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Behavioral Problems in schools: A theoretical overview and the role of ICTs

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Abstract. Behavior is a relative concept that is evaluated, analyzed, and interpreted based on subjective and social factors. Therefore, it is very likely that different people may characterize the same behavior as normal, desirable, problematic, or undesirable. According to international research, behavioral problems in childhood are the most common forms of dysfunction in interpersonal and social relationships and hinder severely a child's ability to adapt to all levels of education. This paper investigates the behavioral problems that occur in the classroom and the role of ICT in controlling them. It aims to define what problematic behavior is, and what its causes are; to document its impact on the learning process and on the interpersonal relationships of students; and finally, to describe the role that the teacher assumes to prevent, to limit and intervene vigorously, in order to help the students solve their problems.

Keywords. Behavioral Problems, Causes, Intervention, School, ICTs, Metacognition

1. Introduction

It's often very difficult to discern if a certain behavior is usual or atypical. As a result, researchers have established several common criteria, including whether the conduct is damaging to the kid or their environment, the local socio-cultural rules of the areas where they live and learn, and the frequency and severity of the behavior (Greenhalgh, 2001). ADHD (Attention Deficit Hyperactivity Disorder), hostility, school bullying, social isolation, and excessive child obedience are the most typical kinds of behavioral difficulties in the classroom (Gresham & Kern, 2004).

The origins of the problem are searched in the home, at school, in the kid himself, and in society. Unfortunately, the causes frequently converge and overlap, making it difficult to distinguish between them. As a result, the child's troublesome conduct persists in all situations and aspects of his or her life (Kauffman, 2001). Low academic achievement and difficulties forming meaningful connections with peers, parents, and instructors are the results of these behaviors. Internal tensions in the youngster, school dropout, and the deepening of these behaviors are all consequences as well (Hinshaw, 1992).

Training, that promotes the development of cognitive and metacognitive abilities, is essential to regulate behavior disorders (Drigas & Mitsea, 2020). According to Chaidi & Drigas (2020), an individual's emotional intelligence and cognitive processes are strongly correlated. Starting with schooling, there is a tremendous need to build and grow emotional intelligence so

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that the kid can cope with difficult events at school (Drigas & Papoutsi, 2020). The teacher's role in addressing behavioral issues and the stress they produce might be critical. The identification of the problem and, as a result, the implementation of various acceptable teaching ways and techniques that will likely assist the kids minimize their behavior problems in the classroom and develop their positive attributes is the first and most crucial step (Kassen et al., 1990). Teachers' approaches should be adaptable and tailored to the needs of each kid. A teacher should never become a punisher, but rather an ally (Dane & Schneider, 1998). ICT tools for either diagnostic or didactic purposes can develop the students' metacognitive skills through a well-defined educational and pedagogical framework organized by the teacher (Drigas & Karyotaki, 2014).

2. Conceptual definition of problem behavior

In order to characterize a behavior as common or problematic, many diverse elements are considered. The societal norms and rules play a decisive role as each society has its way of life, its cultural elements, and its core value system. Also, the conditions under which the behavior occurs need to be considered, as also the observer's values, perceptions, and attitudes, since all these amplify the subjectivity of the definition. If a behavior does not disturb anyone, it cannot be considered as problematic. Conversely, when the behavior has adverse effects, either on the child itself or the people around them, then this behavior is considered problematic and should be carefully evaluated. Finally, the frequency and intensity with which a behavior occurs (Kauffman, 2001) should also not be overlooked.

