also be performed by the Special Diagnostic Commission of Evaluation (EDEA) and by the certified by the Ministry of Education Medi-Pedagogic Centers of other Ministries.

According to the direction of the Greek Ministry of Education (Document: F./3/527/89125/G1/03.09.2004 YPETH) before a child is sent to KEDDY for evaluation a short term intervention program should be established in cooperation with the local School Counsel. If this program fail then after the application of the parents at KEDDY the child will be examined by a team of five specialists; a special educator, a child psychiatrist (or neurologist) a social worker, a psychologist and a speech pathologist (Law 3699 of 2008). But, in many cases the synthesis of above described committee does not exists due in expert staff lack (Kazalotti, 2011). The evaluations of KEDDYs are based on discrepancy criteria between the intellectual ability and the academic achievement of the child. Furthermore they try to exclude what the child’s difficulty it is not (e.g. sensory impairments) (Anastasiou and Polychronopoulou, 2009). After the evaluations procedures, the KEDDY’s staff provides a written evaluation and suggests to the child’s teacher proper teaching and examination methods they should use so as to ensure the academic progress and the equality under the law for the child. (Law 3699 of 2008). However in some cases a child can wait for 2 years for an evaluation by KEDDY’s staff as nowadays there are too many applications (Kazalloti, 2011).

Above I mentioned which are the formal directions concerning the assessment procedures in Greek educational system. This will help us to compare with what happens in every day practice and to understand better why sometimes in Greek secondary educational system the special provision for children with dyslexia comes too late or it is provided with ineffective way.

4. Research

Dyslexia is a difficulty which is mainly connected to language problems. In Greece this is the case too. As far I am aware, all research about dyslexia in Greek educational system focuses on the difficulties in reading and writing of students with dyslexia in primary education. In this small scale study I will try to discover the implications that dyslexia might cause in teaching and learning non-literature subjects in Greek secondary education.

However this is not the only objective target of this study. Through the semi-structured interviews of this research I am going to consider the background of the teachers and I will try to understand how students with dyslexia are treated in Greek secondary mainstream schools. Hopefully the insights of the teachers will help me to understand how special education within mainstream works in reality and if Greek schools can be characterized as dyslexia friendly.

All being well, at the end I will be in position to make some suggestions for the improvement of the everyday practice in Greek secondary educational system and start a discussion about the implications of dyslexia in teaching and in learning science subjects.

4.1 Methodology

A researcher always should take some important decisions about how he will conduct his scientific research, his choices are crucial for the credibility of his research as one way or another they are going to influence the outcome. More specifically Denscombe (2007) argues that any possible choice of the researcher will have advantages and disadvantages- therefore he must

carefully decide which method is the most suitable for the purpose of his research. Positivism and interpretive research are the names of two different approaches in conducting scientific research, in some other cases scientists-when they believe that is better for their work- choose to use a combination of positivist and interpretive research method which is called triangulation (Cohen et al., 2007).

Social research under the positivist framework is governed by the same rules as a research in physics (Cohen et al., 2007). The positivist social researcher establishes a theory which explains the social phenomenon and then he tries experimentally to verify his theory (Cohen et al., 2007, McNeil and Chapman, 2005). More or less positivist social researchers try to expose the rules that govern human society (Cohen et al., 2007, McNeil and Chapman, 2005). Their main target is to manage to acquire solid and reliable quantitative data which will verify their initial hypothesis about the social phenomenon and therefore establish a theory which allows us to predict human behavior in similar circumstances (Cohen et al., 2007, McNeil and Chapman, 2005). However positivist social researchers look for the underlying causes of human behavior “outside” human and they consider people as “social marionettes” which act the same way in similar conditions ignoring the uniqueness of each individual (Cohen et al., 2007, McNeil and Chapman, 2005).

Social scientists who prefer the interpretative research model consider social reality as a far more complicated system than a mathematical system which is governed by strict rules. They argue that human behavior and therefore social reality cannot be governed by a strict rule system and therefore it is not guaranteed that every time when same social conditions occur, the social result will be the same (Cohen et al., 2007). They claim that social reality is too dynamic as it is heavily influenced by the uniqueness of every human being (Cohen et al., 2007, McNeil and Chapman, 2005). Each human understands and reacts to social circumstances differently according to his background even in similar conditions (Cohen et al., 2007, McNeil and Chapman, 2005). The objective target for an interpretative social researcher is to understand social reality through the eyes of the participant in the research (Cohen et al., 2007, McNeil and Chapman, 2005). In an interpretative social

research study there is an attempt to explain the social phenomenon which is under investigation by understanding the views and the opinions of the participants and therefore including the uniqueness of every human participating in the research (Cohen et al., 2007, McNeil and Chapman, 2005). However interpretative social research studies have some major disadvantages. The data which are gathered in an interpretative social research are mainly qualitative and therefore the generalization of the study's results outside the investigating population is difficult (Cohen et al., 2007, McNeil and Chapman, 2005). Furthermore the active personal engagement of the researcher in an interpretative social research is a risk factor which may lead in subjective and inaccurate scientific results (Cohen et al., 2007, McNeil and Chapman, 2005).

Academic literature nowadays recognizes that dyslexia causes difficulties not only in literature subjects but in non-literature subjects too. However in Greece there is almost no discussion about that fact in secondary education. My research will try to put forward the difficulties that dyslexia causes in learning and teaching in non-literature subjects like mathematics, physics and economics. Especially with my small scale research I want to understand the views- about this matter-of our frontline, our teachers in secondary education. For that reason the interpretative research model is used in my research. Furthermore the small scale of this study cannot provide valuable quantitative data which can lead to safe generalizations. Although that I am going to use some graphs to describe some features of my research like sample I do not intend to use those in order to make general conclusions.

4.2 Data collection

In his book May (2011, p.135) claims that "A semi-structured interview represents an opening up of the interview method to an understanding of how interviewees generate and deploy meaning in social life". A semi-structured interview is the type of interview where although there are some standard questions the interviewer has the ability to ask for details or to expand discussion to any relative to research side theme which may occur. Therefore semi-structured interview is a useful tool for the researcher in his effort to

understand reality from the point of view of the participant in the study (May, 2011). Moreover the flexibility of a semi-structured interview allows the researcher an in depth and analytic approach of the subject under investigation so as to get comparable data (May, 2011; Cohen et al. 2007). Therefore in my research where the objective purpose was to study the difficulties that dyslexia causes in non-literature subjects through the eyes of the secondary education teachers I used semi-structured interviews. However at this point we must put forward some disadvantages of semi-structured interviews which the researcher should overcome in order his study's results to be as valid and useful as possible. Cohen et al. (2007) claim that in some cases the lack of trust between interviewer and interviewee may lead in inaccurate data or significant variances from interview to interview. In my research practice trust which leads to valid data was considered key factor for the best outcome. Therefore in every interview the participant was fully informed about the purpose of the research, his/her rights as a participant in an academic research and I took any necessary measure to ensure anonymity. Another criticism in semi-structured interviews is that in many cases the data are influenced by personal experiences of the participants which the researcher cannot know and evaluate during data analysis (May, 2011). In order to overcome this obstacle in my study I used the flexibility of semi-structured interviews to have the best possible insight into the background of the participant. Finally semi-structured interviews are expensive both in time and money (May, 2011) but the small scale of my study which required only ten interviews did not set any serious obstacle for this research.

