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Education in the Era of Generative Artificial Intelligence: A Transactional Analysis Perspective

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Abstract

Education in the digital age is evolving toward the use of new technologies such as generative artificial intelligence, which increasingly incorporates psychological aspects of learning. Currently, it can offer personalized and effective educational environments that provide tailored feedback. However, it may disrupt cognitive processes and relationships, as well as generate and disseminate misinformation or perpetuate biases. Transactional Analysis (TA), developed by Eric Berne, is based on a model of human communication that allows for the identification and modification of behavioral patterns in interpersonal relationships. The combination of these two fields creates potential for more effective support of educational processes. This article analyzes the impact of ChatGPT on educational processes through the lens of *Transactional Analysis* (TA), with particular emphasis on the dynamics of *Ego States* and *transactions* in teacher-student relationships. Therefore, it is important to examine various aspects of AI use, especially in the context of its impact on relationships.

Keywords: Digital education, GenAI in education, Personalized learning, Transactional analysis

Transactional Analysis as a Theoretical Framework

Transactional Analysis (TA) (Berne, 1964; Petrovsky, 2025) offers unique tools for examining educational interactions in the context of GenAI. Key concepts relevant to this analysis include:

- *Ego States* – behavioral systems (Child, Parent, Adult) activated in interactions;
- *Transactions* – exchanges of messages between participants' Ego States;
- *Psychological Games* – repetitive transaction sequences with hidden motives.

In the context of education utilizing GenAI, maintaining a balance between ego states and the authenticity of transactions becomes particularly significant.

The aim of this article is to present selected issues concerning the impact of GenAI on educational processes through the lens of *Transactional Analysis* (TA) from the perspective of responses provided by the currently most popular system, ChatGPT.

The ChatGPT model used in this study is a natural language processing (NLP) system based on the GPT architecture (*Generative Pre-trained Transformer*), originally developed for tasks such as machine translation and summarization. Unlike traditional artificial intelligence (AI), ChatGPT is a generative artificial intelligence (GenAI). It is designed to generate new content or ideas in real-time in a *text-to-text* format. ChatGPT generates and presents entirely new content during real-time conversations with users while maintaining a dialogue style that closely mimics human interaction (Xu, Dainoff, Ge, & Gao, 2023).

Evolution and Capabilities of Generative Artificial Intelligence

Between 2012 and 2024, GenAI and *large language models* (LLMs, *Large Language Models*) underwent tremendous development (Zhang et al., 2024), marking another milestone in the evolution of artificial intelligence. These models revolutionized human-AI interaction (Xu et al., 2023).

Models like GPT (*Generative Pre-trained Transformer*), especially versions GPT-3 and GPT-4, have found broad applications in education—for tasks such as automated text translation, creating educational materials, and generating test questions (Küchemann et al., 2024) (see Figure 1).

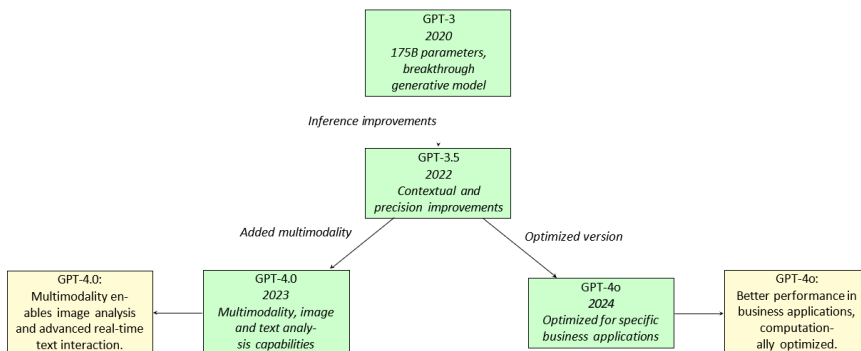


Figure 1

Evolution of AI from GPT-3 (2020)

Source: own materials

Educational chatbots based on these models are becoming increasingly popular in education, particularly in teaching mathematics, foreign languages, and developing critical thinking skills. The efficiency of personalized learning has significantly improved through the implementation of *virtual tutoring* services, enabling interactive work with the system (Hall Jr, 2021; Osmanovic-Thunström, 2022; Qadir et al., 2020), which is crucial for distance learning systems.

