

ICTs in behavioral problems and Research and analysis in Athens' schools

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Abstract

Providing pupils with information and strategies for coping with “present reality” is particularly crucial in the teacher’s job in the modern world. Teachers are required to take on the role of social educators in a time when individuals struggle, personalities are shattered, and ethos and moral values are devalued. Teachers support students’ ability to identify issues and challenges and name, express, and regulate their emotions. This essay aims to investigate the classroom behavioral issues that arise. The current work aims to define what constitutes problematic behavior and outline teachers’ role in preventing, limiting, actively intervening, and assisting pupils in solving problems. The research also involves statistical processing and data analysis based on questionnaires given to eight teachers regarding their perspectives and the intervention methods they use to manage behavioral problems.

Keywords

Behavioral Problems, School, ICTs, Metacognition, Attention Deficit Hyperactivity Disorder (ADHD), Bullying, Oppositional Defiant Disorder (ODD)

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1. Introduction

In recent years, the number of students with behavioral problems in the classroom is steadily growing (Kourkoutas, 2004c). Due to these problems students have tremendous difficulties to meet the expectations of the school environment, both in terms of performance and social relationships with classmates and teachers (Farmer, 2000a). Oftentimes it is very difficult to determine whether a certain behavior is typical or divergent. Therefore, researchers have defined some common criteria such as whether the behavior is harmful to the child or their environment, the local socio-cultural rules of the places they live and learn, and the frequency and intensity of their behavior (Greenhalgh, 2001). The most common forms of behavioral problems in the classroom are: ADHD (Attention Deficit Hyperactivity Disorder), aggression, school bullying, social isolation, and excessive child compliance (Gresham & Kern, 2004).

The causes are sought in the family, at school, in the child himself, and in society. Unfortunately, oftentimes the causes merge and overlap, and cannot be easily identified. As a consequence the problem behavior perpetuates in all environments and areas of the child's life (Kauffman, 2001). The implications of these behaviors are low school performance and difficulty in establishing meaningful relationships with peers, parents, and teachers. Further implications are the child's internal conflicts, the dropout from school, and the intensification of these behaviors (Hinshaw, 1992).

In order to control the behavior problems, training that focuses on the development of cognitive and metacognitive skills is required (Drigas & Mitsea, 2020). Chaidi & Drigas (2020) argue that there is a positive correlation between an individual's emotional intelligence and their cognitive processes. There's a strong need to develop and cultivate emotional intelligence, starting with education, so that the child can cope with the stressful situations at school (Drigas & Papoutsis, 2020). The teacher himself can be a crucial factor for improving behavioral problems and the stress they cause. The first important step is the identification of the problem and consequently the use of various appropriate teaching methods and means that will likely help the students reduce their behavior problems in class and strengthen their positive traits (Kassen et al., 1990). The approach of the teachers should be flexible and bespoke, depending on the child. In no case should a teacher become a punisher, but an ally (Dane & Schneider, 1998).

2. Types of problem behavior

As mentioned above, a behavior is defined as problematic or disturbing if it exhibits impulsive, provocative, antisocial, and aggressive behavior patterns towards others and if it significantly interferes with a child's development and progress (Kamps & Tankersley, 1996). An extensive range of behavioral problems is observed in classroom settings, such as:

2.1. Attention Deficit Hyperactivity Disorder (ADHD)

The main characteristic of ADHD is inattention and hyperactivity/impulsivity. The main features of the syndrome have to do with the fact that children are restless, constantly move hands and feet, cannot focus their attention, do risky things, forget pencils and books, do not wait their turn, constantly interrupt and do not follow the rules. On the other hand, the symptoms of the disorder may be minimal or even absent when the child is engaged in something very interesting to them or when they are in a very strictly structured environment (Kakouros & Maniadaki, 1998; Sciberras et al. 2014).

It is often difficult to distinguish between ADHD and a "vivid" or "snappy" behavior, so parents and teachers must be cautious before giving any characterization to an energetic and disobedient child. In the case of ADHD, the child displays many of the above behaviors in all environments and not just in one, e.g. at school (Lahey et al., 2000). It is also worth mentioning that there are three types of ADHD with corresponding specific symptoms. For example, there may be only the symptom of inattention, which is often overlooked by teachers, as these children do not cause problems in class. On the other hand, there may be only the symptom of hyperactivity, or perhaps both inattention and hyperactivity, which are symptoms associated with behavioral problems (American Psychiatric Association, 2013; Barkley, 2003).

Children's disruptive behavior often leads to their exclusion from school activities, to difficulty in coexisting with classmates, and to learning failure (Whalen & Henker, 1999). Over time, the disorder does not subside, but the symptoms may change form and manifest as internal or external nervousness, anxiety disorders, or aggression (Barkley, 2003).

2.2. Disobedience – Opposition – Aggression

Many children become disobedient at times when they get tired, stressed, or upset, which is within normal limits. However, when a child frequently exhibits confrontational behavior, it can cause significant problems in their relationships with others and strong discomfort (Burke et al., 2002). The main confrontational behaviors of children who show disobedience are the following: they refuse to comply with the classroom rules and to listen to the teachers; they lack self-control, have frequent fights and insulting speech, refuse to cooperate and comply, show hostility, outbursts and touchiness, and they tend to lie to avoid punishment. (Farmer, 2000b; Frick et al. 1991). Often with adverse behaviors, other disorders coexist too, such as ADHD, learning disabilities, mood disorders, and anxiety disorders (Cole et al. 1994).

2.3. Bullying

A child is bullied or victimized when exposed repeatedly and for a long time to negative actions by one or more students. Aggression is unprovoked, unjustified, unfair, and repetitive. It is exercised by a stronger child ("perpetrator") to a weaker child ("victim"). It aims to cause, above all, fear, anxiety, or

pain. The bullying child derives some benefit (e.g., pleasure, social prestige, material gain, etc.) while the weaker child cannot defend himself (Sourander et al., 2000). There are many forms of bullying such as physical, sexual, verbal, racial/racist, indirect, social exclusion, grabbing/destroying things, and threat/coercion (Farrington et al. 1993). Social exclusion, for example, is a prevalent and painful form of bullying, which is less evident to adults (teachers). Indirect bullying may be the spread of negative reputation, stalking, systematic ignorance (ghosting), silence, and intimidation of those related with the "victim". Bullying may occur in the courtyard, in the hallways, on the stairs, in the toilets, on the way to and from school, and on the school bus. This is why many cases are not noticed by the teacher (Psalti et al., 2005).

2.4. Social Isolation

Just as friendship cultivates feelings of companionship, joy, satisfaction, and fulfillment, similarly, lack of it may cause social deprivation, alienation, and loneliness. There are children in the school environment who have certain characteristics that "favor" them in friendships and make them "popular". Likewise, there are children who are more "shy and reserved". These children do not have highly developed social skills/abilities, appear lonelier, and tend to abstain from active participation in class, as also from making friends and communicating with others. They also show passivity to stimuli they receive, thus becoming often targets of negative comments and victims to bullying and ridicule (Boxer & Frick, 2008; Farrington, 1995).

2.5. Excessive Compliance

Excessive compliance is harmful and complicates the dynamics in the classroom, in that it makes the child dysfunctional (both in terms of learning and relationship building with both classmates and teachers) and may lead to their complete submission to them and denial of their own desires, lack of critical ability and expression of views, and finally to loss of their individuality (Schneider & Leitenberg, 1989). In addition, excessive compliance can push a child to antisocial behavior. This means that the child's strong desire to be socially accepted can lead them to show eccentric behaviors in order to become the center of attention and earn the acceptance of their peers, which results in confusion and turmoil in the classroom (Farrington, 1995).

