Educational applications of emotional intelligence for individuals with autism spectrum disorder

Aplicações educacionais de inteligência emocional para indivíduos com transtorno do espectro do autismo

Iryna Omelchenko
National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine
iraomel210781@ukr.net

Vadym Kobylchenko
National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine
vadimvk@ukr.net

Alla Dushka
National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine
a0509999100@gmail.com

Hanna Suprun
Borys Grinchenko Kyiv Metropolitan University, Kyiv, Ukraine
h.suprun@kubg.edu.ua

Iryna Moiseienko
Municipal Institution of Higher Education "Dnipro Academy of Continuing Education", Dnipro, Ukraine
irina.moyseenko@gmail.com

ABSTRACT

The relevance of the study stems from the urgent need for a modern understanding and effective work with people with autism spectrum disorder (ASD). Autism significantly affects the social skills, emotional development, and perception of the world of this special group. In the modern clinical context, the use of emotional intelligence (EI) is becoming a priority for optimal work with this audience. The study aims to develop and test an application for the development of emotional intelligence in people with ASD. The study takes into account an individualised approach, adapting tasks to different levels of cognitive development. Parents and relatives of children with ASD can use the app as a tool for additional development of emotional skills at home. Technological developers can find innovative approaches to creating solutions for people with ASD in the app. The findings of the study may be of interest to psychologists, educators, and organisations that provide psychosocial and educational support to this group. The study's main limitations include the limited number of participants and the lack of long-term follow-up. The findings can serve as a basis for further research and the development of new approaches to working with this special group. In the future, it is important to investigate how different forms of EI-based therapies can affect specific aspects of emotional development in children and adults with ASD. The possibility of integrating EI into existing

therapeutic approaches and programmes is also an area for further research aimed at developing more comprehensive clinical intervention strategies.

Keywords: Educational applications, Modern psychotherapy, Emocional inteligencie, Autism.

<div align="center">**RESUMO**</div>

A relevância do estudo decorre da necessidade urgente de uma compreensão moderna e de um trabalho eficaz com pessoas com perturbações do espetro do autismo (PEA). O autismo afecta significativamente as competências sociais, o desenvolvimento emocional e a perceção do mundo deste grupo especial. No contexto clínico moderno, a utilização da inteligência emocional (IE) está a tornar-se uma prioridade para um trabalho optimizado com este público. O estudo tem como objetivo desenvolver e testar uma aplicação para o desenvolvimento da inteligência emocional em pessoas com PEA. Os pais e familiares de crianças com PEA podem utilizar a aplicação como uma ferramenta para o desenvolvimento adicional de competências emocionais em casa. Os criadores de tecnologia podem encontrar na aplicação abordagens inovadoras para a criação de soluções para pessoas com PEA. Os resultados do estudo podem ser de interesse para psicólogos, educadores e organizações que prestam apoio psicossocial e educativo a este grupo. As principais limitações do estudo incluem o número limitado de participantes e a falta de acompanhamento a longo prazo. Os resultados podem servir de base para mais investigação e para o desenvolvimento de novas abordagens de trabalho com este grupo especial. No futuro, é importante investigar como diferentes formas terapias baseadas na IE podem afetar aspectos específicos do desenvolvimento emocional em crianças e adultos com PEA. A possibilidade de integrar a IE nas abordagens e programas terapêuticos existentes é também uma área de investigação futura com o objetivo de desenvolver estratégias de intervenção clínica mais abrangentes e eficazes.

Palavras-chave: Aplicações pedagógicas, Psicoterapia moderna, Inteligencia Emocional, Autismo.

Introduction

For specialists in the field of clinical psychology, an extremely relevant and important task is the modern understanding and effective work with people with autism. Autism, as a developmental disorder, affects social skills, emotional development, and perception of the world. Accordingly, the primary task for clinical work with this group of patients is the use of emotional intelligence (EI) (Drigas, Sideraki, 2021).

For the purpose of this article, the terms autistic, autistic spectrum disorder, and autistic spectrum disorder are used as similar terms, but they have their own differences in terminology and usage. In a general sense, all of these terms refer to individuals who have an autism spectrum disorder (ASD), but their use may vary depending on the context and individual preferences.

The term 'autistic' can be used to refer to people with ASD in a more informal context, where the focus is on their identity and shared experience of autism. On the other hand, the term "individuals with autism spectrum disorder" or "individuals with autism spectrum disorder" is used to put more emphasis on the medical aspects of the diagnosis and the specifications of the autism spectrum Howes (2023, p. 7252).