The effectiveness of this iterative process reaches two standard deviations (2σ) — the two-sigma effect (Bloom, 1984; Hall Jr, 2021; Leyzberg, Spaulding, & Scassellati, 2014). This improvement stems from immediate feedback, progress at a individually tailored pace, and appropriately adjusted difficulty levels, all of which enhance comprehension and skill acquisition. *Virtual tutors* can thus serve as teacher substitutes (Qadir, 2020). However, it is worth noting that the main obstacles in learning are lack of engagement and the absence of perceived social interaction in the learning process (Qadir, 2015; Qadir & Imran, 2018). ChatGPT plays a key role in mitigating these barriers, though it cannot fully replace the individualized support provided by teachers (E. R. Mollick & Mollick, 2023).

In the latest phase of AI development (since 2023), *multimodality* (Lee et al., 2023) has been introduced, enabling the processing of both text and images. This allows for the creation of more complex educational workflows, spanning content generation to outcome analysis. However, it requires mastering the skill of crafting text-based queries (*prompts*). Prompt construction is challenging enough that a new field — *prompt engineering* — has emerged (Marvin, Hellen, Jjingo, & Nakatumba-Nabende, 2023). Online databases of prompts and their corresponding outputs have appeared (Korzynski, Mazurek, Krzyrkowska, & Kurasinski, 2023), and prompts are now copyrighted, leading to platforms for buying/selling them (e.g., <https://promptbase.com/>).

Thanks to *multimodality* (Lee et al., 2023), AI has become more interactive and capable of adapting to individual student needs (*personalized learning environments*). AI can analyze student work and provide tailored feedback to develop practical skills (bin Mohamed, Hidayat, binti Suhaizi, bin Mahmud, binti Baharuddin, et al., 2022).

In educational contexts, ChatGPT can generate content and solve tasks for students, teachers, and parents alike. It also enables users to receive feedback on their work (Osmanovic-Thunström, 2022; Qadir et al., 2020). However, its use has sparked controversy (Waltzer, Pilegard, & Heyman, 2024) over ethical concerns (Cotton, Cotton, & Shipway, 2024). Studies also suggest that ChatGPT may curb creativity in writing (Niloy, Akter, Sultana, Sultana, & Rahman, 2024). Various aspects of AI's long-term impact on metacognition and learning — including within the framework of the revised Bloom's taxonomy (Anderson et al., 2001) — are discussed in (Johnpaul, Miryala, Jayaprakashnarayana, & Miryala, 2025).

Notably, Poland has developed the *Transactional Analysis Cognitive Toolkit* (Trans-ACT). This toolkit enables the integration of TA principles into multi-agent systems (MAS) (Zamojska, Chudziak, et al., 2025), generating agents with realistic psychological dynamics. Trans-ACT embeds the Parent, Adult, and Child ego states into an agent’s cognitive architecture. Each ego state retrieves context-specific memories to shape responses to new situations, with final outputs aligned with the agent’s core life script. This research opens new possibilities for applications in conflict resolution, educational support, and advanced social psychology studies.

Table 1
Summary of seven approaches to using AI in education

AI Role	Function	Pedagogical Benefits	Pedagogical Risks
MENTOR	Providing feed back	Feedback improves learning out-comes, even when not fully utilized.	Lack of critical assessment of feedback, which may contain errors.
TUTOR	Direct instruction	Personalized direct instruction is highly effective.	Uneven knowledge level of AI and significant risk of confabulation.
COACH	Supporting metacognition	Reflection and self-regulation opportunities enhance learning out-comes.	Coaching style/tone may not suit the learner. Risk of erroneous advice.
TEAMMATE	Enhancing teamwork	Providing alternative perspectives, supporting collaborative work.	Confabulations and errors. Personality conflicts with other team members.
STUDENT	Receiving explanations	Teaching others is a highly effective learning technique.	Confabulations and flawed arguments may disrupt learning effects.
SIMULATOR	Deliberate practice	Practicing and applying knowledge supports skill transfer.	Inadequate simulation fidelity.
TOOL	Task execution	Increases task efficiency by reducing time.	Replaces thinking with task completion.