3. ICTS and behavior problems

According to Kontostavlou & Drigas (2019), the use of ICT in special education has proven to be effective. Teachers can use ICT techniques as a means of intervention for students, which can be beneficial for them as it can enable them to develop their skills and abilities. Prem, Mohanraj, and Samuel (2020) investigated the impact of computer interfaces on the brains of ADHD youngsters. The Brain-Computer Interface (BCI) is a revolutionary technology intervention that helps patients with neurological diseases like Attention Deficit Hyperactivity Dis-

order (ADHD) to enhance their attention. The brain's activation during a task, notably its attention levels, as well as the level of hemispheric balance, may be monitored via BCI (Carelli et al., 2017). It is a relatively recent strategy to use BCI to increase focus in people with attention issues. BCIs decode the nervous system's neurophysiological impulses using mathematical algorithms. Patients can use "neurobio-feedback treatment" to track and control their brain activity. Magnetoencephalography (MEG), near-infrared spectroscopy (NIRS), functional magnetic resonance imaging (fMRI), electrocorticography (ECoG), and multi-electrode intracranial implants are some of the most common BCIs (Mehdi et al., 2016).

According to a meta-analysis, the effects of neurofeedback in children with ADHD improve with time while the effects of medication diminish, thus showing neurofeedback's long-term efficacy (Van Doren et al., 2018). The application of BCI in attention issues is criticized in this study, both for healthy people and for people with various cognitive disorders such as Attention Deficit Hyperactivity Disorder (ADHD), Amyotrophic Lateral Sclerosis (ALS), Autism Spectrum Disorder (ASD), cognitive deficits caused by brain and spinal cord injuries, post-stroke disabilities, and dementia. Twenty-three (23) surveys were obtained and evaluated after searching the databases PubMed, Web of Science, and Scopus using the key words "brain," "interface," "computer," "training," and "neurofeedback" (Prem, Mohanraj & Samuel, 2020).

For children with ADHD, the brain-computer interface has been proposed as a neurofeedback treatment. Jiang et al. (2011) created a BCI-based 3D game to increase attention. The BCI processor measures users' attention levels while they control the movement of a virtual hand using a 3D animation approach. Another set of researchers used a CogoLand game to test an intervention program that featured sensors and Bluetooth technologies. Parents saw a considerable improvement in symptoms in their children with ADHD after the session (Lim et al., 2012). According to neuroimaging studies, neurofeedback therapy has been demonstrated to regulate the brain processes that control selective inhibition in children with ADHD (Beauregard & Levesque, 2006). Munoz et al. (2015) created a video game that used BCI to track the neurophysiological signals of ADHD youngsters. The game was called "The Harvest Challenge." It took place on a coffee plantation. Games tend to improve waiting and scheduling skills, as well as the capacity to follow instructions in order to attain goals. Impulsivity can be controlled if these abilities have been strengthened.

When employing BCI, Qian et al. (2018) took the fMRI approach to look at changes in brain function. The intervention group's inattentiveness symptoms were considerably better after the training than the control group. In children with ADHD, the researchers saw an improvement in behavior and a faster rate of brain maturation. Sciberras et al. (2014) discovered that BCI-based attention training programs alleviated anxiety and low mood symptoms.

According to Drigas & Kokkalia (2016), mobile applications can be used as an additional learning tool in educational environments to improve children's academic skills. Powell, Parker,

Robertson, and Harpin (2017) investigated whether mobile applications are appropriate for children with ADHD. ADHD may now be successfully controlled thanks to technological advancements and programs tailored to this group. Xu et al. (2002) conducted a review of 19 studies examining the use of technology in kids with ADHD between the ages of 4 and 19. The authors concluded that there is currently insufficient data to demonstrate the effectiveness of such therapies. This research looked into the usefulness of ten apps for kids and teens with ADHD and professionals who work with them. Mobile applications from the Apple iTunes Store and the Android Google Play Store in the United Kingdom were sought for this study, and the top 10 applications about children and young people diagnosed with ADHD were chosen. The applications were chosen based on their rankings, determined by algorithms based on the number of downloads and ratings; the search keyword was "ADHD." This study included five clinicians from a health service that serves children and young people with ADHD and five diagnosed youngsters ranging in age from 6 to 17 years. The children with ADHD used the apps during the trial and were then questioned to provide feedback. Clinicians were also questioned about how successful these applications were for this population (Powell et al., 2017).

The therapists believed that apps might be used to track the symptoms of ADHD in children and adolescents and that they had both a beneficial and harmful influence on their interpersonal connections. They were also concerned with topics like accessibility, how crucial it is for apps to consider ADHD symptoms and the challenges that come with them, if they are acceptable for all ages, and whether they offer configurable features so that every user can relate. In addition, two teenagers and doctors remarked that the applications were not always dependable, as they frequently failed to function correctly or became disconnected. Two youngsters thought that paying for the applications was a barrier since they could not afford to pay online. Both children and physicians agreed that applications should be entertaining, aesthetically appealing, and feature language and characters that children can connect to, as well as provide rewards (Powell et al., 2017).

Two participants indicated that the programs might help them relax if they had ADHD symptoms (i.e. help their hyperactivity). They also stated that receiving an immediate reward, such as coins, pleased them throughout the game. Another participant stated that concentrating on patterns allowed him to unwind. Similarly, physicians thought that incentives were necessary to entice users. Applications for ADHD, according to one physician, can increase memory and inhibitions, hence reducing impulsiveness. The young people also indicated that applications should be engaging since they were less impressed and, in some cases, even annoyed by apps that allowed only passive listening or watching. Doctors also indicated that apps might be used as reminders or journals to track diet, mood, and ADHD symptoms (Powell et al., 2017).

According to Kokkalia et al. (2017), serious games are an innovative teaching method that can enhance learning and entertainment in school settings by improving and supporting children with different needs. Hakimirad et al. (2019) looked at

the impact of the EmoGalaxy video game on children with Oppositional Defiant Disorder's (ODD) social skills. Children with ODD were included in the study population and split into two groups (experimental and control). A total of 20 boys aged 7 to 12 years old were chosen and divided at random into two groups: the experimental group (10 children) and the control group (10 children). The experimental group used EmoGalaxy for fifteen (15) 45-minute intervention sessions, whereas the control group did not receive any treatment. Before and after the intervention, the student's social abilities were tested using the Gresham & Elliot (1990) Social Skills Assessment Scale.

The player of the EmoGalaxy video game must travel between four worlds. Each planet represents one of four basic emotions: joy, sorrow, fear, and wrath. The user can play different games in different parts of the planet. The game is intended to help players improve their emotional capacity in three areas: emotion awareness, emotion expression, and emotion management. Anger-related skills, for example, are used on the "frowning" planet; in order to play any game, the player must demonstrate and express anger. The game records the users' faces and detects their emotional expressions using the front camera. If the player cannot exhibit the appropriate emotion, the game will prompt him to identify an angry face among the game's characters. To put it another way, it assesses a very fundamental level of emotional aptitude, name recognition. After each game, the players are given a score. When a player's score hits a specific threshold, they will have enough fuel for their spaceship to fly to the next planet, which correlates to a different emotion (Hakimirad et al., 2019).

EmoGalaxy is compatible with Android 4.4 and higher smartphones and tablets, iPhone 5 and later devices, and PCs. The Unity 5 program was used to create the two-dimensional game. According to the findings, there was a substantial change in social skills test scores before and after the intervention. EmoGalaxy improved teamwork by 0.46 points, assertiveness by 0.59 points, accountability by 0.25 points, and self-control by 0.47 points. Total social skills were affected by 0.73. EmoGalaxy, as a cognitive video game, had a notable impact on all components of social skills in children with ODD, according to the findings of this study (Hakimirad et al., 2019).

4. Methodology

In this part of the work, questionnaires were given to 8 primary school teachers from the 105th Elementary School of Athens regarding their perceptions and attitudes towards behavioral problems. Regarding the teachers' gender, 6 were women, and 2 were men, and the majority ranged between 40-55 years, with considerable teaching experience. The questionnaires included additional information, such as area, grade, teacher, date, and teaching lesson. It is worth noting that in some questions teachers could give more than one answer. The questionnaires were given to different classes. Thereafter, statistical processing and descriptive data analysis of the answers was conducted.