The standard questions of the semi-structured interview will be the following:

1. Age of the teacher.
2. Teaching subject.
3. Years of teaching experience.
4. Training after graduation.

5. What is dyslexia?
6. Can you give some characteristics of dyslexia?
7. Are you familiar with the causes of dyslexia?
8. Is there cure for dyslexia?
9. Do you think that you can recognize a dyslexic student in your classroom and how?
10. Do you believe that dyslexia impairs the academic progress of dyslexic students at your subject? How?
11. Which are the official directions for dyslexia?
12. What happens in every-day reality?
13. Do you feel ready to meet the challenges of a mainstream classroom with included students with dyslexia?
14. What are you doing in every day practice about dyslexic students?
15. What more has to change?
16. (If not) Why not?
17. Are you familiar with the notion of “dyslexia friendly schools”?
18. Is your school dyslexia friendly?
19. If yes: You do believe so?
20. If not: What more has to change?

As has been said before these questions will be the main framework of the interview and hopefully more issues will rise during the interviews.

4.3 Sample

The efficient sampling procedure is crucial for the validity of the results of any academic research, quantitative or qualitative (Onwnengbuzie and Kathleen, 2007; Cohen et al., 2007). During research planning the researcher has to decide on some important characteristics of the sampling strategy like the size and the accessibility of the sample, as well which sampling methodology he will use (Cohen et al., 2007). Probability sampling is a sampling technique which is mostly used in large scale studies where the intention of the researcher is to generalize the conclusions of his research covering large populations (Onwnengbuzie and Kathleen, 2007; Cohen et al., 2007). More specifically in probability sampling the participants in the study are gathered randomly from the general population, this is simple random sample method (Cohen et al., 2007). However probability sampling has also some sub-types - which use more structure sampling methods- like systematic sample, cluster sample and other (Cohen et al., 2007). In a qualitative social academic study where the intention of the researcher is to examine a social phenomenon through the vision of a specific group of participants, non-probability sampling methods are mostly used (Onwnengbuzie and Kathleen, 2007; Cohen et al., 2007). With non-probability sampling technique the researcher targets to a specific group of participants which according to his opinion is the most suitable to serve the aims of his study (Cohen et al., 2007). In small scale social qualitative studies the researcher is almost obligated to use the non-probability sampling method so as to gather valuable data from small population (Cohen et al., 2007). However the results of this kind of studies are cannot be generalized as we cannot be sure that the small sample is actual representing of the social reality (Cohen et al., 2007). Furthermore in small samples there is always risk for researcher bias (Cohen et al., 2007).

In my study I used the non-probability sampling method for two major reasons. When I discovered that there is little discussion about the difficulties that dyslexia causes in non-literature subjects in Greek secondary education I decide that an efficient first step would be to take a look of the problem from the point of view of the teachers. Therefore the actual purpose of this study is not find solid data which can be generalized in whole population but to start a

more active discussion by examining the opinions of our teachers. Furthermore this small scale study cannot afford the time and the money which is needed for a qualitative study which use non-probability sampling methods. The “quota sampling” technique (Cohen et al., 2007 p.114) was used in this research. I choose teachers of four different non-literature subjects from the Greek secondary education curriculum: Mathematics, Physics, Computers Science and Economics Science. More specifically my sample is consisted by three Mathematics teachers, three Physics teachers, two Computers Science teachers and two Economics Sciences teachers (Chart 1). Four of them are based at state schools in the center of Athens which is considered low-privilege area and in addition there is an increased ratio of immigrants’ children who cannot speak Greek language fluently. Four of them are based at public schools in the South suburbs of the Athens (about 10km away from the center) which is considered as high-class areas where the habitants’ economical and educational background is usually above average. Finally the last the last two were selected from two different private schools where the parents must pay fees for their children. (Chart 2)

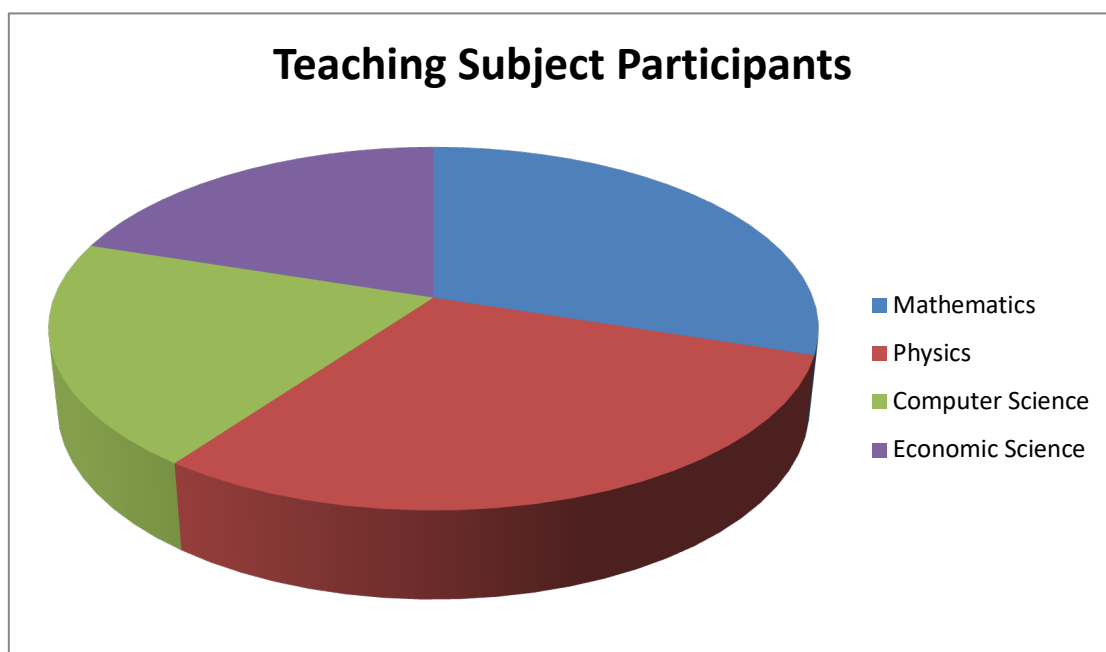


Chart 1.