Although behavior is a rather complex topic and function, influenced by multiple endogenous and exogenous factors, many attempts have been made to describe the concept of behavior problems. According to Greshman (2004), problematic or disturbed behavior is considered a child's attitude that differs from what is considered normal for a certain age; that is associated with patterns of provocative, antisocial, and aggressive behavior towards others, and that significantly interferes with the child's development and progress. Another definition proposed by IDEA (Individuals with Disabilities Education Act) focuses on three parameters: the difficulties these children face at school, the duration of problem behaviors, and their severity. More specifically, these can include:

1) Learning difficulties that cannot be attributed to medical, mental, or sensory factors.
2) Inability to develop and maintain good interactive relationships with peers and adults such as parents or teachers.
3) Divergent emotions and behaviors in everyday situations.
4) Prevalence of a depressed mood and a feeling of dissatisfaction.
5) Tendency to exhibit physical symptoms and fears, which are related to personal problems or problems at school (Bierman, 1993)

Although no definition to date embraces the full range of behavioral problems, it is generally accepted that prerequisite for characterizing a behavior as problematic or undesirable is its prolonged deviation from current cultural and social norms (Lynch, 1998).

3. Causes of problem behavior

The prevailing view is that the root causes for behavior problems can be found at home, at school, and in the child himself. These three factors are so intertwined that it is almost impossible to identify a single causal factor (Kaufman, 2001). Therefore, problem behavior can

no longer be considered as an autonomous, independent disorder. In order to evaluate and interpret a behavior problem, several factors should be taken into account such as the child's generic mental state and function, the parameters and conditions under which the problematic behavior is exhibited, and the role of the family's, school's, and broader society's contexts. These factors perpetuate and accumulate, and the more negative parameters in a child's life, the greater the risk of developing some form of behavioral dysfunction (Cicchetti, 1993).

3.1. Endogenous factors

3.1.1. Medical factors

Physical disabilities such as blindness, quadriplegia, or deafness do not in themselves cause behavioral problems. However, the frustration, pressure, prohibitions, rejection and restrictions that a child with a physical disability suffers in trying to meet their socio-emotional needs may lead to behavioral problems (Kourkoutas, 2011). In addition, biochemical abnormalities such as thyroid problems or childhood diabetes can easily cause behavioral problems due to the body's biological disorders, as also due to the restrictions and prohibitions the child suffers to maintain his/her health (Kauffman, 2001).

3.1.2. Emotional factors

Emotional factors that are associated with a child's temperament and specific personality traits, substantially affect their behavior. For example, a child's inherent characteristics, such as their calm or enthusiastic reaction to events, the degree of adaptability to social changes, the degree of composure or panic under challenging situations, and the tendency to get irritated or anxious are factors that contribute to the development or not of problem behavior (Carr, 2001). Also, in their effort to stand up for and protect themselves, children establish various defense mechanisms such as lying or accusation that have consequences affecting their behavior and the climate in class. Finally, the child's self-esteem should not be overlooked, since it functions as a measure of their self-worth and determines their behavior. It has been often observed that children with low self-esteem have behavioral problems. Most of them tend to feel accountable for their problems, which only worsen their behavior (Heward, 2000).

3.1.3. Developmental-Cognitive factors

Developmental/cognitive factors determine the thinking and reasoning abilities of children and, consequently, their behavior. For example, children with encephalopathy or cerebral palsy may be deficient in developing their mental skills, which results in learning difficulties with obvious reading and writing deficits. Learning disabilities, in turn, can cause low self-esteem, frustration, and behavioral problems (Sameroff, 2004).

3.2. Exogenous factors

According to the ecosystem theory, the majority of children's behavioral problems are due to factors in their environment such as family, school, and the greater social context to which the child belongs. Family factors constitute a predisposition to problem behavior, while other social factors such as school and community networks to which a child belongs may perpetuate or even worsen existing problems (Gresham & Kern, 2004).