5. Questionnaires' Analysis

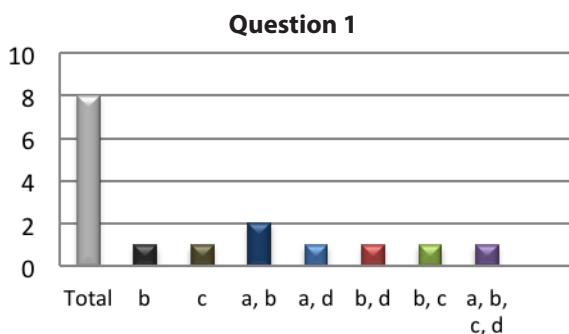
Question 1:

Do you think that the behavioral problems that usually occur in your classroom are due to: *

- a) The child's difficulty to socialize and adapt to the school reality
- b) A problematic family environment
- c) Influences of the broader social environment
- d) Cultural differences and social inequality

Table 1. Presentation of results

Options	Absolute frequency	Relative frequency
B	1	12,5%
C	1	12,5%
a, b	2	25%
a, d	1	12,5%
b, d	1	12,5%
b, c	1	12,5%
a, b, c, d	1	12,5%
Total	8	100%



Graph 1. Visual presentation of results

Question 2:

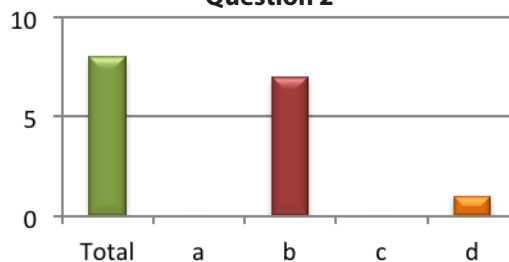
Problem behaviors that occur in the classroom can be effectively addressed:

- a) Exclusively and solely by you
- b) In cooperation with the parents
- c) With the help of colleagues and the manager
- d) With the help of specialized scientists

Table 2. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	7	87,5%
c	0	0%
d	1	12,5%
Total	8	100%

Question 2



Graph 2. Visual presentation of results

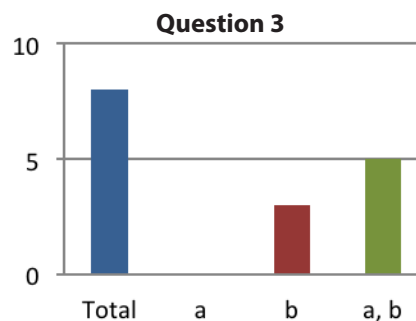
Question 3:

When a problematic behavior occurs, you give priority to: *

- a) Diagnosing the root causes of the problem
- b) The pedagogical treatment of the problem

Table 3. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	3	37,5%
a, b	5	62,5%
Total	8	100%



Graph 3. Visual presentation of results

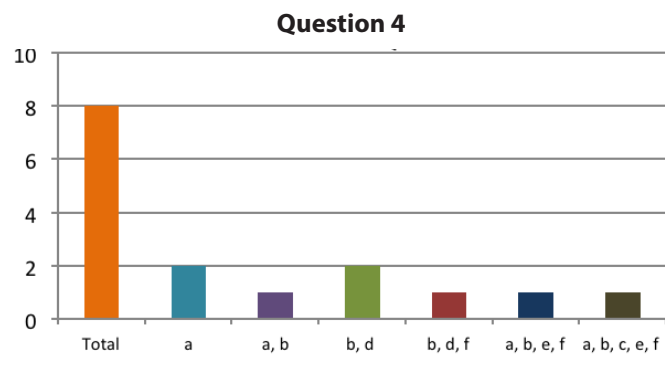
Question 4:

You characterize an unwanted student's behavior in class as problematic after:*

- a) Systematic observation of the student's behavior in the school environment
- b) A detailed record of the frequency, intensity and duration of the problem behavior
- c) A friendly discussion with the student
- d) Communicating with the parents
- e) Cooperating with the school counselor
- f) Referring the student to a specialized scientist or service

Table 4. Presentation of results

Options	Absolute frequency	Relative frequency
a	2	25%
a, b	1	12,5%
β, d	2	25%
b, d, f	1	12,5%
a, b, e, f	1	12,5%
a, b, c, d, e, f	1	12,5%
Total	8	100%



Graph 4. Visual presentation of results

Question 5:

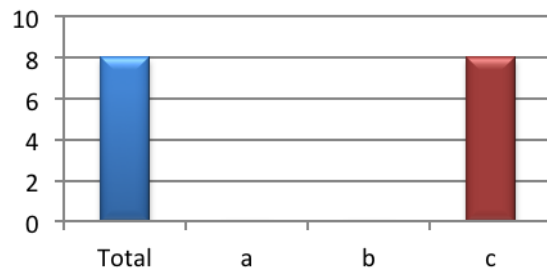
To deal with a problematic behavior in class, you intervene with:

- a) Advice and counseling
- b) Disapproval and reprimands
- c) Interest and sympathy

Table 5. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	0	0%
c	8	100%
Total	8	100%

Question 5



Graph 5. Visual presentation of results

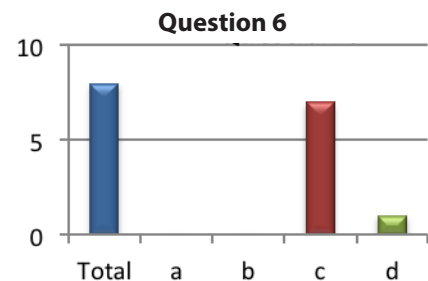
Question 6:

Do you introduce your students to desirable behaviors by developing social skills and imitating role models?

- a) Never
- b) Rare
- c) Often
- d) Always

Table 6. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	0	0%
c	7	87,5%
d	1	12,5%
Total	8	100%



Graph 6. Visual presentation of results

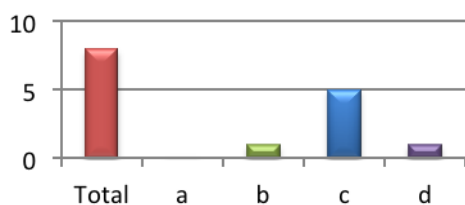
Question 7:

Interpersonal relationships in class and student behavior affect school success or failure:

- a) Not at all
- b) Somewhat
- c) Quite much
- d) Very much

Table 7. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	1	12,5%
c	5	75%
d	1	12,5%
Total	8	100%

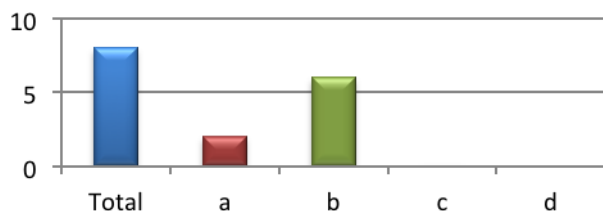
Question 7**Graph 7.** Visual presentation of results**Question 8:**

Do you believe that education of students with behavioral problems should take place:

- a) In a regular class
- b) In a regular class but with parallel support from another teacher
- c) In a special class
- d) In a special school

Table 8. Presentation of results

Options	Absolute frequency	Relative frequency
a	2	25%
b	6	75%
c	0	0%
d	0	0%
Total	8	100%

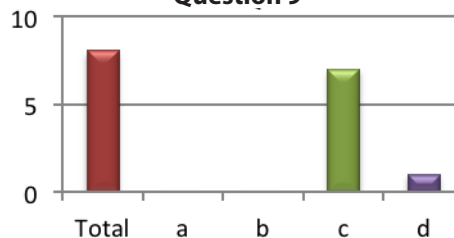
Question 8**Graph 8.** Visual presentation of results**Question 9:**

Do you think there is a correlation between the behavioral problems and the learning difficulties that a student faces in the classroom?

- a) Not at all
- b) Somewhat
- c) Quite much
- d) Very much

Table 9. Presentation of results

Options	Absolute frequency	Relative frequency
a	0	0%
b	0	0%
c	7	87,5%
d	1	12,5%
Total	8	100%

Question 9**Graph 9.** Visual presentation of results**6. Conclusions**

During the research, eight (8) questionnaires were given to eight (8) teachers of both sexes from the same school but different classes, with different backgrounds and experience, different knowledge, and sometimes different teaching means, due to diverse problems in some of the classes. The questionnaires contained questions regarding the teachers' perceptions of behavioral problems and how they chose to address them. Each question is analyzed below with regard to the answers given, and the resulting percentages.