Teachers' number per teaching subject and location

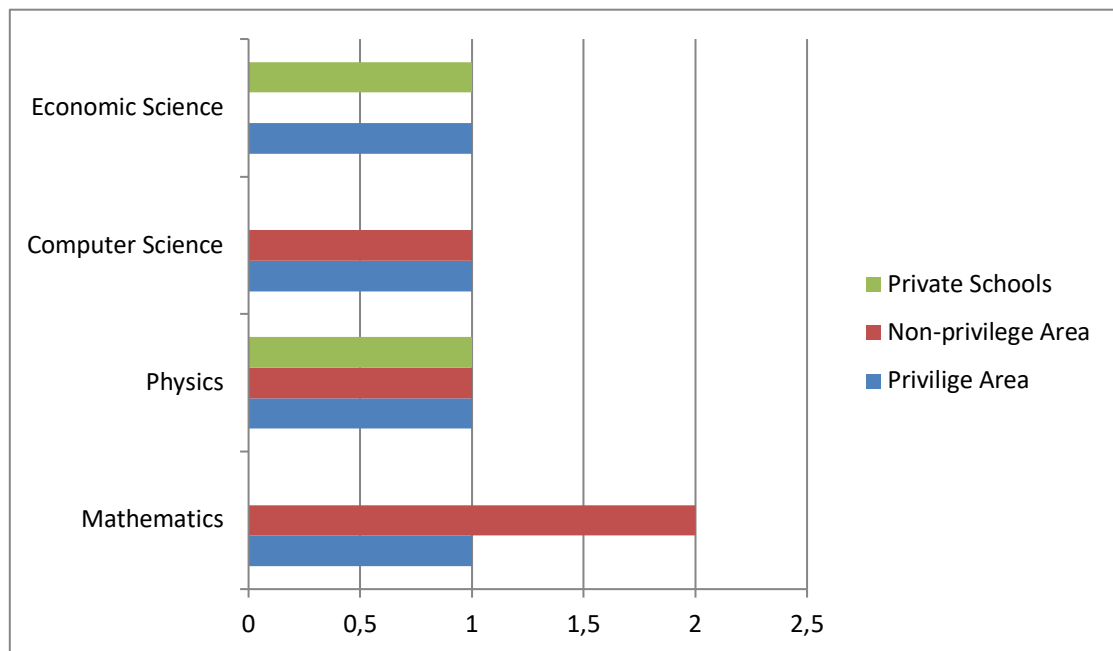


Chart 2

4.4 Ethics

According to the Alumiware-Samaranayake (2012) the constant effort of the academic researcher to contribute with his/her studies in general good and knowledge with respect to the rights of the participants of his/her study, called ethics. In an academic research ethical issues can emerge from many different aspects such as personal data, participants' mental and physical condition and more (Cohen at al., 2007). During the past decades a very serious and systematic discussion about the ethical issues and restrictions of an academic study has taken place (Denscombe, 2009). The result of this discussions are visible in the ethics codes, which are nothing more than lists of rules which will help the researcher to find a starting point for good research practice (Denscombe, 2009). An example of a research ethical code is that which is recommended by the British Educational Research Association (BERA, 2011).

The researcher is obligated to follow some important steps so as to achieve sufficient ethical level for his study. It is very important for the participants in

the research to be fully informed about the aims of the study (Cohen et al., 2007; Denscombe, 2009). Therefore the researcher should be sure that he has the fully consent the participants even if he has to use formal procedures (Cohen et al., 2007; Denscombe, 2009). Participants should be aware of any change in the plan of the study and must have the right to withdraw at any time they want (Cohen et al., 2007; Denscombe, 2009). Furthermore the researcher should respect the participants and ensure that they will not be exposed in any kind of risk or being harmed like stressful interviews or loss of anonymity (Denscombe, 2009; Flick, 2009; Punch, 2006). All the procedures in the study should be planned that way that guarantee data safety and of course the anonymity of the participants (Cohen et al., 2007; Denscombe, 2009). All the above steps are very important for good research practice and in my research was all implicated. However in qualitative social studies with semi-constructed interviews where the personal involvement of the researcher in data collection is high, emerges one more ethical issue. The researcher must ensure that his personal thoughts and perceptions will not influence in any way the data which are collected by the semi-structured interviews and therefore protect the validity of the research (Denscombe, 2009). During my research I did not engaged with the participants in any kind conversation about research subject before the interviews. Furthermore during the interviews I never expressed personal opinion but only I asked additional questions when I thought was for the best of the study. Therefore I manage not to have any influence on interviewees' opinions.

4.5 Data analysis

Chenail (2012) claims that the constant and demanding effort to discover the paths of knowledge which eventually may lead you to the better understanding of the world is the data analysis of the academic researches. In qualitative social studies like this, the data analysis takes place under the conditions that the participants set (Cohen et al., 2007). More specifically as the qualitative social researcher seeks the social truth and knowledge through the eyes of the research's participants he is obligated to accept the conditions that the participants set (Cohen et al., 2007). Denscombe (2007) settled four major principles that qualitative data analysis data should follow. According to

him the results of social qualitative study should be directly connected to the data. Furthermore Denscombe (2007) argues that the social research has to put huge effort and carefulness in data analysis and at the same time he must ignore his personal opinion, knowledge and theories so as to the analysis to be objective and as valid as possible. Finally the qualitative data analysis is a very dynamic and systematic procedure which often requires to go back and look again your data and always “comparing the empirical data with codes, categories and concepts that are used” (Denscombe 2007, p.288).

The major data analysis framework on which is based this study's data analysis has four major steps; Data preparation (in this research the data preparation was the transcribed interviews), careful examination of all the collected data which will lead to familiarity so as to proceed to the next level which is the formation of codes and categories. Finally the researcher should process with great persistence and detail the data and then hopefully he will be able to identify patterns which will help him to extract valuable conclusions (Cohen et al., 2007; Denscombe, 2007; Hopkins and Ahtaridou, 2008). There are several categorizations analyzing strategies in social qualitative research practice such as individual by individual analysis, by related issues analysis, by group analysis and by number of question analysis (Cohen et al., 2007). In this small scale study the data analysis method which initially is used is question by question analysis as it offers a pre-prepared pattern which is a time saving advantage (Cohen et al., 2007). Furthermore the question by question data analysis tactic offers the opportunity to discover patterns more easily in topics like where the objective purpose is to have a first general view in the research's subject (Cohen et al., 2007).

Here we must put forward the fact that qualitative data analysis has some major disadvantages such as the very limited generality of the produced conclusions (Denscombe, 2007). Moreover qualitative data analysis requires more time and there is higher risk the outcome of the study to be influenced by the researcher's personal view compare to a strict statistic quantitative data analysis (Denscombe, 2007). However Denscombe (2007) claims that the qualitative data analysis which requires direct connection between data and conclusions is more efficient at studying and analyzing complex social

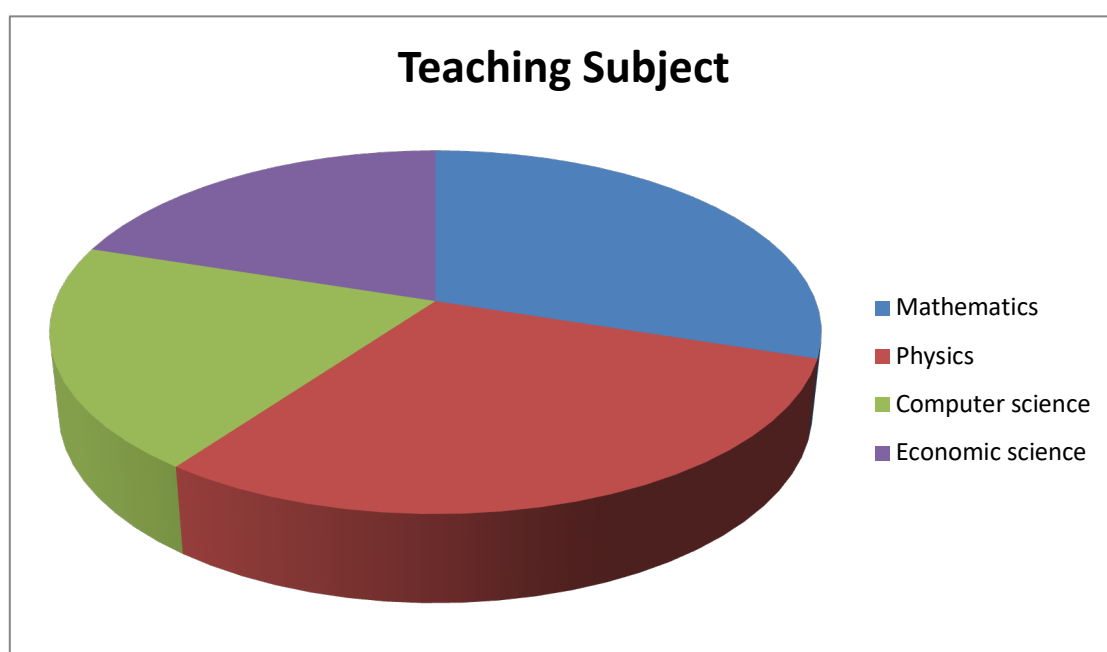
phenomena. Furthermore he adds that the qualitative data leaves space for more than one explanation of the social phenomenon. Therefore in this small scale study the qualitative data analysis is used as it serves better the purposes of this research.