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3.2.1. Family

According to research, a toxic family environment with parental conflicts, parental mental disorders, limited alternative solutions, and low emotional capacity combined with a low family status in society are factors that form the basis for problematic behavior in children (Hinshaw,1992). In particular, the child's experiences in their family such as the pedagogical methods of their parents and especially the disciplinary measures, such as excessive mercy or excessive austerity, can ignite emotional reactions. For example, parental inability to set clear boundaries or express clear expectations, the lack of supervision and guidance, overly severe or inappropriate punishments and very strict discipline practices are huge risk factors for developing problem behaviors (Kourkoutas, 2011). Also, an essential factor is the child's relationship with their family members; behavioral problems are observed when a child, instead of care, interest, understanding, and support, experiences lack of parental tenderness and warmth and low parental emotional engagement. The most critical factors are lack of a consistent emotional support, judgmental parenting, and maternal rejection (Merrell, 2002).

The family's context, structure, and living conditions influence and determine its climate, and consequently the psycho-emotional development of the children within it. For example, children who have witnessed family members being abused or who have been victims of physical abuse themselves display severe behavioral problems. Also, children who live in a climate of confusion, tension, and chaos at home exhibit unexpected behaviors. In addition, poverty which results in poor sheltering, poor nutrition, and the constant absence of parents due to work, is often cited as a cause of children's behavioral problems. Finally, the lessons a child receive within a family is also essential, since the parents' values, rules, and way of living significantly shape their behavior (Kauffman, 2001). Children imitate parental behavior patterns in their interactions with peers or they internalize these patterns and end up suffering from intense emotional struggles, while at the same time their entire personality is disrupted (Kourkoutas, 2011).

3.2.2. The school environment

Another important factor that largely determines a child's behavior is school. School is a complex environment (social, cultural, physical, and technical), in which students spend a large amount of their time participating in the school community's learning activities. A significant amount of research confirms that each school's organization, tactics, and practices significantly influence children's behavior (Kassen et al., 1990). More specifically, whenever the education system is authoritarian, the sanctions and punishments are strict, and the teaching methods promote only individual efforts and responsibility, along with the teacher's unquestionable authority, behavioral problems are more frequent. In contrast, schools with democratic and child-centered practices combined with an affectionate and constructive way of collaboration will result in fewer behavioral problems (Kourkoutas, 2011).

In addition, a significant number of research data confirm that if the school environment does not satisfy the student and does not meet their expectations, interests, and emotional needs, the student-school relationship is disrupted and the student develops a repulsive attitude with behavioral problems as a consequence. Furthermore, as the curricula are usually designed to meet the values and standards of the middle class and the needs of an average student, many children may feel bored if the program is far below their abilities or contrariwise, they may feel demotivated, frustrated, and inadequate if the program is far beyond their abilities. In both cases, these are conditions for developing behavioral problems (McClelland et al., 2000).

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According to Merrell (2002), a meaningful organization in class favors the development of an appropriate socio-emotional climate, which helps mitigate behavioral problems. Furthermore, the teacher's behavior, their tone, mood, speech intensity and teaching style can reinforce behavioral problems (Poulou & Norwich, 2001). It has been observed that in many cases, teachers may alter their behavior and tolerance, depending on the children's performance. For example, they may show understanding and patience toward "good" students ignoring discipline difficulties, while they may give moral lectures to less performing students (Greenhalgh, 2001).

Finally, the classroom's organization is equally important, as overcrowded classrooms have an impact on the psychopathology and on the development of the students' personalities in general. It is argued that a prolonged restrictive environment can cause overstimulation and problems in behavior (Merrell, 2002).

3.2.3. The social environment

The social environment is considered as one of the most decisive factors contributing to behavioral problems. For example, the synthesis and quality of the society in which a child lives, such as low socioeconomic status, and differences in culture, lifestyle, religion, or ethnicity, may not favor the development of good interpersonal relationships (Kauffman, 2001). Also, the media, a significant component in societies, and the way they operate may affect negatively the children's behavior and the development of their personality. Children behave, act and speak through observing and imitating role models. One such model is television. When the media misinform and immobilize children manipulating them towards consumerism, when violence on television is much more frequent than in real life, and when children do not use their free time creatively but devote much of it to binge-watching television, then the road is paved for communication and behavioral problems. Thus, the commercialization of leisure time and entertainment, combined with violent scenes broadcasted in the news, in shows, on the Internet, and in virtual reality games, becomes a way of life (Sanders et al., 2000).