The first question concerned the teachers' perceptions of the causes of problem behavior. The majority of teachers gave more than two answers (6 out of 8); however, their choices differ; only 25% (2 teachers) gave the same answer. Therefore, a difficulty is observed in identifying the causes of behavioral problems, possibly due to the complexity of the subject that allows multiple and subjective approaches and also due to the ignorance of most teachers. However, 87.5% of teachers highlighted the complex family environment among others.

The second question concerned the teachers' perceptions regarding the most effective way of addressing problem behavior. Here we observe that most teachers (87.5%) considered that cooperation with parents is crucial, while only one teacher considered the help of specialized scientists to be more criti-

cal. These results are directly related to the previous question as the majority of teachers (87.5%) considered the complex family environment as one of the reasons for the occurrence of these problems, and thus consider the cooperation with the family as necessary.

The third question concerned the priority that teachers give when a problematic behavior occurs. It is observed that out of the 8 teachers, 3 advocated for the pedagogical treatment of the problem. At the same time, the other 5 emphasized the diagnosis of the problem's causes and pedagogical treatment. None of them focused solely however on the problems' diagnosis. Linking these answers with the previous ones, we see a firm tendency of teachers to address these problems with pedagogical means and in collaboration with the problems' source.

The fourth question concerned the context and conditions that help teachers determine if a behavior is problematic. We notice here too that most (6 out of 8) selected more than two answers and in different combinations. However, 87.5% stated that one of the primary conditions is to record in detail the problem behavior's frequency, intensity, and duration, whilst only one teacher stated that one of the conditions is a friendly discussion directly with the student. This displays a willingness of teachers to observe the student's behavior consistently over a long period of time. This is also verified by 75% of them who marked the systematic observation of the student in the school environment as a necessary condition.

The fifth question tackles how the teacher intervenes directly in the classroom. Here it is observed that 100% of them choose interest and sympathy. None chose advice, suggestions, disapproval, and reprimands. This answer is very much in alignment with the previous answers on how to deal with problems, and this was the pedagogical approach for most of the teachers. We also note a consistency in answers regarding the next question, which investigates whether development of social skills and role modeling is employed as triggers for desired behaviors. The majority of them (82.5%) employ these approaches most of the time, while one teacher employs them as a standard practice.

Regarding question 7 on the teachers' views whether interpersonal relationships and student behavior in class affect school success or failure, most teachers (75%) stated that this is very much the case. Also, one teacher stressed that this correlation is excessively strong, whilst another supported the opposite, i.e. that it makes no difference. These answers are closely related to the answers of the 9th question regarding the relationship between behavioral problems and learning disabilities. As before, most teachers (87.5%) stated that there is a substantial relation, while only one teacher stated again that that this codependence is excessive. This consistency in the answers, despite the different questions, leads to the conclusion that teachers strongly associate behavioral problems with learning disabilities and school failure.

Finally, the 8th question tackled the teachers' views on the appropriate education setting for students with behavioral problems. The majority of them (75%) stated that the best school context is the regular classroom, yet with parallel sup-

port of another educator. The remaining 25% advocated for the regular classroom, but without parallel support. No teacher recommended special classes or a special school. In short, all teachers consider the regular classroom as the most appropriate school setting for children with behavioral problems. Most likely they do not want to worsen the existing stigmatization of these children and thus consider the regular classroom as the best way to strengthen interpersonal relationships and to resolve whatever problems within the team promoting the values of diversity and inclusion.

7. Discussion

This paper aimed to study the behavioral problems that occur in the classroom. Problematic behavior is associated with provocative, antisocial, and aggressive attitudes towards others and affects significantly the child's development and progress. Forms of problem behaviors include Attention Deficit Hyperactivity Disorder (ADHD), Disobedience-Opposition-Aggression, Bullying, Social Isolation, and Excessive Compliance (Kourkoutas, 2011).

The implications of problematic behaviors in the learning process and the students' interpersonal relationships are vast. At first, children exhibit learning difficulties that are not caused by health, sensory, or mental issues (McClelland et al., 2000). They have also difficulties in establishing and maintaining good interpersonal relationships with peers and adults. They exhibit inappropriate emotional reactions when interacting with others and they experience discomfort, misery, and depression. Last but not least, they tend to experience fear and display rebellious behaviors (Boxer & Frick, 2008).

The general conclusion of the literature review is that bespoke interventions within the classroom that aim to promote positive behaviors, as also interpersonal and emotional skills for children with behavioral problems seem to be effective, especially if combined with new technologies. (Drigas & Kokkalia, 2016; Mcevoy & Welker, 2000; Poulou & Norwich, 2001a). Managing behavioral problems in the classroom is extremely difficult and challenging. Therefore, the early identification of the problem is crucial for the student's academic and personal development (Merrell, 2002).

The findings of a study conducted on eight primary school teachers from Athens' 105th Elementary School show that we have long since left behind the traditional classroom of the past, in which the teacher ruled through austerity, punishment, enforcement, and marginalization of students who deviated from acceptable standards. Instead, modern teachers adopt a humane approachable attitude towards resolving problematic situations in the classroom and show interest in modern pedagogical methods. These hopeful results represent a substantial shift from previous trends; nonetheless, in order to generalize the findings, the current research must be applied to a broader group of teachers.

Finally we have to underline the role of all the digital technologies in education domain and especially in behavioral problems intervention, that is very productive and successful,

facilitates and improves the assessment, the intervention and the educational procedures via Mobiles [55-63], various ICTs applications [64-95], AI & STEM ROBOTICS [96-106], and games [107-114]. Additionally the combination of ICTs with theories and models of metacognition, mindfulness, meditation and emotional intelligence cultivation [115-149] as well as with environmental factors and nutrition [51-54], accelerates and improves more over the educational practices and results, especially for students with behavioral problems.