The research question is that many existing methods of working with people with autism spectrum disorders do not take into account the emotional feelings and perceptions of these people. Nevertheless, AI can be an important component in communicating with the audience, helping them to better understand their needs and feelings.

The use of emotional intelligence (EI) in clinical trials with people with autism spectrum disorder (ASD) opens up practical opportunities that contribute to improving the quality and effectiveness of therapeutic interactions. First of all, EI can help therapists and psychologists to understand and adapt the emotional characteristics of patients with ASD. In practice, the development of EI helps people with ASD to improve communication, in particular by taking into account their emotional perception. Awareness of the patient's emotional state can help in interaction and create a favourable and reliable social context for treatment (Skura, & Świderska, 2022, 412).

Individualisation of EI-based therapy is an important component. Therapy can be adapted to the characteristics of each ASD patient through strategies that take into account emotional needs and abilities. This includes the use of various techniques such as educational games, emotional exercises, art therapy, and other creative approaches.

The use of intelligent technologies in clinical work with individuals with autism spectrum disorders may evolve in the future, including the introduction of virtual reality and other modern technologies to create interactive and tailored treatment programmes for each patient. Expanding the understanding and use of AI in clinical settings will increase the effectiveness and inclusiveness of treatment for this unique group of patients Skura and Świderska (2022, p. 410).

The purpose of the article is to study the role of emotional intelligence in clinical work with people with autism spectrum disorder (ASD).

The task of gender:

1. Evaluation of the effectiveness of an application for the development of emotional intelligence in people with autism spectrum disorder (ASD), which takes into account an individualised approach and adapts to different levels of cognitive development.

2. Identify and understand how emotional intelligence can be an effective tool to improve the quality of therapeutic interventions and promote social inclusion of this group of people.

The focus is to provide new opportunities for improving the quality of psychological care for people with autism spectrum disorders and will also contribute to the development of more adaptive and inclusive methods of clinical practice. Understanding and applying EI in working with this group of patients can help solve various problems related to social isolation and difficulties in interacting with the outside world, which is important in the current healthcare environment.

Theoretical framework and literature review

The terminology associated with autism is quite diverse. PDD-NOS, autism, and Asperger's syndrome are often combined into the concept of "autism spectrum disorders" or "autistic disorders" Myers and Johnson (2007, pp. 1162-1182) and autism itself is also called autism syndrome (early childhood autism syndrome, childhood autism syndrome, or infantile autism), or simply childhood autism (Miloradova, 2023, 52). In clinical practice, the words "autism", "autism spectrum disorders" and PDD are used synonymously Caronna, Milunsky, and Tager-Flusberg (2008, p. 520).

The first mention of autism spectrum disorder appeared in the 1980s in the American Psychiatric Association (1987, pp. 50-55).

This was the third version of the manual, and for the first time in psychiatry, a structured description of the diagnostic category of ASD appeared. This led to an

unusual increase in research activity, with descriptions emerging from different perspectives: psychological, psychoeducational, and medical. This is a vast field of research involving specialists from a wide variety of fields. There are more and more publications about autism and several specialised journals (Skura, & Świderska, 2022; Huggins, Donnan, Cameron, and Williams (2021, pp. 307-321).

The term "emotional intelligence" is quite new to science. The concept of emotional intelligence was introduced into scientific usage by Salovey and Mayer (1990, pp. 185-211), according to whom emotional intelligence is a group of mental abilities that contribute to the awareness and understanding of one's own emotions and the emotions of others. They developed the concept of emotional intelligence, which includes the ability to recognise one's own emotions, manage emotions, understand other people, and self-motivation.

The ideas of Salovey and Mayer (1990, pp. 185-211) became the basis for the development of the Goleman model (1995), in which emotional intelligence is interpreted as a combination of cognitive abilities and personal characteristics and is also considered an important component of leadership skills Goleman (1995, pp. 100-102).

Goleman assigns the leading role in the structure of emotional intelligence to the intellectual component, and the main characteristics of emotional intelligence include the following:

1) self-awareness of the individual (emotional self-awareness, self-esteem, confidence in one's own abilities and capabilities);

2) self-control (the ability to control emotions, to be open, adaptable, and optimistic);

3) social sensitivity (the ability to support each other and pay attention to others);

4) relationship management (ability to help, teamwork).