5. Data of the research

5.1 The background of the teachers who took part in the research.

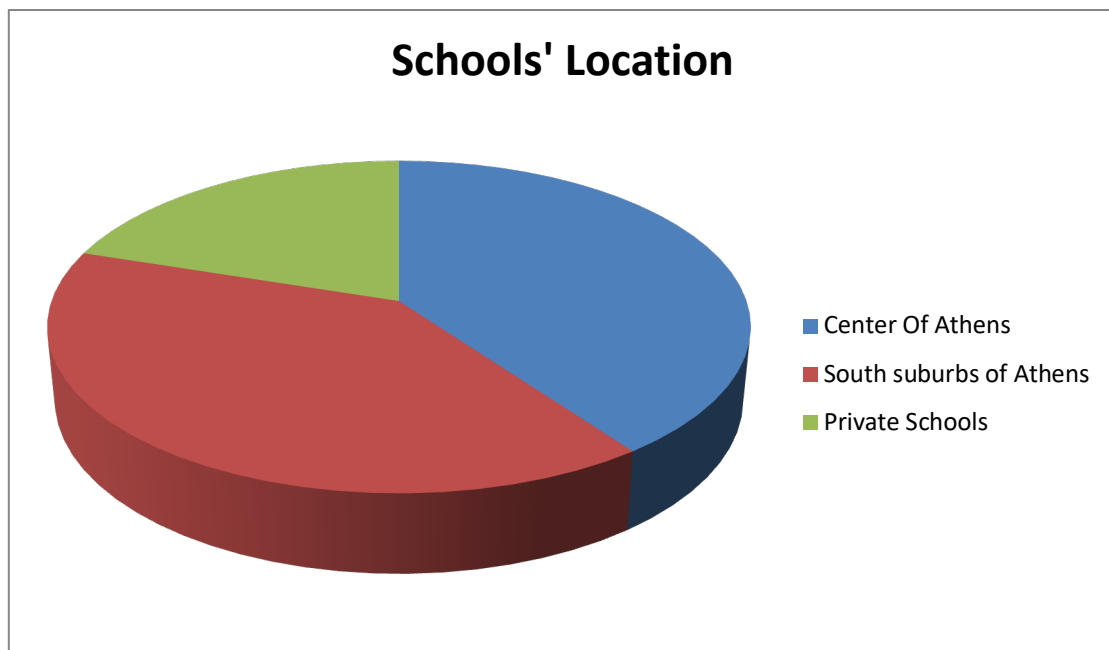
5.1.1 Basic data analysis

Research participants are Greek Secondary School teachers. In order to investigate the effect of dyslexia on non-literature lessons teachers with specialisms in Mathematics (two teachers), Physics (three teachers) and Economic Science (two teachers) were chosen.

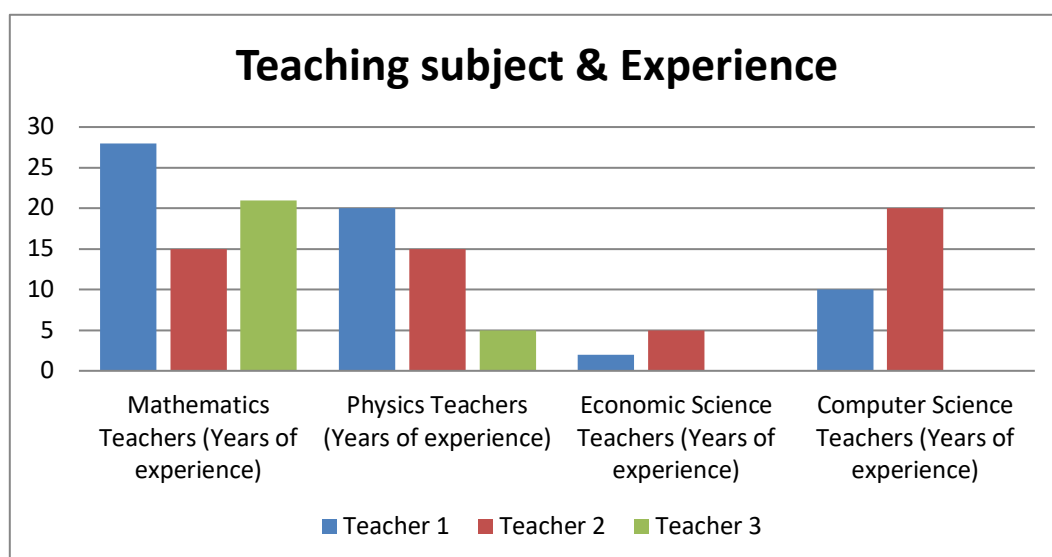


Four of the teachers are teaching in schools in the center of Athens where the social and economic background of the parents are mainly low. Furthermore in many occasions the students in schools in the center of Athens are children of immigrants who do not speak the Greek language at all or they speak Greek with great difficulty. A teacher during the interviews said that "...there are occasions that we need another child from the same country to translate so as to communicate with a new student as often they do not speak Greek at

all”. The next four teachers which took part in this research are teaching in a public school in the south part of Athens which is considered as high class area. The rents and the price of houses in this area are high and the residents of this area normally have strong economic and educational background. Finally the last two teachers are teaching in private Greek secondary schools where the parents have to pay tuition fees which today are double than the annual basic salary.



The teaching experience of my study’s participants varied. The range of the teaching experience was from 2 to 28 years of teaching. Furthermore the more experienced teachers have more responsibilities as one of them was also the assistant manager of the school.



5.1.2 Postgraduate training

Concerning the postgraduate training of the teachers the results also were mixed. Five of the teachers have no postgraduate training at all. They did not have masters degree or had not taken part in a seminar of any kind. Two of the teachers have masters degrees. One of the physics teachers has master in Specialization of Physics Science and one of the computer science teachers has a master in Computer Science. However they both said that their master degrees do not help them in teaching.

More specific physics teacher said “...when Greek Open University opened I just selected the master program I liked most...”

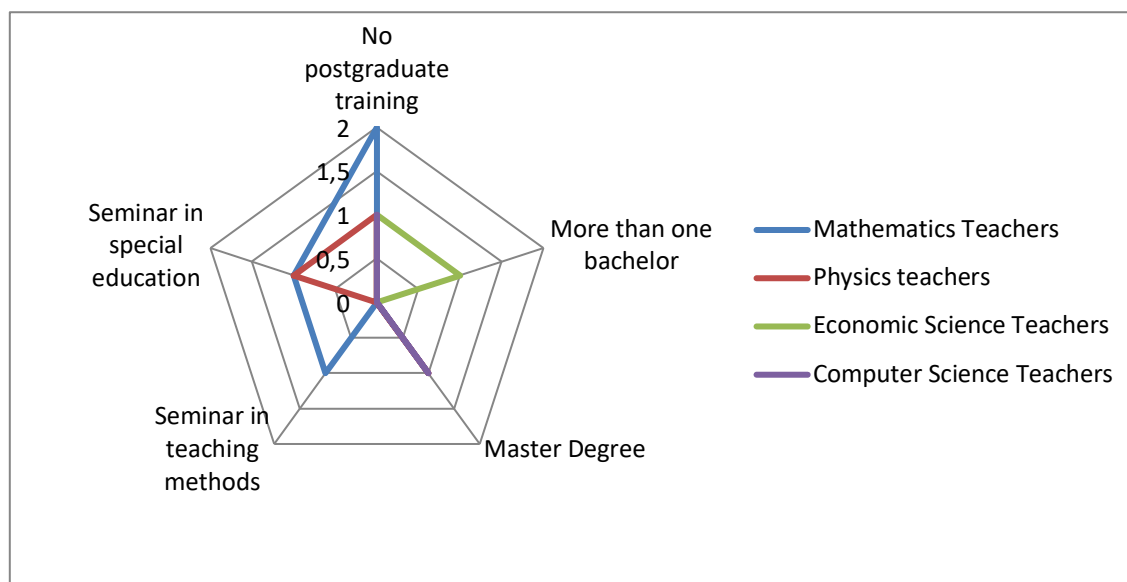
and the computer science teacher told that “...at that time I was not thinking to teach so I had a master that I thought would be more helpful for my career back then...”.