References

1. American Psychiatric Association, DSM-5 Task Force. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5™* (5th ed.). American Psychiatric Publishing.
2. Barkley, R. A. (2003). *Attention-deficit/hyperactivity disorder*. In E. J. Mash & R. A. Barkley (Eds.), *Child psychopathology* (p. 75–143). Guilford Press.
3. Beauregard, M., Paquette, V., & Levesque, J. (2006). Dysfunction in the neural circuitry of emotional self-regulation in major depressive disorder. *NeuroReport: For Rapid Communication of Neuroscience Research*, 17(8), 843–846.
4. Boxer, P. & Frick, P., J. (2008). Treating conduct problems, aggression, and antisocial behavior in children and adolescents: An intergrated view. In R. G. Steele, D. Elkin, & M. C. Roberts (Eds.), *Handbook of evidence-based therapies for children and adolescents* (pp. 241-260). New York: Springer.
5. Burke, J. D., Loeber, R. & Birmaher, B. (2002). Oppositional defiant disorder and conduct disorder: A review of past 10 years, part II. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 1275-1293.
6. Carelli, L., Solca, F., Faini, A., Meriggi, P., Sangalli, D., Cipresso, P., Riva, G., et al. (2017). Brain computer interface for clinical purposes: cognitive assessment and rehabilitation. *BioMed Research International*: 1695290.
7. Chaidi, I., & Drigas, A. (2020). Autism, Expression, and Understanding of Emotions: Literature Review. *International Journal of Online and Biomedical Engineering (iJOE)*, 16(02), pp. 94–111. <https://doi.org/10.3991/ijoe.v16i02.11991>
8. Cole, P. M., Michel, M. K. & Teti, L. O. (1994). The aggressive and anxious children. *Journal of Abnormal Child Psychology*, 104, 104-113.
9. Dane, A. V. & Schneider, B. H. (1998). Educational environments for students with E/BD. In D. A. Sabatino & B. L. Brooks (Eds), *Contemporary interdisciplinary interventions for children with emotional/behavioral disorders* (pp. 113-143). Durham: Carolina Academic Press.
10. Drigas, A., & Kokkalia, G. (2016). Mobile Learning for Special Preschool Education. *International Journal of Interactive Mobile Technologies (IJIM)*, 10(1), pp. 60–67. <https://doi.org/10.3991/ijim.v10i1.5288>
11. Drigas, A., & Mitsea, E. (2020). A Metacognition Based 8 Pillars Mindfulness Model and Training Strategies. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 8(4), pp. 4–17. <https://doi.org/10.3991/ijes.v8i4.17419>
12. Drigas, A., & Papoutsis, C. (2020). The Need for Emotional Intelligence Training Education in Critical and Stressful Situations: The Case of Covid-19. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 8(3), pp. 20–36. <https://doi.org/10.3991/ijes.v8i3.17235>
13. Drigas, A.S., Mitsea, E. (2020). The 8 Pillars of Metacognition. *International Journal of Emerging Technologies in Learning (IJET)*. Vol.15, n.21, p.162-178. DOI: 10.3991/ijet.v15i21.14907
14. Farmer, T.W. (2000a). Social dynamics of aggressive and disruptive behavior in school: Implications for behavior consultation. *Journal of Educational and Psychological Consultation*, 11, 299-322.
15. Farmer, T. W. (2000b). Misconceptions of peer rejection and problem behavior: Understanding aggression in students with mild disabilities. *Remedial and Special Education*, 21, 194-208.
16. Farrington, D. P. (1993). Understanding and preventing bullying. In M. Tonry (Ed.), *Crime and justice* (pp. 381–458, vol 17). Chicago: University of Chicago Press.
17. Farrington, D. P. (1995). The development of offending and antisocial behavior from childhood: Key findings from Cambridge Study in Delenquent Development. *Journal of Child Psychology and Psychiatry*, 36, 929-964.
18. Frick, P., Kamphaus, R., Lahey, B., Loeber, R., Christ, M., Hart, E. & Tannenbaum, L. (1991). Academic underachievement and the disruptive behavior disorders. *Journal of Consultin and Clinical Psychology*, 59, 289-294.
19. Greenhalgh, P. (2001). Ingredients of effective practice with pupils who have emotional and behavioral difficulties. In J. Visser, H. Daniels & T. Cole (Eds.), *Emotional and Behavioural Difficulties in Mainstream Schools* (pp. 47-62). Oxford: Elsevier.
20. Gresham F. M and Elliott S. N. (1990). *Social Skills Rating System Manual*. Circle Pines, MN: American Guidance Services. Inc. Publishers building.
21. Gresham, F. M. & Kern, L. (2004). Internalizing behavior problems in children and adolescents. In R. Rutherford, M. Quinn & S. Mathur (Eds.), *Handbook of research in behavioral disorders* (pp. 262-281). New York: Guilford Press.
22. Hakimirad Elham, Kashani-Vahid Leila, Hosseini Marzieh Sadat & Moradi Hadi (2019), Effectiveness of EmoGalaxy Video Game on Social Skills of Children with Oppositional Defiant Disorder, in IEEE Conference on International Serious Games Symposium (ISGS), Tehran, Iran, 26-26 Dec. 2019.
23. Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Casual relationships and underlying mechanism. *Psychological Bulletin*, 111, 127-155.
24. Jiang, L., Guan, C., Zhang, H., Wang, C. & Jiang B. (2011). Brain computer interface-based 3D game for attention training and rehabilitation. *Proceedings of the 6th IEEE Conference on Industrial Electronics and Applications*, Beijing: 124-127.
25. Kakouros, E. & Maniadaki, K. (1998). The effects of ADHD on children's academic achievement and behaviour. Oral presentation at the International Conference on Developmental / Intellectual Disabilities, Larnaca, Cyprus.
26. Kamps, D. M. & Tankersley, M. (1996). Prevention of behavioral and conduct disorders: Trends and research issues. *Behavioral Disorders*, 22, 41-48.
27. Kassen, S., Johnson J. & Cohen P. (1990). The impact of school emotional climate on student psychopathology. *Journal of Abnormal Child Psychology*, 18, 165-177.
28. Kauffman, J. M. (2001). Characteristics of emotional and behav-

- ioral disorders of children and youth (7th edition). Columbus: Merrill Prentice Hall.
29. Kokkalia, G., Drigas, A., Economou, A., Roussos, P., & Choli, S. (2017). The Use of Serious Games in Preschool Education. *International Journal of Emerging Technologies in Learning (IJET)*, 12(11), pp. 15–27. <https://doi.org/10.3991/ijet.v12i11.6991>
 30. Kontostavlou, E. Z., & Drigas, A. S. (2019). The Use of Information and Communications Technology (I.C.T.) in Gifted Students. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 7(2), pp. 60–67. <https://doi.org/10.3991/ijes.v7i2.10815>
 31. Kourkoutas, E. (2004c). Alternative intervention programs related to school behavior problems. Paper presented at the EERA-European Conference on Educational Research, 22-25 September, Rethymno, Crete.
 32. Kourkoutas, E. (2011). *Children with Behavioral Disorders: Ecosystemic psychodynamic interventions within family and school context*. New York: Nova Science.
 33. Lahey, B. B., McBurnett, K. & Loeber, R. (2000). Are attention-Deficit/Hyperactivity Disorders and Oppositional Defiant Disorder developmental precursors to conduct disorders. In A. J. Sameroff, M. Levis & S. M. Miller (Eds.), *Handbook of Developmental Psychopathology* (2nd ed., pp. 431-446). New York: Kluwer Academic/Plenum Publishers.
 34. Lim, C.G., Lee, T.S., Guan, C., Sheng-Fung, D.S., Zhao, Y. et al. (2012). A Brain-Computer Interface Based Attention Training Program for Treating Attention Deficit Hyperactivity Disorder. *PLoS ONE* 7(10).
 35. McClelland, M. M., Morrison, F. J. & Holmes, D. L. (2000). Children at risk for early academic problems: The role of learning-related social skills. *Early Childhood Research Quarterly*, 15, 307-329.
 36. Mcevoy, A. & Welker, R. (2000). Antisocial Behavior, Academic Failure, and School Climate: A critical Review. *Journal of Emotional and Behavioral Disorders*, 8, 130-140.
 37. Mehdi, O.S., Lebedev, M.A., Sorensen, H.B.D., Puthusserypady, S. (2016). Neurofeedback Therapy for Enhancing Visual Attention: State-of-the-Art and Challenges. *Frontiers in Neuroscience*, 10: 352.
 38. Merrell, K. W. (2002). Social-emotional intervention in schools: Current status, progress, and promise. *School Psychology Review*, 31, 143-147.
 39. Munoz, J.E., Lopez, J.F., Lopez, D.S. & Lopez, A. (2015). Design and Creation of a BCI Videogame to Train Sustained Attention in Children with ADHD. *Proceedings of the 10th Computing Colombian Conference*, September.
 40. Poulou, M. & Norwich, B. (2001a). Teachers' cognitive, emotional and behavioral responses to students with emotional and behavioral difficulties: a model of decision making. *British Educational Research Journal*, 28, (1), 111-138.
 41. Powell, L., Parker, J., Robertson, N., Harpin, V., (2017). Attention Deficit Hyperactivity Disorder: Is There an App for That? Suitability Assessment of Apps for Children and Young People With ADHD. *JMIR Mhealth Uhealth* 5(10):145.
 42. Prem, A., Mohanraj, K. & Rajan-Samuel A., (2021). Brain Computer Interface (BCI) on Attention: A scoping Review. *Journal of Experimental Biology and Agricultural Sciences*, Volume 9, page 10–22.
 43. Psalti, A., Papathanasiou, M., Konstantinou, K. & Deliyanni, V. (2005). Studying bullying in Greek schools: A first attempt at identifying and defining the phenomenon, Paper presented at the 27th International School Psychology Association Colloquium, Athens, 13-17 July, 2005.
 44. Qian, X., Yi-Loo B.R., Castellanos, F.X., Liu, S., Koh, H.L., et al. (2018) Brain-computer-interface-based intervention re-normalizes brain functional network topology in children with attention deficit/hyperactivity disorder. *Translational Psychiatry* 8: 149.
 45. Sciberras, E., Lycett, K., Efron, D., Mensah, F., Gerner, B., Hiscock, H. (2014). Anxiety in children with attention-deficit/hyperactivity disorder. *Pediatrics*. 133(5):801–8.
 46. Shneider. M. J. & Leitenberg, H. (1989). A comparison of aggressive and withdrawn children's self-esteem, optimism and pessimism, and causal attributions for success and failure. *Journal of Abnormal Child Psychology*, 17, 133-145.
 47. Sourander, A., Helstela, L., Helenius, H. & Piha, J. (2000). Persistence of bullying from childhood to adolescence. A longitudinal 8-year follow-up study. *Child Abuse & Neglect*, 24, 873-881.
 48. Van Doren Jessica, Arns Martijn, Heinrich Hartmut, Vollebregt Madelon, Strehl Ute, Loo Sandra K. (2019). Sustained effects of neurofeedback in ADHD: a systematic review and meta-analysis. *European Child & Adolescent Psychiatry*, 28:293–305.
 49. Whalen, C. K. & Henker, C. K. (1999). The child with attention-deficit/hyperactivity disorder in School. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 157-178). New York: Plenum.
 50. Xu, C., Reid, R., Steckelberg, A. (2002). Technology applications for children with ADHD: assessing the empirical support. *Educ. Treat. Children*, 25(2):224-248.
 51. Stavridou Th., Driga, A.M., Drigas, A.S., Blood Markers in Detection of Autism ,*International Journal of Recent Contributions from Engineering Science & IT (IJES)* 9(2):79-86. 2021.
 52. Zavitsanou, A., & Drigas, A. (2021). Nutrition in mental and physical health. *Technium Soc. Sci. J.*, 23, 67.
 53. Driga, A.M., Drigas, A.S. "Climate Change 101: How Everyday Activities Contribute to the Ever-Growing Issue", *International Journal of Recent Contributions from Engineering, Science & IT*, vol. 7(1), pp. 22-31, 2019. <https://doi.org/10.3991/ijes.v7i1.10031>
 54. Driga, A.M., and Drigas, A.S. "ADHD in the Early Years: Pre-Natal and Early Causes and Alternative Ways of Dealing." *International Journal of Online and Biomedical Engineering (IJOE)*, vol. 15, no. 13, 2019, p. 95., doi:10.3991/ijoe.v15i13.11203
 55. Vlachou J. and Drigas, A. S., "Mobile technology for students and adults with Autistic Spectrum Disorders (ASD)," *International Journal of Interactive Mobile Technologies*, vol. 11(1), pp. 4-17, 2017
 56. Papoutsi C., Drigas, A. S., and C. Skianis, "Mobile Applications to Improve Emotional Intelligence in Autism – A Review," *Int. J. Interact. Mob. Technol. (IJIM)*; Vol 12, No 6, 2018
 57. Karabatzaki, Z., Stathopoulou, A., Kokkalia, G., Dimitriou, E., Loukeri, P., Economou A., & Drigas, A. (2018). Mobile Application Tools for Students in Secondary Education. An Evaluation Study. *International Journal of Interactive Mobile Technologies (IJIM)*, 12(2), 142-161
 58. Stathopoulou A., Loukeris D., Karabatzaki Z., Politi E., Salapata Y., and Drigas, A. S., "Evaluation of Mobile Apps Effectiveness in Children with Autism Social Training via Digital Social Stories," *Int. J. Interact. Mob. Technol. (IJIM)*; Vol 14, No 03, 2020
 59. Stathopoulou, et all Mobile assessment procedures for mental health and literacy skills in education. *International Journal of Interactive Mobile Technologies*, 12(3), 21-37, 2018,