The definition of "emotion" in the broadest sense is defined as a general state of the body and mind, expressed in a subjective feeling that is either pleasant or unpleasant, but never neutral; accompanied by expressive behaviour or posture and physiological changes. Science recognises several classifications of basic or core

emotions. This paper uses six classic human emotions according to Ekman (1992, p. 172) joy (or happiness), surprise, fear, disgust, anger (or anger), and sadness (or sadness). All of these names, according to the scientist, are rather conventional. The brain is used to describing everything, defining and naming everything. This is very important for each of us because it is thanks to the brain's descriptions that we are able to understand each other.

Another unexplored area is the relationship between emotional intelligence and social skills in the context of autism. Some aspects of social interaction may be particularly difficult for people with autism, and exploring how emotional intelligence can improve their social skills may be key to developing inclusive approaches. A major challenge is the lack of modern and reliable tools and techniques for measuring emotional intelligence in people with autism, which makes it difficult to conduct research and develop effective interventions.

Research design and methods

The article uses the method of documentary research, which is a widely recognised and important tool in the field of psychology and pedagogy. To achieve the research goal, the author analysed scientific papers and medical documents related to the research topic. This method made it possible to collect and systematise a significant amount of information necessary for solving research problems. The documentary analysis was used as a basis for formulating reasonable conclusions and developing analytical studies in the article.

The Diagnostic and Statistical Manual of Mental Disorders is a key document in the field of psychiatry and clinical psychology, widely used to classify and diagnose various mental disorders. The text cited above indicates that the documentary research method was used to analyse scientific papers and medical documents related to autism spectrum disorders. The DSM was one of the main sources of information for organising the data and understanding the characteristics of autism spectrum disorders in the study. Thus, the DSM serves as a documentary

basis for analysing and justifying the terms, concepts, and classifications used in understanding the autism spectrum in scientific research.

Previous studies and international medical regulatory frameworks were reviewed to consider different approaches, methods, and outcomes related to the chosen topic. (1) This approach allowed for the investigation of the characteristics of individuals with ASD. (2) This task involves assessing the potential benefits and considerations for implementing psychological interventions for individuals with ASD.

Results

Autism spectrum disorders are characterised by a huge range of symptoms and manifestations. Among the main ones are the following:

1. Lack of interest or ability to contact other people, lack of eye contact;

2. Craving for stereotypical or repetitive behaviour;

3. Absence or delay of speech;

4. Problems with orientation in time and space;

5. Acute sensitivity to sounds, visual images, tastes, smells, and touches Kaminskyy and Viesova (2020, pp. 17-26).

These disorders begin in childhood and follow a person throughout life. Individuals with autism spectrum disorders have at least minor interactive, behavioural, and communication difficulties, but the severity of such problems varies widely. In addition, the diagnosis of ASD in most cases implies an underdeveloped EI. It is very important to be able to recognise both your own and other people's emotions for full socialisation and successful communication. People with ASD have significant difficulties with these processes. It is important to note that the study highlights an individual approach to the diagnosis and treatment of autism spectrum disorders (ASD). This is determined by the variety of symptoms, which can include high and low-functioning autism. The diagnosis of ASD is usually made based on observations and assessments by relevant professionals, taking into account variations in symptoms. However, it should be emphasised that an

individualised approach is key to making an accurate diagnosis and providing effective treatment, as symptoms can be varied and similar to other disorders Raza (2022, pp. 45-56).

Emotions are usually associated with nervous and humoral processes and are externally expressed through movements known as expressive movements. These movements are the most important aspect of emotions and represent their outward form. Emotional expressions are universal sets of expressive signs that are similar for all people and reflect certain emotional states Baig (2023, p. 17).

The ways in which emotions are expressed can be observed through various means, such as gestures, facial expressions, pantomime, emotional components of speech, and vegetative changes. It is worth noting that the human face is particularly adept at conveying a wide range of emotions Dobrovolska et al. (2021, p. 58).

Developing the emotional intelligence of children with ASD is a rather lengthy process, the implementation of which requires the use of various methods, techniques, and tools to get things moving. Traditional methods of stimulating and correcting emotional intelligence include various educational games and exercises. For example, intonationally coloured reading of books, fairy tales, conversation by the story, by a fairy tale, by pictures, as well as explanation and explanation of their emotional connotations Trevisan et al. (2021). One of the most popular areas in the development of emotional intelligence is animal therapy, art therapy, etc. Ways to develop emotional intelligence in children can be divided into the following categories:

1. Role-playing game or play therapy (role-playing helps to understand the other person, take into account their situation, mood, wishes).