Source: own research.

Roles of Artificial Intelligence in Education

Currently, AI can be positioned in seven fundamental roles (E. Mollick & Mollick, 2023), each associated with both benefits and risks — see Table 1.

From a didactic process perspective, practically every role contributes to improved learning outcomes. This approach covers all critical aspects of the educational process that have historically been challenging to implement: personal-

ized learning, rapid feedback, development of reflection and self-regulation skills, teamwork, the highly effective “teaching others” technique, opportunities for practical knowledge application, and efficiency-boosting tools.

Research indicates that maintaining a balance between AI-assisted work (20-30%) and independent work (70-80%) is crucial (J. Wang & Fan, 2025). Studies show that when AI serves in a supporting role, results are comparable to traditional learning (S. Wang et al., 2024). However, unrestricted use of standard generative models reduced subsequent performance by approximately 17% (S. Wang et al., 2024). AI support is best applied during initial idea generation, simulation, or test practice phases. The core elements of the process — analysis, critique, correction, and learning — should remain the student’s responsibility. Table 2 presents recommended AI involvement levels for different learning stages.

Table 2
Recommended AI involvement for different learning stages

Stage	Percentage of AI use	Independent work
Planning	20%	80%
Idea/solution generation	30%	70%
Analysis, critique, correction	10% – AI verification	90%
Knowledge repetition and testing	30% – AI flashcards	70% – repetition

Source: own research.

Recommended ways to use AI within the discussed roles are as follows:

- *AI tutor/AI coach/AI mentor* — students ask questions and request guidance rather than using ready-made solutions (E. Mollick & Mollick, 2023);
- *AI simulator* — e.g., conversations, case studies in foreign languages, programming;
- *AI tool* — generating short questions, quizzes, flashcards to support learning techniques like *spaced repetition* (Baillifard, Gabella, Lavenex, & Martarelli, 2023; Plaskura, 2024).

It’s worth noting that a positive aspect of AI implementation is the reduction of exam-related stress (Elsayed, Kholikov, Abdullayeva, Al-Farouni, & Wodajo, 2024).

Impact of AI Roles on Ego States

The use of AI generates certain risks (J. Wang & Fan, 2025) related to an uncritical approach to received feedback, issues concerning the risk of AI delivering information of varying quality and reasoning methods, as well as providing false information or problems with simulation fidelity. This may lead to conflicts with other team members due to likely being equipped with slightly different knowledge of var-

ying credibility levels, as well as cognitive challenges related to the use of tools supporting the educational process, the functioning of which may not be entirely clear.

Each role is characterized by distinct features:

- *Parent (P)* – norms, evaluations, prohibitions, care or criticism
- *Adult (A)* – rational analysis, logical decisions
- *Child (C)* – emotions, spontaneity, creativity, fears, rebellion

Clearly, different roles influence *ego states* (Tankelevitch et al., 2024) – see Table 3. The psychopedagogical interpretation is as follows:

- When students use AI consciously and critically for analysis, testing, and verification, they strengthen their *Adult* (AI as Adult function).
- If AI imposes solutions or moralizes (e.g., feedback without reflection), it may activate the internal *Critical Parent* (AI as pseudo-Parent).
- In roles like TEAMMATE or COACH – AI can stimulate the *creative and curious Child*, fostering emotional engagement (AI as Child stimulus).