60. Drigas, A., Kokkalia, G. & Lytras, M. D. (2015). Mobile and Multimedia Learning in Preschool Education. *J. Mobile Multimedia*, 11(1/2), 119–133.
61. Stathopoulou, A., Karabatzaki, Z., Kokkalia, G., Dimitriou, E., Loukeri, P.I., Economou, A., and Drigas, A. (2018). Mobile assessment procedures for mental health and literacy skills in education. *International Journal of Interactive Mobile Technologies (IJIM)*, 12(3):21-37. <https://doi.org/10.3991/ijim.v12i3.8038>
62. G Kokkalia, AS Drigas, A Economou 2016 Mobile learning for preschool education. *International Journal of Interactive Mobile Technologies* 10 (4)
63. A Stathopoulou, Z Karabatzaki, D Tsiros, S Katsantoni, A Drigas 2022 Mobile apps the educational solution for autistic students in secondary education *International Association of Online Engineering*
64. Drigas, A. S., & Ioannidou, R. E. (2011, September). ICTs in special education: A review. In *World Summit on Knowledge Society* (pp. 357-364). Springer, Berlin, Heidelberg.
65. Drigas, A. S., J.Vrettaros, L.Stavrou, D.Kouremenos, E-learning Environment for Deaf people in the E-Commerce and New Technologies Sector, *WSEAS Transactions on Information Science and Applications*, Issue 5, Volume 1, November 2004.
66. Drigas, A.S., Vrettaros, J. and Kouremenos, D. (2004a) 'Teleeducation and e-learning services for teaching English as a second language to deaf people, whose first language is the sign language', *WSEAS Transactions on Information Science and Applications*, Vol. 1, No. 3, pp.834–842.
67. Drigas, A., Koukianakis, L., Papagerasimou, Y., Towards an ICT-based psychology: Epsychology, *Computers in Human Behavior*, 2011, 27:1416–1423. <https://doi.org/10.1016/j.chb.2010.07.045>
68. Charami, F., & Drigas, A. (2014). ICTs in English Learning and Teaching. *International Journal of Engineering and Science*. Vol. 2(4):4-10. DOI: 10.3991/ijes.v2i4.4016
69. Drigas A.S., Kouremenos D (2005) An e-learning system for the deaf people. In: *WSEAS transaction on advances in engineering education*, vol 2, issue 1, pp 20–24
70. Drigas A., Pappas M, and Lytras M., "Emerging technologies for ict based education for dyscalculia: Implications for computer engineering education," *International Journal of Engineering Education*, vol. 32, no. 4, pp. 1604–1610, 2016.
71. Drigas, A. & Kokkalia, G. 2017. ICTs and Special Education in Kindergarten. *International Journal of Emerging Technologies in Learning* 9 (4), 35–42.
72. Drigas A., and Koukianakis L., A Modular Environment for E-learning and E-psychology Applications, *WSEAS Transactions on Information Science and Application*, Vol. 3, 2004, pp. 2062-2067.
73. Drigas, A., Leliopoulos, P.: Business to consumer (B2C) e-commerce decade evolution. *Int. J. Knowl. Soc. Res. (IJKSR)* 4(4), 1–10 (2013)
74. Pappas M, Drigas A, Papagerasimou Y, Dimitriou H, Katsanou N, Papakonstantinou S, et al. Female Entrepreneurship and Employability in the Digital Era: The Case of Greece. *Journal of Open Innovation: Technology, Market, and Complexity*. 2018; 4(2): 1.
75. Papanastasiou G., Drigas, A. S., Skianis Ch., M. Lytras & E. Papanastasiou, "Patient-Centric ICTs based Healthcare for students with learning, physical and/or sensory disabilities," *Telemat Inform*, vol. 35, no. 4, pp. 654–664, 2018. <https://doi.org/10.1016/j.tele.2017.09.002>
76. Drigas, A., & Kontopoulou, M. T. L. (2016). ICTs based Physics Learning. *International Journal of Engineering Pedagogy (IJEP)*, 6(3), 53-59. <https://doi.org/10.3991/ijep.v6i3.5899>
77. Papanastasiou, G., Drigas, A., Skianis, C., and Lytras, M. (2020). Brain computer interface based applications for training and rehabilitation of students with neurodevelopmental disorders. A literature review. *Heliyon* 6:e04250. doi: 10.1016/j.heliyon.2020.e04250
78. Drigas, A. S., John Vrettaros, and Dimitris Kouremenos, 2005. "An e-learning management system for the deaf people," *AIKED '05: Proceedings of the Fourth WSEAS International Conference on Artificial Intelligence, Knowledge Engineering Data Bases*, article number 28.
79. Pappas, M., Demertzi, E., Papagerasimou, Y., Koukianakis, L., Kouremenos, D., Loukidis, I. and Drigas, A. 2018. E-Learning for deaf adults from a user-centered perspective. *Education Sciences* 8(206): 3-15.
80. Marios A. Pappas, Eleftheria Demertzi, Yannis Papagerasimou, Lefteris Koukianakis, Nikitas Voukelatos, and Drigas, A. S., 2019. Cognitive Based E-Learning Design for Older Adults. *Social Sciences* 8, 1 (Jan. 2019), 6. <https://doi.org/10.3390/socsci801000>
81. Drigas, A. S., Leyteris Koukianakis: Government online: An e-government platform to improve public administration operations and services delivery to the citizen. *WSKS* (1), volume 5736 de *Lecture Notes in Computer Science*, 523–532. Springer, 2009.
82. Theodorou, P.; Drigas, A. ICTs and Music in Generic Learning Disabilities. *Int. J. Emerg. Technol. Learn.* 2017, 12, 101–110
83. Pappas, M.A., & Drigas, A.S. (2015). ICT based screening tools and etiology of dyscalculia. *International Journal of Engineering Pedagogy*, 3, 61-66.
84. Drigas, A., & Kostas, I. (2014). On Line and other ICTs Applications for teaching math in Special Education. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 2(4), pp-46. <http://dx.doi.org/10.3991/ijes.v2i4.4204>
85. Alexopoulou, A, Batsou, A, Drigas, A. (2019). Resilience and academic underachievement in gifted students: causes, consequences and strategic methods of prevention and intervention. *International Journal of Online and Biomedical Engineering (IJOE)*, vol. 15, no. 14, pp. 78.
86. Pappas, M. A., & Drigas, A. S. (2015). ICT Based Screening Tools and Etiology of Dyscalculia. *International Journal of Engineering Pedagogy*, 5(3)
87. Drigas, A. & Ioannidou, R. E. (2013). Special education and ICT's. *International Journal of Emerging Technologies in Learning* 8(2), 41– 47.
88. Drigas, A., & Papanastasiou, G. (2014). Interactive White Boards in Preschool and Primary Education. *International Journal of Online and Biomedical Engineering (IJOE)*, 10(4), 46–51. <https://doi.org/10.3991/ijoe.v10i4.3754>
89. Drigas, A. S. and Politi-Georgousi, S. (2019). Icts as a distinct detection approach for dyslexia screening: A contemporary view. *International Journal of Online and Biomedical Engineering (IJOE)*, 15(13):46–60.
90. Lizeta N. Bakola, Nikolaos D. Rizos, Drigas, A. S., "ICTs for Emotional and Social Skills Development for Children with ADHD and ASD Co-existence" *International Journal of Emerging Technologies in Learning (IJET)*, <https://doi.org/10.3991/ijet.v14i05.9430>
91. Kontostavrou, E.Z., & Drigas, A.S. (2019). The Use of Information and Communications Technology (ICT) in Gifted Students. In-