2. Labour activity, in particular sports exercises (achievement of a positive result, joy for the work done, a sense of satisfaction from work). This also includes psycho-gymnastics - one of the non-verbal methods that involves the expression of emotional state, emotional problems through movement, facial expressions, gestures (sketches, mimicry, pantomime).

3. Works of fiction or fairy tale therapy (comparing oneself with a positive hero, active empathy with him/her; negative assessment of the behaviour and

actions of a negative hero). There are directive and non-directive approaches to fairy tale therapy. In directive therapy, the therapist manages the therapeutic process: sets topics, observes the child's behaviour, and interprets it. In non-directive fairy tale therapy, the role of the therapist is reduced: the main function is to create an atmosphere of emotional acceptance of the child and conditions for the spontaneous expression of feelings.

4. Creative activity or art therapy. The main types of art therapy are art therapy itself (drawing therapy and therapy based on the visual arts), drama therapy, music therapy, dance therapy, bibliotherapy, and film therapy. The main goal of art therapy is to harmonise the individual through the development of his or her abilities of self-expression and self-knowledge Cumin, Pelaez, and Mottron (2022, p. 1155).

Art, as a symbolic activity, stimulates the creative (artistic) capabilities of a person, so art therapy is based on art and creative productive forms of activity. The symbolic language of art makes it possible to overcome the effect of defence mechanisms, identify problems and analyse them. Of particular interest among the proposed approaches to the development of psycho-correctional programmes is the use of computer technology to address the problem of emotional intelligence.

According to researchers, the use of computer programs in working with people with disabilities, such as people with ASD, is due to the fact that this category of people prefers a computerised environment that involves minimal contact with other people. In addition, in the process of using computer games, people with special needs have the opportunity to work at their own pace, and the repetition of game exercises allows them to consolidate the skills they have developed Rakhimov and Mukhamediev (2022, pp. 12-23).

The development of applications usually takes into account the fact that people with ASD, in most cases, may suffer from a delay in the development and formation of reading skills. The process of forming and developing EI with the help of an information and educational environment in assistive technology is presented through the following stages: explanation of the definitions of emotions to improve the correlation of an abstract concept with reality, numerous exercises to recognise

other people's emotions (visually - in photographs and pictures; and by context), learning to recognise and express one's own emotions (these can be puzzles or emotion constructors based on combining facial features, as well as an emotion tracker or diary Drigas and Sideraki (2021, p. 80)

The work in the app is organised in three steps (Table 1).

Table 1 – Organisation of work in the application

The stage of work	Description
First	Obtaining information about basic emotions (theoretical block). The child receives information about the visual display of emotions on the face, situations in which this emotion can be felt, and related feelings. The mode of voicing messages for children without reading skills is used.
Second	Recognising other people's emotions from pictures or photos. It includes three stages: 1) Choose a photo that matches the name of the emotion. 2) Matching the photo with the title and a schematic image. 3) Matching the name of the emotion with the schematic image.
Third	Teaching children to recognise and express their own emotions using puzzles or emotion builders. The child receives the name of the emotion and assembles it from individual pieces. The result is discussed with the parents.

Source: Created by the authors based on Sam et al. (2020, p. 1940).

Thus, the function of parents in this app is to assess the correctness of the task and the possibility of moving on to the next task. It is important to emphasise that a significant advantage of the app is keeping a diary or emotion tracker. The inherent possibility of forming a reflective position of a child with ASD is an absolute novelty of the projected supportive technology Salomone, Bulgarelli, Thommen, Rossini, and Molina (2019, p. 388).

In the app, this is presented through various options (taking into account the level of cognitive development of the student). For example, the simplest option is

for a person to select from the proposed schematic images of emotions those that describe their current mood or those that they feel after working with the app. In addition, the app allows you to indicate the reason for this mood, the type of activity that caused this emotion - for example, a walk, sports, etc. This action strengthens the awareness of the cause and effect of emotions.

Discussion

The study reveals a large number of symptoms in autism spectrum disorders, indicating the need to improve approaches to working with this group of people. As noted by Sukhostavets (2022, p. 7), it is important to take into account their individual characteristics and possible lag in the development of information perception skills. In contrast, Wulandari, Apsari, and Hapsari (2023, p. 23) note that the adaptation process should not be based on differentiation in terms of perception of the environment.