A teacher of economic science has two bachelor degrees one in Home Economics and one in Economic and Insurance studies. One of the mathematicians has no master degree but his an active member of the Greek Mathematical Company and he had during his career many seminars in several fields including teaching methods and special education.

He said “...I cannot recall all the seminars that I had all these years...but I am sure that I had seminars for teaching methods in mathematics and special education...”

Finally one the physics teachers had a 400 hours seminar in special education. With this seminar he was qualified to work in Greek special education for four years:

“... I had the 400 hours seminar in special education which helped me to work in special education. At that time -2000- that was enough to work in special education, now a master degree is required. So I had the ASEP exams, I passed and now I work in general education. I know that my route in educational system is opposite than the normal...”



5.1.3 The questions for our semi-structured interviews:

1. Age of the teacher.
2. Teaching subject.
3. Years of teaching experience.
4. Training after graduation.
5. What is dyslexia?
6. Can you give some characteristics of dyslexia?

7. Are you familiar with the causes of dyslexia?
8. Is there cure for dyslexia?
9. Do you think that you can recognize a dyslexic student in your classroom and how?
10. Do you believe that dyslexia impairs the academic progress of dyslexic students at your subject? How?
11. Which are the official directions for dyslexia?
12. What happens in every-day reality?
13. Do you feel ready to meet the challenges of a mainstream classroom with included students with dyslexia?
14. What are you doing in every day practice about dyslexic students?
15. What more has to change?
16. (If not) Why not?
17. Are you familiar with the notion of “dyslexia friendly schools”?
18. Is your school dyslexia friendly?
19. If yes: You do believe so?
20. If not: What more has to change?

The questions Nr 1 to 4 helped me to collected data about the background of the teachers. With the questions Nr 5 to 10 of the interviews I tried to investigated the knowledge of the participants on the field of the dyslexia and how dyslexia impairs the teaching and learning process in each occasion. Finally questions 11 to 20 were designed to take a closer look to the everyday practice in Greek secondary schools and in the same to hear the suggestions of the teachers for a better more inclusive school. Here I must add that my study's interviews was semi-structured this means that in several occasions the discussion was expended beyond the interview's questions however not ignoring the initial targets which were settled.

6. Basic knowledge about dyslexia

What is dyslexia?

The first question that I asked the interviewees was if they know or are familiar with a definition of dyslexia.

The teacher with the experience in special education defined dyslexia as "...a difficulty in reading and reading comprehension, a difficulty to say verbally what the dyslexic person thinks and a difficulty to understand what they see in a picture."

He added that "...children with dyslexia seem to understand pictures differently than their non-dyslexic peers."

In the same question another of the interviewees responded that "...dyslexia is a difficulty which impairs reading skills of children with dyslexia in comparison to their normal classmates."

However the vast majority of the teachers who participated in this research did not know any definition of dyslexia. In my question about the definition of dyslexia they mainly responded by presenting characteristics of dyslexia that they face in every day practice.

A mathematician specifically said that "...dyslexia is a difficulty in writing numbers and a difficulty in generalization of knowledge."

The next question was about the characteristics of dyslexia and the comorbidity with other special educations needs.

"...characteristics of dyslexia are the reduced ability for generalization of knowledge, problems in memory, low self-esteem because the school is more difficult for them, difficulty in putting thoughts in paper and a discrepancy between verbal and written examination."

Another teacher commented that "Children with dyslexia often are mirror writing. Furthermore they have problems in writing as they tend to misspell and to use letters in wrong sequence. They also have difficulty in reading, reading comprehension, in generalization of knowledge and in memory."

About comorbidity, four of the teachers understand that dyslexia co-exists with other special education needs-mainly with ADHD-. One of them told during the interviews "...children with dyslexia very often do not have difficulties only by dyslexia. In most cases they also have symptoms of ADHD which makes the learning process even harder."

Moreover two of the other six teachers believe that ADHD is a characteristic of dyslexia. "...attention deficit is always there in children with dyslexia and I think is one of the most difficult characteristics of dyslexia to deal with in a classroom." said one of them.

Almost all the answers revealed that the teachers who took part in our research seem to recognize all the key characteristics of dyslexia. However a teacher of computer science responded in that question as: "...there is not any characteristic of dyslexia that I have noticed. There are no implications in my subject from dyslexia and I think that there is too much conversation and resources waste about nothing. "

Most teachers who participated in this study understand that dyslexia is a syndrome. In their interviews many times referred to the fact that although that the children with dyslexia have some characteristics which are similar the degree of the difficulties that they face varies.

"There are children with dyslexia who have problems that they never manage to deal with and there are others with more mild difficulties." said during the interviews one of the teachers.

Another teacher said that "...there are children with dyslexia who seem not to have so many problems compare to other dyslexic students. Moreover in some cases seem that the children with dyslexia do not to have the same problems but each one has each own weaknesses...but I am not sure why...remember that we work in secondary education and children before come here were in primary schools and we do not know what their teachers did about their problems..."

Next I asked which the factors that cause dyslexia are. Now in this more specialized question only the teacher with the special education background

answer with confidence that "...dyslexia has biological origin, and this is something that we cannot change."

Eight teachers were not sure about the origin of dyslexia. All of them said during the interviews that they think that dyslexia is result of combination of biological and environmental factors, but they cannot be sure. More specifically one them commented "I can understand that behind dyslexia and- in general- the way that a children learns are genetic factors which must inherited from parents. But it also very important what parents and teachers do after the child is born. From this point of view I believe that there are also non-genetic causes that create what we call today dyslexia".

Finally a teacher believed that the roots of dyslexia are not biological at all "Today we give to children to much information from very young age. We send them to learn a second language and computer science from the age of six. We believe that the earlier is the better and as result we create unnecessary pressure and stress to the children. Some children cannot stand this entire situation and they break. Then special education needs like dyslexia come up. I do not believe that there is any genetic-biological difference before a child has the first characteristic of dyslexia."

The next question of my interviews was if the teachers believe that there is a cure for dyslexia. All answered that they do not believe that there is a cure for dyslexia but they believe with the right intervention tactics a teacher can help a children with dyslexia to overcome part of the difficulties that dyslexia causes.

One the teachers said "...no there is no therapy for dyslexia. Until now there is not a magic pill that wipes out all dyslexia problems. Only well planned intervention tactics and the great effort from the child can help a child with dyslexia."

In the same spirit another of the interviewees commented that "The only respond to the problems that dyslexia sets in teaching and learning procedure is teacher to find which teaching strategy is better for the children with dyslexia and the whole classroom. I do not believe that there is cure for

dyslexia and if someone say that he can vanish the symptoms of dyslexia I think there is a high possibility to be a fraud.”

7. The implications of dyslexia in teaching Mathematics, Economic Science, Physics & Computer Science in Greek secondary schools.

4.1 Teacher's views

In my effort to see what happens in every day practice the next question that I asked was if they believe that they can recognize a children with dyslexia in their classroom. The first of the interviewees told “I think that I can but I won't be sure because I do not have the proper training”

Another of the teachers commented that “Yes I can recognize a student with dyslexia. As I told you before (at the question about dyslexia's characteristics) there are things that you cannot ignore during the lessons.”