- ternational Journal of Recent Contributions from Engineering, Science and IT, 7(2), 60-67. doi:10.3991/ijes.v7i2.10815
92. Drigas, A. S., and Vlachou J. A., "Information and communication technologies (ICTs) and autistic spectrum disorders (ASD)," *Int. J. Recent Contrib. Eng. Sci. IT (IJES)*, vol. 4, no. 1, p. 4, 2016. <https://doi.org/10.3991/ijes.v4i1.5352>
 93. Drigas, A. S., Koukianakis, L., Papagerasimou, Y. (2006) "An elearning environment for nontraditional students with sight disabilities," *Frontiers in Education Conference, 36th Annual. IEEE*, p. 23-27.
 94. Drigas A., and Koukianakis L. An open distance learning e-system to support SMEs e-enterprising. In proceeding of 5th WSEAS International conference on Artificial intelligence, knowledge engineering, data bases (AIKED 2006). Spain
 95. AS Drigas, LG Koukianakis, YV Papagerasimou 2005 A system for e-inclusion for individuals with sight disabilities Wseas transactions on circuits and systems 4 (11), 1776-1780
 96. Drigas, A. S., Rodi-Eleni Ioannidou, A Review on Artificial Intelligence in Special Education, *Information Systems, Elearning, and Knowledge Management Research Communications in Computer and Information Science Volume 278*, pp 385-391, 2013 http://dx.doi.org/10.1007/978-3-642-35879-1_46
 97. Drigas, A., Vrettaros, J.: An Intelligent Tool for Building e-Learning Content-Material Using Natural Language in Digital Libraries. *WSEAS Transactions on Information Science and Applications* 5(1) (2004) 1197-1205
 98. Drigas, A.S., Vrettaros, J., Koukianakis, L.G. and Glentzes, J.G. (2005). A Virtual Lab and e-learning system for renewable energy sources. *Int. Conf. on Educational Tech.*
 99. Drigas AS, Argyri K, Vrettaros J (2009) Decade review (1999-2009): artificial intelligence techniques in student modeling. In: *World Summit on Knowledge Society*. Springer, pp 552-564
 100. Vrettaros, J., Tagoulis, A., Giannopoulou, N., & Drigas, A. (2009). An empirical study on the use of Web 2.0 by Greek adult instructors in educational procedures. *World Summit on Knowledge System (WSKS)*, 49, 164-170. http://dx.doi.org/10.1007/978-3-642-04757-2_18
 101. Drigas, A., Dourou, A. (2013). A Review on ICTs, E-Learning and Artificial Intelligence for Dyslexic's Assistance. *iJET*, 8(4), 63-67.
 102. Anagnostopoulou, P., Alexandropoulou, V., Lorentzou, G., Lykothanasi, A., Ntaountaki, P., & Drigas, A. (2020). Artificial intelligence in autism assessment. *International Journal of Emerging Technologies in Learning*, 15(6), 95-107. <https://doi.org/10.3991/ijet.v15i06.11231>
 103. Pappas, M., & Drigas, A. (2016). Incorporation of artificial intelligence tutoring techniques in mathematics. *International Journal of Engineering Pedagogy*, 6(4), 12-16. <https://doi.org/10.3991/ijep.v6i4.6063>
 104. N Lytra, A Drigas 2021 STEAM education-metacognition-Specific Learning Disabilities *Scientific Electronic Archives* 14 (10)
 105. E Mitsea, N Lytra, A Akrivopoulou, A Drigas 2020 Metacognition, Mindfulness and Robots for Autism Inclusion. *Int. J. Recent Contributions Eng. Sci. IT* 8 (2), 4-20
 106. E Chaidi, C Kefalis, Y Papagerasimou, A Drigas 2021 Educational robotics in Primary Education. A case in Greece. *Research, Society and Development* 10 (9), e17110916371-e17110916371
 107. I Chaidi, A Drigas 2022 Digital games & special education *Technium Social Sciences Journal* 34, 214-236
 108. Papanastasiou, G. P., Drigas, A. S., & Skianis, C. (2017). Serious games in preschool and primary education: Benefits and impacts on curriculum course syllabus. *International Journal of Emerging Technologies in Learning*, 12(1), 44-56. <https://doi.org/10.3991/ijet.v12i01.6065>
 109. Kokkalia, G., Drigas, A., Economou, A., Roussos, P., & Choli, S. (2017). The use of serious games in preschool education. *International Journal of Emerging Technologies in Learning*, 12(11), 15-27. <https://doi.org/10.3991/ijet.v12i11.6991>
 110. Drigas, A. S., and Pappas M.A. "On line and other Game-Based Learning for Mathematics." *International Journal of Online Engineering (iJOE)* 11.4, 62-67, 2015 <https://doi.org/10.3991/ijoe.v11i4.4742>
 111. Papanastasiou, G., Drigas, A., Skianis, C., & Lytras, M. D. (2017). Serious games in K-12 education: Benefits and impacts on students with attention, memory and developmental disabilities. *Program*, 51(4), 424-440. <https://doi.org/10.1108/prog-02-2016-0020>
 112. Drigas, A. S., & Kokkalia, G. K. (2014). ICTs in Kindergarten. *International Journal of Emerging Technologies in Learning*, 9(2). <https://doi.org/10.3991/ijet.v9i2.3278>
 113. A Doulou, A Drigas 2022 Electronic, VR & Augmented Reality Games for Intervention in ADHD *Technium Social Sciences Journal*
 114. Kokkalia, G., Drigas, A., & Economou, A. (2016). The role of games in special preschool education. *International Journal of Emerging Technologies in Learning (IJET)*, 11(12), 30-35.
 115. Drigas, A., & Mitsea, E. (2020). The 8 Pillars of Metacognition. *International Journal of Emerging Technologies in Learning (IJET)*, 15(21), 162-178. <https://doi.org/10.3991/ijet.v15i21.14907>
 116. Drigas, A., & Papoutsis, C. (2019). Emotional intelligence as an important asset for HR in organizations: Leaders and employees. *International Journal of Advanced Corporate Learning*, 12(1). <https://doi.org/10.3991/ijac.v12i1.9637>
 117. Drigas, A. S., and M. Pappas, "The Consciousness-Intelligence-Knowledge Pyramid: An 8x8 Layer Model," *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, vol. 5, no.3, pp 14-25, 2017. <https://doi.org/10.3991/ijes.v5i3.7680>
 118. Drigas A, Karyotaki M (2017) Attentional control and other executive functions. *Int J Emerg Technol Learn iJET* 12(03):219-233
 119. Drigas A, Karyotaki M 2014. Learning Tools and Application for Cognitive Improvement. *International Journal of Engineering Pedagogy*, 4(3): 71-77. From (Retrieved on 13 May 2016)
 120. Drigas, A., & Mitsea, E. (2021). 8 Pillars X 8 Layers Model of Metacognition: Educational Strategies, Exercises & Trainings. *International Journal of Online & Biomedical Engineering*, 17(8). <https://doi.org/10.3991/ijoe.v17i08.23563>
 121. Drigas A., Papoutsis C. (2020). The Need for Emotional Intelligence Training Education in Critical and Stressful Situations: The Case of COVID-19. *Int. J. Recent Contrib. Eng. Sci. IT* 8 (3), 20-35. [10.3991/ijes.v8i3.17235](https://doi.org/10.3991/ijes.v8i3.17235)
 122. Drigas, A., & Mitsea, E. (2020). The Triangle of Spiritual Intelligence, Metacognition and Consciousness. *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, 8(1), 4-23. <https://doi.org/10.3991/ijes.v8i1.12503>
 123. Kokkalia, G., Drigas, A., Economou, A., & Roussos, P. (2019). School readiness from kindergarten to primary school. *International Journal of Emerging Technologies in Learning*, 14(11), 4-18.
 124. Drigas, A., & Mitsea, E. (2021). Metacognition, stress-relaxation balance & related hormones. *International Journal of Recent*