4. Consequences on the learning process and the students' interpersonal relations

One of the main symptoms of children with behavioral problems is that they are unable to maintain stable and satisfactory relationships with their peers, as also relationships of mutual trust and cooperation with others, despite their need for acceptance (Bierman, 1993). It has been observed that children with a tendency towards destructive behaviors face severe struggles in their emotional development, in showing empathy and in developing other social skills that are necessary for building meaningful interpersonal relationships. These youngsters are usually characterized by high egocentrism, immature thinking, intense mental conflicts, and by an inability to control their impulses. They also face great difficulty controlling the intensity of their negative emotions towards others, such as anger and irritability, and thus release their tension through antisocial and violent acts (Kauffman, 2001). Also, they are often possessed by hostile prejudices; they attribute hostile intentions to others and may interpret neutrality as signs of provocation (Kourkoutas, 2011).

Children with behavioral problems and aggressive tendencies most often experience rejection from peers and thus are usually isolated or they establish relationships with peers who have similar difficulties (Kauffman, 2001). They may even develop a positively inflated self-perception, which functions as a defense mechanism against peer rejection and conceals their low self-esteem. In many literature sources, it is argued that these children have difficulty establishing internal functional patterns that form the foundations for positive behavior,

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emotional bonding, and satisfaction. The accumulation and internalization of negative and traumatic experiences during critical phases of their development form internal patterns that trigger aggression and behavioral problems in general (McClelland et al., 2000). Also, their inability to control and regulate their emotions prevents them of finding creative ways to resolve their inner conflicts and interpersonal struggles, thus leading them to exhibit provocative and destructive behaviors towards others (Kauffman, 2001).

Children with behavioral disorders often experience poor performance in school combined with learning disabilities and high rates of school failure and school dropout. Problem behavior and school failure interact and reinforce each other, so it is extremely difficult to determine which of the two precedes (Kassen et al., 1990). Most often it is argued that school failure reinforces the child's disengagement from school and consequently enhances adverse behavior. Also, children with behavioral problems are very likely to experience not only rejection from their peers, but direct or indirect rejection from their teachers' too. It seems that children with antisocial behavior are rarely encouraged by their teachers' to try to behave positively, and are much more often punished for their negative actions than their classmates (Hinshaw, 1992).

5. Strategic Interventions

It is known that children with behavioral problems show significant heterogeneity in terms of cognitive, emotional, social, and family characteristics. Therefore each of them needs different treatment and intervention in order to integrate them in the classroom (Merrell, 2002). In order for teachers to reduce behavioral problems and to set effective rules, their speech should be swift and concise because students tend to comply with "commands" that are short and easy to understand. Also, rules should be expressed in a gentle and positive tone and manner, giving the child the impression that the teacher is not a punisher but rather someone who wants to help them change and improve. If the teacher imposes some form of punishment this may reduce the occurrence problems, but only as long as the instructions he gives are straightforward, understandable, practical, and without further explanations or excuses that may compromise the teacher's authority. It is advised that the teacher gives their students a reasonable amount of time to process and comply with the rules and possible repercussions (Greenhalgh, 2001).

The teacher can use enhancers, positive or negative, to respectively reinforce or weaken behaviors. For example, the student may get a sticker for the progress in his behavior, or the teacher may stop reprimanding the student as soon as they apologize for their negative behavior (Poulou & Norwich, 2001). In addition, changing and modifying the physical-social environment in the classroom may reduce problems. For example, for children with ADHD, it is effective to modify the classroom layout in order to limit the stimuli they receive. For instance, the teacher may change the student's seating placing him/her close to the podium in an attempt to limit his distractions; he may place the paper basket close to the child so that he/her can reach it without having to get up and become distracted by other factors (Kourkoutas, 2004).