In general all the teachers of my research are confident that they can recognize children with dyslexia in their classrooms.

Dyslexia is a difficulty which mainly causes problems in literature lessons. Especially in Greece there is almost no research about the implications of dyslexia on teaching and learning non literature subjects like Mathematics, Physics, Computer Science and Economic Science in secondary education. The next question was exactly this. How dyslexia impairs teaching and learning procedures at yours subject.

One of the mathematicians told me that “I know that dyslexia causes great problems in literature subjects but in mathematics the problems from dyslexia are not so big. Furthermore there are children with dyslexia which in Mathematic have above average performance’

“Although that the problems which dyslexia causes in Physics and in general in science subjects are less important we cannot ignore them. Characteristics of dyslexia like low self-esteem, memory problems and impaired reading

comprehension can be huge obstacles in science subjects.” said another teacher.

One interviewee who teaches Economic science told “The difficulties in reading, in reading comprehension and in memorizing are the most important obstacles that dyslexia sets in teaching and learning Economic Science. In my subject children must not only read and memorize but also to deeply understand the meaning. My dyslexic students face great problems at this.”

“I am working on the secondary education for 21 years. After all this years I am not sure if the pure performance of students with dyslexia in Mathematics is the result of dyslexia’s characteristics. In many cases children which came in secondary education from primary schools have almost zero background on Mathematics. Is this fault of dyslexia? Or is it fault of the parents and schools? Moreover a positive formal assessment for dyslexia by KEDDYs gives some benefits in dyslexic students. However in reality this paper that they take from KEDDYs almost ensures that they will pass the school’s exams. Therefore in most cases they are getting lazier after a positive assessment.” said during the interviews one of the mathematicians.

Another of the mathematicians had the same doubts “...my friend I am not sure if problems with mathematics are due to dyslexia or due to laziness. But because I want also to be 100% honest with you I do not feel that I have the capability to understand which are the reasons behind problems with dyslexia.”

However a part of the interviewees said that dyslexia does not impair their lesson : “...I have no problems with dyslexia. I cannot tell that children have problems in my lesson due to dyslexia.”

One of the teachers of Economic Science put forward the same problems that dyslexia causes as the above teachers but she also said “Yes as I said you before dyslexia impairs the academic progress of the children, but our biggest problem is not dyslexia. Is the lack of education and awareness of the parents and school staff on this very important educational aspect. Furthermore there is not a unified educational policy from pre-school to universities”. This answer

was a very nice assist for my next set of question questions which will help us to take a look in every day practices. With the first question I wanted to know which the formal government educational policy is. So I asked them which are the formal instructions by the Greek Ministry of Education about the matter of dyslexia?

The first of the interviewees' said "I know that there is a law about special education in Greece but I have never read it and I will not because I believe that this is not my work to do. On the other hand the Greek Ministry of Education does not organize seminars in a systemic way. Moreover when there are some seminars for special and general education the positions are limited and not enough for all schools' staff. So in the reality of every day practice the only thing which teachers always do is verbal examination for children diagnosed with dyslexia by KEDDYs."

"No in reality almost nothing happens from those which are written in the Greek law for special education, just the verbal examinations. Now and then are some efforts from the Greek ministry of education for staff training and other but always there is no continuum." Told another of the teachers participating in the research.

All the other answers about the formal tactics of schools for dyslexia were at the spirit. The only formal provision which have Greek secondary schools for dyslexia is verbal examinations only for children which are certified from KEDDYs as students with dyslexia. However we wanted to know not just the formal directions but also what happens in reality. Therefore we asked teachers what happens in reality. What do you do to overcome the obstacles that dyslexia puts in every day teaching practice?

One of the teachers of physics said "Although that there are no formal directions what to do in every day classroom practice the vast majority of the teachers develop their own tactics to help children with dyslexia. Not only for children which are diagnosed as dyslexic by KEDDYs but also for other children who have similar problems and must wait for over one year for a KEDDYs' evaluation. More specific I rephrase questions in tests or explain questions verbally for all children in classroom. Furthermore I try to use

multisensory teachings strategies; however this often is difficult due the lack of time as we have to follow a very strict educational program and not enough equipment.”

“What I do for children with dyslexia is the result of my own efforts to find the best way to teach dyslexic children and I am sure that it is not the best. Normally I will make special notes for dyslexic students so as to just watch me during the lesson and not trying to make notes at the same time. Moreover I will have more time them compare to their classmate with no special education needs.” Told another of the teachers.

The other of the physics teacher mentioned about the everyday teaching practices: “I admit that children with dyslexia have the most of my time during my class- but I am not sure if this is ok for other children. Moreover I try to create a more personal relationship so as to dyslexic children trust me and believe that I try for the best of them. I make some special notes for them and maybe I simplify parts of my subject. However I cannot change the basic structure of the lesson as we have to follow a very strict curriculum which creates huge demands in time and resources.”

One of the mathematicians said during the interviews “We have no help by the official government. There are teachers who try really hard to find the best possible teachings methods and they spend the most of their free time on that. I do not. I believe that any not well organized “central” effort is meaningless. So in every day practice I try to offer to the children with dyslexia or in other children with educational problems more time and a little more attention, but more than that the only I do is the verbal final examinations for children diagnosed as dyslexic by the KEDDYs.”

8. The Greek secondary school as a dyslexia friendly school. Is it? What have to change? The view of the teachers.

During the interviews I asked the teachers if their school is a dyslexia friendly school. Most of them have not herd never before the term dyslexia friendly and they asked to explain to them what it is. I presented to them the characteristics of the dyslexia friendly school in the way I did in the literature

review of this small scale research. Then we discussed if their schools fulfil some of these and therefore can be characterized as dyslexia friendly schools.

The first answer was very enlightening “My school I think is not dyslexia friendly as the most Greek secondary schools I have been during my teaching career. We as teachers don not have the special training which is needed to follow a dyslexia friendly teaching plan. Moreover this plan does not exist as there is not a unified policy by the Greek government except the verbal examinations. We do not have specialized personnel as psychologists or special educators to supports us in every day practice. Finally I must also tell you that the communication is in many cases difficult as very often they deny accept the problem. At this point we cannot do anything.”

“I do not feel ready to be in an inclusive class. I have not the proper training the proper directions and the proper supportive personnel to back me up. My school cannot be characterized as dyslexia friendly school for sure. We have practical difficulties which are not easy to overcome. Lack of time due to a very inflexible curriculum is one the difficulties. Moreover we need the necessary equipment for multisensory teaching and staff to help us inside the classroom. Finally the contact and the cooperation with the parents is not always easy. Many parents in Greek society see dyslexia as something which leaves a mark on their children. Only recently this situation has started change due to more information that parents have mainly through internet.” Said during the interviews one the teachers.

Another of the teachers mentioned “To be honest I believe that my schools and in general Greek secondary education is not dyslexia friendly even more I believe that is not in general “children friendly”. We as teachers have no communication with primary schools. There is not any file following children and in many cases students have lack of basic knowledge and we do not know it before is too late. At the time we discovered that we have the means and the time to do something due to very strict curriculum. So there are two choices; the first is that you can pass the student knowing that next year will not be able to follow the curriculum and the second to make him repeat the

class with doubtful results. I never find the way to have effective communication with the parents and social services. Because in most cases the blame for the educational result goes to teachers. I can understand that as we are the major tool of the educational system. But think that: the system for the entry in Greek universities have changed from 1999 five or six times, do you name this educational policy? As I said we are not dyslexia friendly for sure. I do not how long will take us from now so as to be able to run effectively inclusive classes as we have many-many things to do.”

