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# FUTURE COMPUTER SCIENCE TEACHERS' TRAINING TO IMPLEMENT THE CONCEPT OF TRAUMA-INFORMED TEACHING IN A MODERN SCHOOL

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The article examines the concept of trauma-informed teaching and its integration into future Informatics teachers' training. It is determined that modern Ukrainian education faces challenges that have serious consequences for students with traumatic experiences. It affects students' emotional state and psycho-emotional well-being, which, in its turn, sets new tasks to support students in such conditions. The basic principles of trauma-informed learning are described: safety, trust, choice, cooperation, expansion of opportunities. These principles allow you to create a comfortable and supportive atmosphere that allows students to recover and overcome traumatic experiences. It is noted that the implementation of these principles in the educational process contributes to the formation of an empathy environment, which supports students in difficult emotional situations and allows them to feel safe.

Particular attention is paid to future Informatics teachers' training, who should not only have theoretical knowledge, but also practical skills of emotional stability, nonviolent communication and inclusive teaching. For this purpose it is important to include in educational programs activities that contribute to the development of self-regulation skills, reducing stress, creative self-expression and social interaction. In particular, students who study under educational programs of secondary education are offered exercises aimed at improving emotional climate and adaptation to learning conditions in the post-traumatic environment.

The introduction of trauma-informed learning principles helps to create a more adaptive and sensitive learning environment that reduces the stressful situation for students, giving them the opportunity to adapt better to new conditions. It is emphasized that the formation of readiness for the introduction of trauma-informed learning is a key task of modern pedagogical education aimed at creating a safe, supportive and inclusive environment for students, which in its turn helps them to adapt effectively to the challenges of the present.

**Key words:** trauma-informed teaching, safe educational environment, inclusive education, future computer science teachers.

# Тінькова Дар`я, Ткаченко Анна, Данилюк Сергій. Підготовка майбутніх учителів інформатики до реалізації концепції травма-інформованого навчання у сучасній школі

У статті досліджено концепцію травма-інформованого навчання та її інтеграцію в підготовку майбутніх учителів інформатики. Визначено, що сучасна українська освіта стикається з викликами, румовленими війною, яка має серйозні наслідки для учнів із травматичним досвідом. Це впливає на емоційний стан та психоемоційне благополуччя учнів, що, своєю чергою, ставить перед педагогами нові завдання щодо під-

тримки учнів у таких умовах. Описано основні принципи травма-інформованого навчання: безпека, довіра, вибір, співпраця, розширення можливостей. Ці принципи дають змогу створити комфортну та підтримувальну атмосферу, яка дає змогу учням відновлюватися та долати травматичні переживання. Зазначено, що реалізація цих принципів у навчальному процесі сприяє формуванню емпатійного середовища, яке підтримує учнів у складних емоційних ситуаціях і допомагає їм відчувати себе в безпеці.

Особливу увагу приділено підготовці майбутніх учителів інформатики, які повинні володіти не лише теоретичними знаннями, а й практичними навичками емоційної стійкості, ненасильницької комунікації та інклюзивного викладання. Для цього важливо включати до освітніх програм активності, що сприяють розвитку навичок саморегуляції, зниження стресу, творчого самовираження та соціальної взаємодії. Зокрема, для студентів, які навчаються за освітніми програмами середньої освіти, пропонуються вправи, спрямовані на покращення емоційного клімату та адаптацію до умов навчання в посттравматичному середовищі.

Впровадження принципів травма-інформованого навчання допомагає створити більш адаптивне та чутливе навчальне середовище, яке дає змогу зменшити стресову ситуацію для учнів, даючи їм можливість краще адаптуватися до нових умов. Підкреслено, що формування готовності до впровадження травма-інформованого навчання є ключовим завданням сучасної педагогічної освіти, спрямованої на створення безпечного, підтримувального й інклюзивного середовища для учнів, що, своєю чергою, допомагає їм ефективно адаптуватися до викликів сучасності.

**Ключові слова:** травма-інформоване навчання, безпечне освітнє середовище, інклюзивна освіта, майбутні вчителі інформатики.