Also, trained classmates may intervene to solve a problem when some students engage in a conflict they cannot solve themselves. In collaboration with the teacher, these trained classmates may suggest solutions to those involved in the conflict. Wherever this method of conflict management was applied, a steady reduction in behavioral problems was observed. Problem management can be taught through classroom discussions, not in a scheduled way, but by integrating those discussions into existing courses based on the curriculum (interdisciplinary) or inspired by everyday life situations (Greenhalgh, 2001).

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Also, by using appropriate teaching methods (collaborative method) where students take on role play as defined by the teacher to lead to an "academic debate" may lead to effective problem management too. This constructive debate can be performed in any teaching subject to promote learning and conflict resolution. At a general level, the teacher handles (or should handle) the issues this way in order to be able to deal with the problems mentioned above. Also, the teacher may intervene more methodically and structured in order to reduce and ultimately manage the problems (Kassen et al., 1990).

6. The role of ICTs

The use of ICTs [50, 52] in special education has been proven to be helpful, according to Kontostavlou & Drigas (2019). Teachers can utilize ICT approaches to intervene, which can be helpful to students since it allows them to further improve their skills and talents. For example, Prins et al. (2013) created the game "Braingame Brian" to help youngsters with ADHD improve their executive skills. "Braingame Brian," called after the main character Brian, is a 40- to 50-minute game with seven worlds: the neighborhood around Brian's parents' house, the village, the deserted island, the backlands, the beach, the swamp, and the basement workshop. All of the characters in these worlds have a problem. By doing cognitive activities, Brian assists them in resolving these issues.

An external support system is implemented to increase the child's incentive to finish the program. Each training session's data is uploaded to a central database. Educators receive online feedback on the child's progress based on this information. The research involved 40 children (8-12 years old) with ADHD who were separated into two groups: the experimental group (n = 18) who got intervention using "Braingame Brian" and the control group (n = 22) who did not receive any intervention. Before and after the intervention, parents and teachers were given questionnaires to measure executive function deficits, ADHD symptoms, and disruptive behavior issues. The findings revealed that children's executive skills (Gioia et al., 2000) and ADHD symptoms (Inattention and Hyperactive-Impulsivity subscale of the Disruptive Behavior Problem Scale) improved considerably (Pelham et al., 1992). This pilot research provides a lot of hopeful data for the program's success. However, "Braingame Brian" should not be regarded as a stand-alone treatment but instead should be used in conjunction with other ADHD therapies such as medication and behavioral therapy to achieve therapeutic benefits (Prins et al., 2013).

Mobile applications [53-54] may be utilized as an extra learning tool in educational settings to help youngsters enhance their academic skills (Drigas & Kokkalia, 2016; Doulou & Drigas, 2022a). Spachos, Chiazzasse, Merlo, Doherty, Chifari, and Bamidis (2014) investigated the most commonly used applications for tablet or mobile as therapies for children with ADHD. They also evaluated the WHAAM mobile application and its use. Due to the hardware capability of smartphones, which allows e-health functionalities in mobile apps, mobile health (m-health) has become a crucial subset of e-health (Liu et al., 2011). Other applications serve as instructional and educational aids, while others aid in managing and tracking ADHD symptoms or even enabling diagnosis. By creating a network of persons involved in childcare and collecting data, the WHAAM application enables SMART behavior monitoring. The obtained data is subsequently displayed and analyzed by the health experts involved, allowing for intervention planning and scheduling. In addition, the WHAAM application includes tools for evaluating the intervention's efficacy (Alves et al., 2014).