Key conclusions regarding AI roles’ impact on *ego states*:

- Varied AI roles can support development of all *ego states* when used consciously and reflectively.
- Greatest pedagogical benefits come from coaching and simulation modes, strengthening the *Adult* and *healthy Child*.
- The main risk is over-reliance on AI as *Parent* – potentially leading to submissiveness, lack of autonomy, and avoidance of independence.

Table 3
Impact of AI roles on student’s ego states in Student-AI interaction

AI Role	Dominant effect on <i>ego state</i>	Impact description (on student’s <i>ego state</i>)
MENTOR	Nurturing Parent/Adult	Provides guidance and feedback – may activate the internal Parent (<i>I should improve this</i>) or Adult if feedback is critically analyzed.
TUTOR	Adapted Child/Critical Parent	Unreflective acceptance of instructions may activate the Adapted Child; excessive correction – the internal Critical Parent.
COACH	Adult/Child	Encourages reflection and self-regulation – strengthens the Adult. Warm AI style may also stimulate the creative Child.
TEAMMATE	Child/Adult	Collaboration stimulates creativity and initiative (Free Child), but also analysis and dialogue (Adult).

Table 3
Impact of AI roles on student's ego states... (cont.)

AI Role	Dominant effect on <i>ego state</i>	Impact description (on student's <i>ego state</i>)
STUDENT	Parent/Adult	AI as student strengthens the Adult (material control) and normative Parent (student becomes expert).
SIMULATOR	Adult	Requires repetition, analysis and knowledge application - clearly activates the Adult state.
TOOL	Adult/risk for Child	Supports efficiency (Adult) but may suppress process enjoyment (Free Child) if used too mechanically.

Source: own research.

The Impact of AI on Ego State Dynamics in Education

The development of AI has significantly influenced the dynamics of *ego states* in the educational process. Traditional teaching models often activated the **Parent ego state** in teachers and the **Child ego state** in students. Modern tools like ChatGPT can:

- Strengthen the *Adult ego state* by democratizing access to knowledge
- Simultaneously reinforce the *Adult* (rational analysis) and provoke *Child* reactions (e.g., AI dependency)
- Disrupt traditional *transactions* by introducing GenAI as a *third participant*
- Create risks of *psychological games* around *work authenticity*, where GenAI overuse could become part of *educational games* (e.g.,)

ChatGPT on Education from a Transactional Perspective

This section presents responses from ChatGPT (<https://chatgpt.com/>) to *prompts* by the author. We used ChatGPT version 4 during June-July 2025. Responses are published unedited. Notably, ChatGPT-generated text demonstrates high structural, grammatical, and semantic accuracy. The following fragment was omitted in all queries:

Assume the role of a researcher specializing in transactional analysis and provide/review relevant literature references.

ChatGPT's Impact on Teacher-Student Transaction Dynamics

Prompt: How does ChatGPT affect teacher-student transactions from a TA perspective?

ChatGPT: ChatGPT may:

- Strengthen *Adult-Adult* transactions through objective information
- Disrupt transactions by provoking *Parent* (control) or *Child* (compliance) reactions
- Create new communication patterns through triangulation (*Teacher-AI-Student*)

My responses can:

- Enhance *Adult-Adult* transactions with factual information
- Trigger *Parent* in teachers (authenticity verification)
- Activate *Child* in students (seeking ready solutions)

Using AI to Support Learning Within Transactional Analysis Framework

Prompt: How can students use AI to support learning without disrupting *Parent* and *Teacher* ego state relationships?

ChatGPT: In the digital era, artificial intelligence (AI) can become a valuable educational tool when maintaining proper TA relationships. The key is balancing *ego states*: **Adult**, **Parent**, and **Child**. Student strategies include:

1. Strengthening the Adult State

Critical Verification:

- Prompts: *What sources confirm this information?*
- Exercise: Comparing AI responses with textbook knowledge

Study Planning:

- Using AI for scheduling (*Adult-Adult transaction*)
- Example: *AI, help me plan my study review sessions according to the forgetting curve.*

2. Avoiding Overdependence (*Child-Parent*)

Self-awareness:

- Monitoring requests: *Am I asking for help or complete solutions?*
- Technique: Recording own ideas before AI consultation

Responsible Use:

- 30/70 rule – 30% AI inspiration, 70% independent work
- Example: Using AI only for result verification, not generation

3. Maintaining Healthy Teacher Relationships

Clear Communication:

- Disclosing: *I'm using AI for [specific purpose], is this appropriate?*
- Avoiding hidden AI collaboration

Collaboration Over Replacement:

- Example: *Teacher, AI suggests this interpretation – what do you think?*

Practical AI applications by ego state are shown in Table 4.