Introduction. Modern Ukrainian education is experiencing significant challenges due to the ongoing Russian-Ukrainian war and its consequences for children and youth. Permanent stress, anxiety, traumatic experiences and uncertainty about the future are a part of many students' reality. In this context, a teacher's role takes on special importance, as he/she is a key figure in creating a safe and supportive educational environment. Computer science teachers, in particular, perform not only the function of transferring knowledge about modern technologies, but also become moderators and support in difficult psychological situations associated with the war and its side effects.

Analysis of the professional standard "Teacher of a General Secondary Education Institution" [8] showed that a modern teacher must have the knowledge and skills necessary to create a safe and supportive educational environment that takes into account students' psycho-emotional needs. One of the key requirements for a teacher is knowledge of students' individual characteristics and understanding the impact of these characteristics on the assimilation of educational material and socialization. A teacher must be able to identify signs of deterioration in students' psycho-emotional state and provide them with support, especially those who are experiencing stress or other difficulties. This requires a teacher not only to be observant, but also to be able to respond empathetically to situations that may negatively affect the teaching and students' emotional state. In addition, future teachers must know the types of feelings and emotions, understand their intensity and causes. It is important to learn to apply practices of concentration of attention, conscious emotional response and emotional stability. Such practices contribute to the development of students' emotional intelligence and help them to cope more effectively with stressful situations. To do this, future computer science teachers must master emotional support strategies and be able to integrate them into the educational process.

Implementing the principles of universal design in education is another important aspect of future teachers' training. This involves organizing the educational environment taking into account students' characteristics, needs, abilities and interests, including those with traumatic experiences. A teacher must know how to adapt educational materials and the environment to create inclusive conditions for all learners.

No less important are the skills of dialogue and polylogue, conscious and empathetic listening, non-violent and conflict-free communication. A teacher must be able to use these methods when discussing educational, social and life issues, preventing conflicts in the educational process. Such skills help to establish trusting relationships between a teacher and students, contributing to the creation of a supportive environment.

Thus, future computer science teachers' training should be aimed at developing in them the knowledge and skills necessary to support students in difficult situations, create an inclusive environment, and implement practices of emotional resilience and nonviolent communication.

Analysis of research and publications. Theoretical aspects of future Informatics teachers' professional training are widely covered in the scientific works of such researchers as T. Vakalyuk, M. Zhaldak, N. Morze, S. Semerikov and others. T. Vakalyuk pays special attention to future teachers' training to form students' logical thinking, focusing on the importance of developing analytical skills and ability to constructive thinking, which is a necessary element in teaching Informatics. Future Informatics teachers' mathematical training is explored by M. Zhaldak, focusing his attention on the basics of mathematical disciplines, which are the basis for Informatics effective teaching. N. Morze analyzes an Informatics teacher's methodological training, in particular the methods of integration of modern technologies into the educational process, as well as effective teaching strategies to ensure high quality of students' teaching. The issue of introduction of cloud technologies in future Informatics teachers' training is considered by S. Semerikov, emphasizing the importance of these technologies for the development of pedagogical practices and the availability of educational materials, which allows to create flexible and inclusive educational environment.

At the same time, trauma-informed teaching, which should gain more and more popularity in education, has become a topic of many scientists' deep research, among whom J. Karello, L. Butler, A. Hotch, T. Holovatenko, A. Dzhurylo and others can be distinguished. In their writings, J. Karello and L. Butler studies the impact of traumatic-informed practice on the general educational process, in particular on students' ability to learn and their psychological well-being. In his turn, A. Hotch's research is focused on how universities can adapt their support strategies for students who have experienced traumatic events. They focus on the importance of introducing injury-informed assistance in the context of students' health and well-being, as well as how such support can facilitate the process of adapting students who have experienced traumatic events to the educational process. T. Holovatenko analyzes in detail the foreign experience of implementing traumatic and informed practices in schools, in particular in foreign language lessons, emphasizing the meaning of such approaches to create a safe and supportive environment for students, which contributes to their emotional and psychological stability. A. Dzhurylo is considering the introduction of the concept of traumatic-informed learning in modern conditions, taking into account the challenges facing society during the war and post-war recovery. It explores the ways of creating a safe learning environment in conditions where students can be psychologically injured and how these methods can help to increase the efficiency of the educational process.

