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Behavioral Problems and ICTs: Research and analysis in schools in Athens

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Abstract. The role of the teacher is considered particularly important in our time for offering students not only knowledge but also ways of dealing with the "current reality." In an era where people are struggling, personalities are crushed, and ethos and moral values are belittled, teachers are called to become social educators. Teachers help children to recognize difficulties and problems, and to name, express and manage the emotions they feel. The aim of this paper is to examine the behavioral problems that occur in the classroom. The current work attempts to define what constitutes problematic behavior and to describe the role that teachers take in order to prevent, limit, intervene vigorously and help students solve problems. The study includes also statistical processing and data analysis, based on questionnaires given to 8 teachers on their insights and the intervention strategies they adopt for addressing behavioral problems.

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

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 & Papoutsi, 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 Disorder (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

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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

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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

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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

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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

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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

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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

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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

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**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

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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 critical. 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 support 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.

References