The most of the answers about how dyslexia friendly are Greek secondary schools was about as the above. However one the mathematicians has a different view about the situation. He told us “I -in personal basis- try to be constantly educated on major educational aspects. One of those aspects is-of course- dyslexia. Therefore when I discovered the need to know more about dyslexia and every day practices to face dyslexia, I found the way to learn more. From this point of view I feel ready to deal with an inclusive class and I believe that I have the proper knowledge to be part of a dyslexia friendly school. In addition I am very lucky because I work in a school which is well organized and the parents and the mayor of our town help so as to not have lacks in equipment. I know that there are very few public schools like mine.” Moreover he added “...normally I do not have problems with the communication with the parents of my students.” He is one of the teachers in the school in the green area of Athens.

I asked the teachers who participated in my research to tell me if their cover some of the specifications in order to be characterized as dyslexia friendly schools. Then I discovered that participants believe that our secondary schools reality is far from being characterized dyslexia friendly. So at the last part of the interviews I asked from them to propose ways which will help Greek secondary school to be more dyslexia friendly.

“There is a vital need for teachers to be more educated not only about special education but also for general education, teaching and learning too...” was the first answer and he continued “...we also need to input new technologies in teaching, not because I am sure that new technologies will have better

results but because children must get used in new technologies. Finally I believe that the curriculum should be more flexible and moreover children must have the opportunity to select classes according to their strengths and weaknesses.”

In the same spirit was also the next answer “If you ask for me personally I believe that I need more knowledge. I am sure more education would help me to be more confident and productive in classroom. Furthermore I think that we need more equipment for multisensory teaching but it is important in the same to create smaller classes and a more flexible curriculum so as to teachers to be able to use new technologies.”

“We as teachers must be continually educated in a systemic way organized by the Greek ministry of education and based on latest research and academic knowledge. In addition I believe schools must also ensure that parents are also aware about the challenges that our educational system faces. In that way maybe the communication with the parents was more effective.” Said during the interviews another of the teachers.

An economic science teacher told that “Off course education and post graduate training is important but I think that is just the first step. We need central planning and other important steps must be done too, like to put in our classroom extra personnel to help children with difficulties in real time. I know that in this time of crisis this is almost impossible but I am afraid that we “burn” a whole generation.”

“I am not expert upon dyslexia. But I strongly believe that we must transform our strict and inflexible school into a school which recognizes strengths and weakness. A school which provides the necessary general education but in the same time let the children the space to develop their strengths” Was the opinion another of the participants in my research.

9. Presentation of findings

In the first part of this research I tried to take a closer look at the basic knowledge of teachers of non-literature subjects on the field of dyslexia. The teachers who participated in my research teach Mathematics, Physics, Economic Science and Computer Science in Greek secondary education. At a first glance dyslexia which is a difficulty that impairs mainly reading skills seems not be connected with difficulties in those subjects. A fact which makes the answers and the insights of the participants of my study more interesting as the participants of this are teaching non-literature subjects.

Concerning the definition of dyslexia the participants did not knew any detailed definition. Almost all the answers were more a description of the characteristics of dyslexia and not a specific definition of dyslexia. Just one of the teachers who had seminars about special education and in addition had worked in Greek secondary special education was in position to give a definition.

After that I asked from the participants in my research to describe some of the characteristics of students with dyslexia. Most of the teachers even if they do not teach literature subjects are in position to identify the vital characteristics of dyslexia. More specific the difficulty of children with dyslexia in reading comprehension and in generalization of knowledge was mentioned almost from all teachers. In addition the vast majority of the participants referred to memory problems of children with dyslexia. A noticeable fact is that none of the participants told me that children with dyslexia straggle to read. I can think two explanations about this. The first is that children in secondary education have already managed to find a way to read sufficiently. The second is that reading skills for teachers who teach non-literature subjects is not so crucial as reading comprehension and connection of old knowledge with new. Furthermore memory issues are also too important so as to a student to be successful in mathematics, Physics, Economic Science and Computer Science. However I must add that the participants of this study mentioned also characteristics like misspelling, discrepancy between written and verbal examinations and mirror writing.

In several answer of this study the participants referred consciously or subconsciously to the comorbidity of dyslexia with other special education needs. Many of the teachers told me that one of the main of dyslexia is attention deficit hyper activation disorder (ADHD). The other who had a better theoretical background on dyslexia said that almost never is just dyslexia and in most cases is dyslexia with ADHD or something else. Beside the fact the many teachers did not have the knowledge to understand that dyslexia is different than other special education needs like ADHD, it is encouraging that in way or another they are capable to see the comorbidity of dyslexia. Furthermore the participants recognize that dyslexia is a syndrome and every student with dyslexia has its own weakness and strengths. Finally the most of the teachers who participated in this study think that dyslexia origin is at the biological level. However they also believe that the environment that children grow up and are educated is crucial in terms of the development of the characteristics of dyslexia and the level that will impair the academic progress of the children. Moreover all teachers understand that there is no therapy for dyslexia and the only way to improve children's life and academic progress is through well design intervention tactics in a holistic environment where the teachers, the parents and the state's services are a unit who work for the best of the children.

The participants of my research are sure that they can recognize a student with dyslexia in their classroom. They generally said that except the obvious cases which are children diagnosed with dyslexia by KEDDYs that they are in position to notice the students which are in high risk of dyslexia. This research was based on participants who teach non-literature subjects. Rationally the next question was if and how dyslexia impairs the academic progress of dyslexic children in non-literature subjects. The answers at this part of the interview were not so clear. Teachers recognize the fact that some of the key characteristics of dyslexia like poor reading comprehension, difficulties and low self-esteem are toxic factors for the adequate performance in subjects like Mathematics, Physics, Economic Science and Computer Science. Additionally they said that for sure we cannot ignore dyslexia in non-literature subjects because even if dyslexia does not impair the academic progress in non-

literature subjects directly there are side effects. When I asked to explain me which are the side effects of dyslexia the answer were revealing. In reality the vast majority of the participants believe that the difficulties that students with dyslexia faces in non-literature in the secondary education are the result of the poor intervention or not intervention at all during the years in primary schools. They claimed during the interviews that children with dyslexia who have worked hard during the first years in schools continue successfully in the secondary education even if they still have to overcome the obstacles that dyslexia sets. Furthermore the teachers of Computer Science both told during the interviews that dyslexia does not impair the teaching and learning process at their subject at all. One of them especially believes that there is no dyslexia and there is a great a spent of money and resources on this matter without reason. Maybe the nature of computer science, the very few hours per week and the advanced ability of the modern kids with new technologies are hiding of those teachers the problems that dyslexia causes.

All teachers told to us that the only formal direction about the students with dyslexia is the verbal exams just for children which have been assessed by the KEDDYs and had dyslexia positive results. However the participants of this research admit that this is not enough and that they have developed their own tactics which they believe that help the educational outcome of all children. They create special notes, they try so their lesson to be as much multisensory as possible, they read or rephrase the questions during the tests but all this is nothing more than what every teacher separately thinks is the best and not a unified policy.

In the last part of the interviews participants had to answer if their schools fulfill some of the requirements so as to be characterized as dyslexia friendly. In summary the opinion of the most of the participants was that Greek secondary schools have to go a long way before they manage to be dyslexia friendly schools. First of all teachers asked again and again during the interviews training and education on special fields like dyslexia. They want to have in their dispose specialized personnel like psychologists and the proper equipment so as to be more effective in the classroom. Furthermore they mentioned the difficulties in communication or the total lack of communication

between the triangle parents, schools and social services. They added also that there is also lack of communication between primary and secondary education too. Finally they argued that there is just an inflexible curriculum which all schools have to follow with no bends.