However, the issue of future Informatics teachers' training for the introduction of trauma-informed teaching in the educational process remains insufficiently disclosed, which led to the choice of the topic.

The purpose of the article is to explore the concept of trauma-informed teaching and its integration into future computer science teachers' training to create a safe and supportive educational environment.

**Materials and methods.** The study used general scientific methods of scientific research – analysis, synthesis, comparison, clarification, generalization of scientific literature, systematization and generalization of the information obtained.

**Results.** Millions of Ukrainians have witnessed or been directly affected by violence, destruction, and stressful situations that have led to psychological trauma. The war has caused traumatic experiences that have profound and long-lasting effects on people's physical, mental, and emotional well-being. Traumatic experiences during war can include experiences of fear, loss of loved ones, psychological stress due to the constant risk of violence and persecution, and experiences of alienation and isolation. According to American researchers [2], trauma is any experience in which a person's

internal resources are insufficient to cope with external stressors. Indicators that may indicate that students are experiencing a trigger or the effects of trauma include [2]:

- Emotional reactions: sudden and intense emotional reactions, such as crying, anger, or panic; students appear withdrawn or unusually quiet; signs of stress, such as shaking or hyperventilation are noticeable.
- Physical symptoms: complaints of headaches, stomachaches or other symptoms related to stress;
  restlessness or physical discomfort; changes in posture or body language that indicate tension or hyperactivity.
- Changes in engagement in learning: loss of interest in participating in learning activities; avoidance of eye contact or group interaction; turning off the camera during online lessons or abruptly leaving the classroom; inconsistent attendance of classes or suddenly leaving them.
- Avoidant behavior: skipping individual lessons or assignments, especially those dealing with sensitive topics; reluctance to participate in discussions or complete reflective tasks; avoidance of individual or group discussions.
- Cognitive and behavioral changes: difficulty with concentrating, "disengaging," or appearing distracted; difficulty following instructions or remembering details; unexplained irritability or defensiveness toward classmates or teachers; overreaction to minor remarks or constructive feedback.
- Interpersonal difficulties: unusual conflicts with classmates or teachers; unusual social isolation or withdrawal; distrust or suspicion to others in the classroom.
- Sudden decline in academic performance: a noticeable decline in academic performance; missing deadlines or incomplete assignments for no apparent reason; usage of vague or superficial answers in assignments or discussions.

Taking students' traumatic experiences into account is key to creating a safe and supportive teaching environment. Trauma-informed teaching helps to build an empathetic and safe educational environment that is responsive to the needs of students with traumatic experiences.

Trauma-informed teaching (TIT) was developed by M. Harris and P. Fallot [3] in 2001 to improve clinical practice and the effectiveness of service delivery. Being "traumatized" in this context means understanding how violence, victimization, and other traumatic events can impact the lives of people involved in various processes. It is important to consider these factors when designing systems and providing services to support traumatized individuals. The main goal of this approach is to create environments that are responsive to traumatized individuals' specific needs and support them in their journey to healing and recovery. This requires that services are sensitive to traumatic experiences and that they are supportive of the recovery process. This requires a careful approach to the design of services and environments that support the healing and recovery of those who have been traumatized. In the context of education, a trauma-informed approach is particularly important, as many students may have experienced a variety of stressful situations, trauma, or violence that can impact their ability to learn and socialize, especially in wartime settings. It is therefore important to create classroom environments that support and assist such students.

P. Fallot and M. Harris identify five principles of trauma-informed teaching [1]: the principle of safety, the principle of trust, the principle of choice, the principle of cooperation, and the principle of empowerment.

The principle of safety is implemented by arranging classroom seating so that students have personal space and can see each other clearly, as well as having easy access to aisles and good lighting. Each lesson begins with a clear plan that allows students to understand what is expected of them. Consistent routines are used at the beginning and at the end of a lesson, such as checking homework and reflecting on what students have learned during the lesson. Students are also warned in advance about sensitive or potentially triggering topics so that they can prepare. If a student does not want to participate in certain discussions or tasks, he/she is given the opportunity to do so. It is

important that counseling services or helplines are clearly visible and accessible in the classroom so that students know where to go for help if needed.