Many more apps have been created; the ADHD Treatment Researcher (Vermont Behavioral Solutions, 2011) is an Android app that provides access to the latest ADHD research,

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clinical trials, books, medical videos, events, forums, and more. The "You Can Handle Them All" app (The Master Teacher®, 2011) is available for iPhone, iPad, iPod touch, and Android smartphones and is meant to assist parents or instructors in managing behavior problems. The iBAA Behavior Assessment App (Future help designs, 2012) is designed for psychologists to collect and summarize behavioral data. It is accessible through iPhone or iPod touch and offers a variety of observation techniques, including frequency and intervals of ADHD symptoms. Apple has also created other programs, such as "Behavior Assessment Pro" (Marz Consulting, 2011), which provides behavioral analysis through guided questions and allows users to plan future actions with reminders.

Serious games are an innovative teaching tool that may improve and help children with various needs while enhancing learning and pleasure in educational settings (Kokkalia et al., 2017; Doulou & Drigas, 2022b). For example, Bland'on Diego et al. (2016) assessed and trained attention and self-regulation in children with ADHD using the virtual reality 3D video game Harvest Challenge. A Brain-Computer Interface system (MindWaveBCI) was used to map attention levels from 0 to 100 percent by placing an electrode on the frontal lobe. Additionally, EEG signals were captured when the subject was at rest. Because of the special incentive that neurofeedback and interactive games create and the efficacy they have in relieving the disorder's symptoms, they are therapeutically excellent (Drigas & Bravou, 2012).

With nine children diagnosed with ADHD, two intervention sessions were held at a local specialist institution (Instituto de Audiolog'a Integrated-IdeAI). The 30-minute sessions were split into two halves, the first of which lasted 5 minutes and the second of which lasted 25 minutes. The youngster was first observed using the MindWave device, which captured their EEG readings using the OpenViBE open-source software while they were listening to relaxing music. Three separate phases of interaction were established in the second phase:

1) Equipment: The game begins with adventure sports on an environmentally friendly farm. The player's initial objective is to gather the necessary equipment for a safe trip, which necessitates a significant increase in attention (more than 50%) and adherence to the rules. Through the visual cues on the screen, players must successfully pick a helmet, a pair of gloves, a rope, and footwear.
2) Path repair: To acquire the rope, the player needs to climb to the summit of a mountain. Therefore, a set of wooden steps was installed along a lengthy path where several catastrophes happened. As a result, players will need to pay more attention to rebuilding the track.
3) Carrot Harvest: Players interact with virtual things at this phase. The user is placed in a large carrot harvest field and given a basket to pick as many carrots as possible while rising and maintaining his or her attention levels until the veggies are collected. When players lose focus, the carrots disappear beneath the earth and are no longer collectible. The video game stops when the timer runs out (30 minutes) (Bland'on Diego et al., 2016).

The results demonstrated that the youngsters improved their performance by playing the video game Harvest Challenge, which reflected a better capacity to sustain continuous attention and self-regulation (Bland'on Diego et al. 2016). The findings also revealed increased activity in alpha and beta waves, commonly linked to hyperactivity (Lansbergen et al., 2011).

7. Conclusions

The purpose of this study was the literature review of researches on behavioral problems that occur in the classroom and the role of ICTs to manage and control them. The general

conclusion of the literature review is that individualized interventions within the classroom for children with behavioral problems can be effective when they aim to promote positive behavior as also interpersonal and emotional skills, and when combined with the use of new technologies (Drigas & Kokkalia, 2016). The new conditions that emerge in society make the use of ICT increasingly necessary (Pappas et al., 2017), [43-46]. Digital intervention tools could be extremely beneficial, as they can be utilized at school and at home to improve the quality of the education provided (Drigas & Ioannidou, 2013). Learning approaches based on interactive environments that incorporate active and creative problem solving enhance the students' cognitive and metacognitive abilities (Drigas & Karyotaki, 2016), [47-49]. The discussion about the behavioral problems that arise in the classroom and their appropriate rehabilitation methods has been of great concern to the scientific community. Additional research is required to better understand children's behavioral problems and to develop further therapeutic approaches to improve cognitive and metacognitive skills in order to successfully integrate them in the social environment.

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