Discussion

The main characteristic of dyslexia is the difficulty in reading. The impaired reading skills of students with dyslexia very often leads to low levels of reading comprehension as they put all of their energy just to read (Malmer, 2000). In subjects like Mathematics and other science subjects very often students have to learn a “new” language which is built with symbols and words which now have different meaning (Malmer, 2000). This fact impairs even more the reading comprehension of children with dyslexia something that all the participants of this research put forward. Furthermore they also mentioned the difficulties of children with dyslexia to connect the old knowledge to the new and generalizing knowledge (Simmons and Singleton, 2008). Finally they also referred to other key characteristics of children with dyslexia like memory issues, lack of organization and low self-esteem (Perkins and Croft, 2007; Key and Yeo, 2003; Padeliadou and Mpotsas, 2007). From above we can understand that the teachers who took part in my interviews can recognize the major characteristics of dyslexia which impair the academic progress of their students in non-literature subjects. The interviewees recognize almost all the key characteristics of dyslexia. Furthermore they recognize the comorbidity of dyslexia with other special education needs. And although the lack of postgraduate education on the field of dyslexia many of their answers in our question “Which are the characteristics of dyslexia?” were impressive and complete.

Today the researchers and the specialists in the field of dyslexia have not agreed on a single definition for dyslexia. In reality there are a number of different definitions for dyslexia with each one serving different purposes (Peers and Reid, 2003). However Allen (2010) puts forward the necessity of a definition which will help everyday classroom practice and reduce the risk of late intervention in cases of students with dyslexia. Not one of the Greek

secondary teachers who took part in this study was in position to provide us with a definition of dyslexia. In our question to define dyslexia they mainly tried to define dyslexia by describing its most profound characteristic based on their classroom experience. Until today the Greek Ministry of education has not introduced a dyslexia definition for in class use. This has to be one of the first in the way for inclusive schools.

Although that the majority of the participants of this research recognize and understand the biological origin of dyslexia they do not have any theoretical base for dyslexia and the mechanisms which impair the skills of the children with dyslexia. The result of the above facts is that the teaching methods of the interviewees are mainly reactive and teachers might be seen to be wasting valuable time as they mainly react to the characteristics of dyslexia that they observe in classroom by adjusting their examine methods mainly. A proactive practice which can be designed teaching methods suitable for every student dyslexic and non-dyslexic is far more effective however this requires further training of the teachers on dyslexia field.

Most of the teachers who participated in this small scale research believe that dyslexia cannot be ignored. In general they said that dyslexia mainly impairs the performance of children in literature subjects but there are key characteristics which are obstacles in successfully learning non literature subjects too. However there were a small percentage of the teachers in my research who believe that dyslexia has nothing to do with their subjects. More specifically in my question how dyslexia impairs teaching a teacher of computer science said that dyslexia does not exist. More specifically his opinion is matching with the opinion of Elliot and Gibbs (2008) who claim that in reality dyslexia is nothing more than excuse of modern society. Initially I thought that the nature of the subject of computer science do not put forward the difficulties that dyslexia causes. However when I asked how he teaches his lesson I discovered that a major part was with the traditional way read and learn. Therefore I believe that the combination of lack of training on dyslexia field and the fact that every class has just two hours per week computer science do not help him to recognize the problems that dyslexia causes.

A dyslexia friendly school must work in that way all parts (school-teachers-parents-social services) are in constant and effective communication for the good of the children (British Dyslexia Association, 2011; Coffield and O'Neill, 2004). Moreover the weakness and the strengths should be recognized and being targeted by the teachers so as to achieve the best educational outcome (British Dyslexia Association, 2011). In general we can assume that a dyslexia friendly school is a well-designed machine which works in a holistic way. However Greek secondary schools seem to be far from this point. First of all there is lack of communication between primary and secondary education. In many occasions the interviewees referred to primary as something totally different and in some cases they claimed that there are problems with children with dyslexia because of the late intervention in primary education or/and poor teaching practices. Moreover they mention difficulty in communication with parents and social services. Therefore we can assume that in Greek educational system there is no unified strategy plan for all educational levels as a unit which also includes social services and parents so as to decrease the implications of dyslexia in teaching and learning.

Concerning the teaching methods the vast majority of participants of this research claimed that they do not change anything in their everyday teaching practices due to the inflexible curriculum, lack of training and the lack of time a finding consistent to findings at older researches in primary education. Furthermore they added that the only change that happens for children with dyslexia is that the written exams are replaced by oral exams and this happens only for the children who are certified as dyslexic by the KEDDYs. However here we must add that there are cases that children can wait up to 2 years so as to be examined by KEDDYs' specialists. In meantime the children with dyslexia are considered by the Greek secondary educational that have the same needs, strengths and weakness as their non-dyslexic peers.

Greek schools have to do many steps before they can be characterized as dyslexia friendly and effectively run inclusive classes. The interviews revealed that except of the major deficiencies in central design of Greek educational

system that the heart of the educational system; the teachers feel insecure and unable to be in an inclusive school. However here we must add that are teachers which are very confident about themselves. The key to understand this difference is to look to teacher's background. As for example the teacher who is an active member of the Greek Mathematical Company and he has participated in many seminars. He believes that he can respond to the needs of an inclusive class. Once again it seems that knowledge is the key to find solutions even in "difficult" and unstable environments like the Greek secondary education.

Although this small scale research cannot give safe results so as to be able the researcher to propose how the Greek secondary school must change. I discovered during that teachers are "hungry" for total reform of our educational system. A reform which is not based on other educational systems as mostly happens in Greece (Vlachou, 2006). But a reform based on solid academic research, discussion between all parts and off course central design including primary and secondary education.

In first place the Greek ministry of education should start organizing a huge training program for their teaching staff in mainstreams schools. This is not just a scientific finding of this research but also a strong desire of the vast majority of the participants of this research. More specifically for the teachers of non-literature subjects the extra training will help them to deeply understand how dyslexia can impair the academic progress of their students and provide them the proper knowledge in order to be able to adjust their teaching methods as it fits to their classroom. So they can act proactive and not reactive and therefore reduce the risk of students falling in the cracks of the educational system as the late assessment by the KEDDYs.

Greek government recognizes the importance of an inclusive educational system suitable for every child (Koutrouba et al., 2010; Zoniou-Sideri et al., 2006). However all efforts until today in special educations have not lead to inclusive schools but in general schools which provide special provision for children with special education needs (Avramidis and Kalyva, 2007). This is something that must urgently change as schools should prepare children for

future social and working life and not just awards “empty” graduate certifications. From this point of view the only thing that Greek secondary school does nowadays is to help children with dyslexia to graduate by taking oral instead of written exams. I strongly believe that this time of crisis in Greece is a great opportunity for radical changes in our community including our educational system. However the special characteristics of modern Greece, Greek language and Greek society should be considered before every change so as to the outcome of this effort to be as more effective and suitable for Greek students as possible. School units in Greece work like all other public services in the country by following orders from a central authority the Ministry of Education. That is something that should change as it is impossible for all schools in Greece to have the same needs and furthermore the administration of the schools may do not react or late react to a problem using the excuse that is not their responsibility. Therefore the schools administrations must have more flexibility in making important decisions and not just follow a rulebook. Furthermore Greek schools and Greek families should come closer and to have an active cooperation for the good of the children. However this is something which can only occur through a central well designed change of our educational system.

This small scale study tried to take a small first look how teachers of non-literature see the implications that dyslexia causes in educational progress. There are two basic limitations of this study. Firstly the small number of participants of the research cannot give safe results however it gave us many topics which need more detailed investigation like for example the communication between parents and schools. The second one is that in our attempt to gain a small insight of our secondary educational system we investigated the matter through the eyes of the participants. So there is not high objectivity in our results but once again our results can be used as good start for further investigation.

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