The principle of trust is ensured through clear and transparent assessment, which allows students to know exactly how their assignments are being assessed. Changes in the schedule or expectations should be communicated to students in advance so that they can prepare. Constructive and timely feedback on completed assignments is provided regularly so that students know what they are doing well and where they need to improve. It is important to be honest and open about your own difficulties when appropriate, as this helps to create an atmosphere of trust. It is also important to keep promises made to students, which confirms their confidence in you as a teacher.

The principle of choice is implemented by giving students several options for completing assignments, for example, they can choose between written papers, presentations or creative projects. This allows students to choose the format that suits them best. In addition, students are allowed to choose topics for assignments within the given topic, which allows them to connect the work to their interests. If a student does not want to speak in front of the whole class, he/she can contribute in writing or participate in small group discussions. It is also important to allow students to work both independently and in groups on projects, which helps to develop their team skills. Where possible, students can choose a convenient deadline for completing assignments, which gives them more control over their own learning.

The principle of cooperation is implemented by involving students in creating classroom norms and rules at the beginning of the year so that they feel responsible for maintaining order and mutual respect. Group tasks should be such that students can teach and support each other, developing cooperation skills. It is important to allow groups to decide for themselves how to distribute responsibilities so that they can develop organizational and leadership skills. Feedback from students on how the lessons are going is regularly collected, which allows for adjustments to teaching methods and the quality of learning to be improved. This can be done using questionnaires or anonymous suggestion boxes so that students have the opportunity to share their thoughts on what is working well and what can be improved.

The principle of empowerment is implemented by focusing on students' strengths and achievements before addressing areas for improvement. This increases their self-confidence and motivates them to achieve further. It is important to celebrate even students' small achievements so that they feel progress and become more independent. It is also important to conduct activities that help students to develop skills outside the classroom, such as stress management or time management, that will help them in life. Creating mentoring opportunities where senior students can help younger ones helps to develop leadership and communication skills. Relating the subject to real-life situations and students' long-term goals helps them to better understand the significance of what they are learning and see how it can be useful in the future.

T. Holovatenko considers "trauma-informed teaching" as an approach aimed at creating an educational process and environment in an educational institution based on respect for participants' previous traumatic experience in this process. The main principles of such learning, according to the author, are [6]: creating a safe environment, trusting business relationships, mutual support, cooperation and mutual respect, participants' empowerment in the educational process, as well as social justice.

The principle of a safe environment is implemented by ensuring conditions for the physical and psychological safety of participants at all levels. This includes creating a space where everyone can feel protected, in particular by increasing attention to participants' emotional state and preventing any forms of violence or discrimination.

Trust and openness in relationships are achieved through transparent decision-making processes at all levels, which contributes to the formation of trusting interactions among participants in the

educational process. Openness to discussions is important, where everyone has the opportunity to express their thoughts, ideas and experiences.

Mutual support is the foundation of a safe environment. It gives participants hope, facilitates the exchange of experiences and supports each other in the path of recovery from trauma. This allows for an atmosphere of interaction in which everyone can find support and help.

The core value is collaboration, where each participant's role is not dependent on their status or position. Everyone has an important role in a trauma-informed approach, and mutual support and collaboration are key to success. This emphasizes the importance of a collective approach, where each participant has an equal opportunity to influence the process.

Participants' empowerment in the educational process is achieved by focusing on each person's strengths, their capacity for recovery, and supporting initiative. This allows individuals and communities to overcome trauma through active choice and the opportunity to participate in processes that directly affect their lives.

Social justice is about promoting the overcoming of stereotypes and prejudices that may exist at the cultural, historical, and gender levels. It is important to maintain equality and respect for different cultural and social groups, including their histories and experiences, which allows for equal opportunities for each participant in the educational process.