- Contributions from Engineering, Science & IT (iJES), 9(1), 4–16. <https://doi.org/10.3991/ijes.v9i1.19623>
125. Pappas M, Drigas A. Computerized Training for Neuroplasticity and Cognitive Improvement. *International Journal of Engineering Pedagogy*. 2019;(4):50-62
 126. Papoutsis, C. and Drigas, A. (2017) Empathy and Mobile Applications. *International Journal of Interactive Mobile Technologies* 11. 57. <https://doi.org/10.3991/ijim.v11i3.6385>
 127. Papoutsis, C. & Drigas, A. (2016). Games for Empathy for Social Impact. *International Journal of Engineering Pedagogy* 6(4), 36-40.
 128. Karyotaki, M., & Drigas, A. (2015). Online and other ICT Applications for Cognitive Training and Assessment. *International Journal of Online and Biomedical Engineering*. 11(2), 36-42.
 129. Papoutsis, C., Drigas, A., & Skianis, C. (2019). Emotional intelligence as an important asset for HR in organizations: Attitudes and working variables. *International Journal of Advanced Corporate Learning*, 12(2), 21–35. <https://doi.org/10.3991/ijac.v12i2.9620>
 130. Chaidi I. and Drigas, A. S., "Autism, Expression, and Understanding of Emotions: Literature Review," *Int. J. Online Biomed. Eng.*, vol. 16, no. 02, pp. 94–111, 2020. <https://doi.org/10.3991/ijoe.v16i02.11991>
 131. Drigas, A. S., & Karyotaki, M. (2019). A Layered Model of Human Consciousness. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, 7(3), 41- 50. <https://doi.org/10.3991/ijes.v7i3.11117>
 132. Drigas, A. S., Karyotaki, M., & Skianis, C. (2018). An Integrated Approach to Neuro-development, Neuroplasticity and Cognitive Improvement. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, 6(3), 4-18.
 133. Karyotaki M. and Drigas, A. S., "Latest trends in problem solving assessment," *International Journal of Recent contributions from Engineering, Science & IT (iJES)*, vol. 4, no. 2, 2016. [Online serial]. Available: <https://online-journals.org/index.php/i-jes/article/view/5800/>. [Accessed Aug. 21, 2019]. <https://doi.org/10.3991/ijes.v4i2.5800>
 134. Mitsea E., Drigas, A. S., and Mantas P., "Soft Skills & Metacognition as Inclusion Amplifiers in the 21st Century," *Int. J. Online Biomed. Eng. IJOE*, vol. 17, no. 04, Art. no. 04, Apr. 2021. <https://doi.org/10.3991/ijoe.v17i04.20567>
 135. Angelopoulou, E. Drigas, A. (2021). Working Memory, Attention and their Relationship: A theoretical Overview. *Research. Society and Development*, 10(5), 1-8. <https://doi.org/10.33448/rsd-v10i5.15288>
 136. Tourimpampa, A., Drigas, A., Economou, A., & Roussos, P. (2018). Perception and text comprehension. It's a matter of perception! *International Journal of Emerging Technologies in Learning (IJET)*. Retrieved from <https://online-journals.org/index.php/ijet/article/view/7909/5051>
 137. A Drigas, E Mitsea 2020 A metacognition based 8 pillars mindfulness model and training strategies. *International Journal of Recent Contributions from Engineering, Science & IT ...*
 138. C Papoutsis, A Drigas, C Skianis 2021 Virtual and augmented reality for developing emotional intelligence skills *Int. J. Recent Contrib. Eng. Sci. IT (IJES)* 9 (3), 35-53
 139. S Kapsi, S Katsantoni, A Drigas 2020 The Role of Sleep and Impact on Brain and Learning. *Int. J. Recent Contributions Eng. Sci. IT* 8 (3), 59-68
 140. A Drigas, E Mitsea, C Skianis 2021 The Role of Clinical Hypnosis and VR in Special Education *International Journal of Recent Contributions from Engineering Science & IT ...*
 141. V Galitskaya, A Drigas 2021 The importance of working memory in children with Dyscalculia and Ageometria *Scientific Electronic Archives* 14 (10)
 142. I Chaidi, A Drigas 2020 Parents' Involvement in the Education of their Children with Autism: Related Research and its Results *International Journal Of Emerging Technologies In Learning (Ijet)* 15 (14 ...
 143. A Drigas, E Mitsea 2021 Neuro-Linguistic Programming & VR via the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences *Technium Soc. Sci. J.* 26, 159
 144. A Drigas, E Mitsea 2022 Conscious Breathing: a Powerful Tool for Physical & Neuropsychological Regulation. The role of Mobile Apps *Technium Social Sciences Journal*
 145. A Drigas, E Mitsea, C Skianis 2022 Clinical Hypnosis & VR, Subconscious Restructuring-Brain Rewiring & the Entanglement with the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences. *International Journal of Online & Biomedical Engineering* 18 (1)
 146. A Drigas, M Karyotaki 2019 Attention and its Role: Theories and Models. *International Journal of Emerging Technologies in Learning* 14 (12), 169-182
 147. A Drigas, M Karyotaki 2019 Executive Functioning and Problem Solving: A Bidirectional Relation. *International Journal of Engineering Pedagogy (IJEP)* 9 (3)
 148. V Bamicha, A Drigas 2022 ToM & ASD: The interconnection of Theory of Mind with the social-emotional, cognitive development of children with Autism Spectrum Disorder. The use of ICTs as an alternative ... *Technium Social Sciences Journal* 33, 42-72
 149. A Drigas, E Mitsea, C Skianis 2022 Neuro-Linguistic Programming, Positive Psychology & VR in Special Education. *Scientific Electronic Archives* 15 (1)