It is worth emphasising that there is a wide range of strategies for developing and adapting emotional intelligence in patients with autism spectrum disorders (ASD). It is useful to talk about different approaches, but it is important to understand that each method has its advantages and disadvantages, and the method should be chosen according to the needs of each patient. Introducing an emotion diary for people with ASD and recognising the role of rehabilitation facilities is an important step. It is also important to emphasise that all patients with ASD should have access to these resources and programmes. For emotional intelligence tools to be effective with this group of patients, it is important to ensure widespread access.

The development of apps for the development of emotional intelligence is an effective method of working with ASD, going through three stages: a theoretical block with an explanation of emotions, exercises to recognise other people's emotions, and learning to recognise and express one's own. According to Charlton, Smith, Mazefsky, and White (2019, pp. 2588-2590) the practical tasks performed in the app contribute not only to the development of emotional understanding skills but also to reflection, which is a novelty in approaches to working with ASD. Instead,

Drigas and Sideraki (2021, p. 80), Papoutsi, Drigas, and Skianis (2021, pp. 35-53) note that a significant positive effect is achieved only during interpersonal interaction. Employees of rehabilitation facilities are assigned an active role in determining the correctness of tasks, and the introduction of an emotional diary makes it possible to form a reflective position in people with ASD. As noted in the studies by Hassan, Pinkwart, and Shafi 2021), and Miloradova (2023, p. 50), the use of digital tools for the formation of EI also takes into account the possibility of developing environmental perception skills for people with disabilities. The research highlights the effectiveness of digital tools in developing emotional intelligence, but it is important to keep in mind that not all patients with ASD may be equally ready to use these technologies. Individual capabilities and limitations should be taken into account when implementing digital tools. The papers emphasise that the study expands the understanding of the relationship between emotional intelligence and ASD, but it should be noted that this is only one aspect of comprehensive work with this group of patients. It is important to take into account other aspects, such as social skills training and communication, which also affect the quality of life of people with ASD.

The theoretical implications of the study open up new horizons in understanding the relationship between emotional intelligence and clinical work with people with autism. In particular, the study of individual reactions to emotions and their reflection on the face contributed to the expansion of the theoretical apparatus for understanding the peculiarities of emotional perception in this group of people. An important theoretical contribution is the development and refinement of methods for recognising emotions using images and practical steps that facilitate the automation of this process. This approach allows us to consider emotion recognition not only as part of clinical work but also as a key component of emotional development in patients with autism.

In practical terms, the results of the study can be used to develop and improve pedagogical programmes and therapeutic approaches for people with autism. In particular, the emotion recognition techniques developed in the study can be used in clinical practice to improve perception and adaptation to the social

environment. The practical implications of the study also consider the possibility of using the developed pedagogical tools in cooperation with parents and relatives of children with autism. This can contribute not only to clinical progress but also to strengthening the partnership between professionals and families, which is an important aspect of a comprehensive approach to working with people with ASD.

Ongoing research could also look at modifying and creating apps to help people with ASD better access digital resources, particularly apps that focus on emotional intelligence. Research could include examining how differences in functioning affect interactions with digital technologies and how well they work to develop social and emotional skills.

It is also important to think about new ways of teaching that take into account the characteristics of each patient. Ongoing research can identify the best methods and approaches to using digital tools to develop emotional intelligence in patients with autism spectrum disorders.

The study, while having significant results, is limited by certain methodological aspects. Firstly, it is important to note that the developed app and its effectiveness were tested on a limited number of participants, which may affect the overall representativeness of the results. It focuses on individuals with ASD, and thus may not fully account for individual variations in emotional intelligence in this group. Also, given the wide range of peculiarities in the perception of information in children with autism, it may be necessary to further adapt the application for different levels of cognitive development. In addition, the study does not take into account the dynamics of the long-term impact of the app on the development of EI, and the lack of a control group may complicate the analysis of the app's effectiveness compared to other teaching methods.

Conclusion

In summary, the study examines the impact of emotional intelligence on the treatment of autism spectrum disorder (ASD). The results indicate its effectiveness in improving the recognition and expression of emotions. The study also points to

the importance of an individualised approach to the development of emotional intelligence, including taking into account different levels of cognitive development and possible delays in reading skills in children with ASD. It should be noted that the study has its limitations, including the limited number of participants and the lack of long-term follow-up. Additional research taking these factors into account may help to better understand the individual characteristics of children with ASD and optimise methods of their education and development. This work may be useful for psychologists, teachers, and other professionals working with children with autism spectrum disorders. They can use the developed application as a tool to improve the development of emotional intelligence in their patients or students. The results of the study may be useful for parents and relatives who are raising children with autism spectrum disorders. The app can serve as an additional resource for developing emotional skills at home.

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