For students studying in the educational program Secondary Education (Informatics) of the specialty 014.09 Secondary Education (Informatics) and in the educational program Secondary Education (Physics and Informatics) of the specialty 014.08 Secondary Education (Physics and Astronomy), it is especially important to learn how to implement the concept and principles of trauma-informed teaching into the educational process. Therefore, while mastering the mandatory components "Inclusive Education", "Informatics Teaching Methods" of the relevant educational programs, students are offered the following activities to perform:

Activity 1. Develop self-regulation, mindfulness, and stress reduction skills through creative exercises aimed at creating a safe and supportive environment for students, especially in stressful situations.

### **Instructions:**

- 1. Explanation of the exercise: In this exercise, we will draw lines, but our goal is not to create a picture or image. We will draw lines that do not have to represent anything specific. It is important that each student has the opportunity to express themselves through this process without being judged or compared.
  - 2. Rules of the exercise:
  - o The first rule: The lines should not cross or touch each other.
- o The second rule: Keep drawing lines until I tell you to stop. You can draw quickly or slowly, the main thing is not to stop unnecessarily.
  - o The third rule: Draw silently, without talking. This will help you stay calm and focused.
  - 3. Preparation:
  - o On one side of a piece of paper, draw several lines that do not cross or touch each other.
  - o On the other side, draw several lines that touch or cross each other.
- o Explain to students that these drawings are examples of what their work might look like, but that they should not copy your drawing and can draw the lines however they want, as long as they follow the rules.
- 4. Students draw for 3-5 minutes (or longer if they are interested). If possible, you can turn on quiet music without words to create an atmosphere for concentration and calmness.
  - 5. After completion, conduct a reflection with students.

This activity aims to promote the development of emotional resilience, helping students to maintain inner peace and to maintain a positive attitude towards teaching, which is an important aspect when working with students who may be experiencing stress or trauma.

Activity 2. Using trauma-focused principles such as choice, collaboration, and empowerment, develop a strategy to support students' self-esteem and empowerment, focusing on the specifics of computer science.

Step 1: Identify the need. Think about what challenges students may face in computer science classes in terms of self-esteem and empowerment (for example, fear of failure, lack of motivation to learn, or difficulty expressing themselves when completing technical tasks). Analyze these challenges in the context of computer science and determine which of them are relevant to students.

Step 2: Develop a strategy. Once you have identified the main challenges, develop a strategy to help students to overcome these challenges. Consider the following questions: How can you help students to see their strengths, especially in the context of digital skills? What types of tasks can help them to understand their achievements? How can you give students more choice and opportunities for self-expression within computer science lessons? For example, this could be choosing projects, exploring new topics independently, or choosing ways to complete tasks. How can creative elements (such as programming, creating digital projects, or graphic design) help students to express themselves?

Step 3: Create a strategy plan. Plan how you will implement your chosen strategy. To do this, write down:

*Who:* Which students or groups will benefit from this strategy? This could be individual students or the entire class.

What: What exactly will your activities involve? This could be a series of lessons, projects, or individual assignments.

When: When and how often will your strategy be implemented? How often will you provide opportunities for students to demonstrate their strengths?

*How:* What resources or training are needed to implement the strategy? This could be project materials, time for individual work, or training from you as a prospective teacher.

The task aims to help to develop a strategy that not only supports students' self-esteem, but also develops their capabilities within computer science, using creative approaches and inclusive teaching methods.

Conclusions. Future computer science teachers' training to implement the concept of trauma-informed teaching is an extremely important aspect of modern teacher education. Given the challenges associated with the consequences of war for students, in particular their traumatic experiences, this approach contributes to the creation of a safe, supportive and inclusive educational environment that takes into account the individual needs of each student. The implementation of the trauma-informed approach is based on five key principles: safety, trust, choice, cooperation and empowerment. The implementation of these principles in the educational process not only improves the quality of the educational environment, but also contributes to the development of students' emotional resilience and psychological comfort. Future computer science teachers need to master the skills of emotional resilience, non-violent communication, creating trusting relationships with students, and also to integrate the principles of inclusive education into their pedagogical practice. Activities focused on developing self-regulation, creative thinking, and stress management skills help future computer science teachers to realize the importance of empathizing with students. Integrating the principles of trauma-informed learning into future computer science teachers' professional training is an important step towards ensuring a psychologically comfortable environment in a modern school, even in difficult social conditions.

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