Table 4
Safe AI Applications by Ego State

Area	AI Application	Ego State
Review	Flashcard generation	Adult
Problem-solving	Step-by-step hints	Adult
Paper writing	Style correction	Adult
Language learning	Conversations	Adult-Adult

Source: own research.

Risks and countermeasures include:

Infantilization risk (*AI will do it for me*) – Solution: Set time limits for AI use

Teacher authority erosion – Solution: Treat AI as *study group peer* not authority In summary, AI concluded that:

- AI works best as an *intelligent encyclopedia*, not human relationship substitute
- Awareness of *ego states* in tech interactions is crucial
- Teachers should be partners in implementing AI in education

The Impact of Asking Good Questions on Relationships

Prompt: In the age of AI, can asking good questions disrupt *Adult ego state* and *Child-Parent* relationships?

ChatGPT: The development of artificial intelligence (AI) can influence relationship dynamics from a transactional analysis (TA) perspective, particularly regarding **communication, authority, and learning processes**.

Adult ego state and AI Relationship

- Risks
 - Dependence on AI (e.g., ChatGPT) as an *omniscient Parent* may weaken the **Adult state** – rational, critical thinking.
 - *Example:* When students/teachers uncritically accept AI responses as *absolute truths*, they abandon their own analysis (disengaging the Adult state).
 - Dehumanization of relationships: AI may replace human dialogue, limiting natural *Adult- Adult* transactions.
- Benefits
 - AI can be a **tool supporting the Adult state**, for example by:
 - Providing data for independent verification (e.g., *Let's check what research says about this*).
 - Training question-asking skills (e.g., *Is this source reliable?*).

Child-Parent Relationship and AI

— **Risks**

- Teachers/parents may use AI as a *digital Parent* that:
 - Issues commands (e.g., algorithms scheduling a child's day).
 - Punishes/rewards (e.g., automated grading systems).
- Students may fall into *Child role* (*AI knows better, I don't need to think*).

— **Benefits**

- AI as *supportive Parent* can:
 - Provide positive feedback (e.g., educational apps with gamification).
 - Assist with emotional regulation (e.g., therapeutic chatbots for children).

IMPACT OF QUESTIONS ON TRANSACTIONS

The key is **awareness of the ego state** behind questions:

— **Adult questions:**

What are the arguments for and against this theory? → Strengthens critical thinking.

— **Child questions:**

Tell me what to think! → Reinforces dependence.

— **Parent questions:**

Are you sure you're right? (controlling) → May provoke rebellion (*Child role response*).

RECOMMENDATIONS

- For teachers/parents:
 - Teach **critical dialogue with AI** (e.g., *Why does AI think this? How can we verify it?*).
 - Model *Adult-Adult* transactions (*AI is a tool, not an authority*).
- For students:
 - Practice **metacognition** (e.g., *Is this question driven by curiosity or laziness?*).
- For AI developers:
 - Design interfaces that **don't infantilize** users (e.g., avoid messages like *Good boy for asking!*).

The Use of AI in Early Childhood Education from a Transactional Analysis Perspective

Prompt: Create a 5x3 grid table describing the impact of ChatGPT on early childhood education (grades 1-3) from a transactional analysis perspective. Show use cases in rows AND provide brief text in two columns (teachers and children). The table should include short explanatory text.

The response included a table created in L^AT_EX format – see Table 5.

Table 5

Impact of ChatGPT on early childhood education (grades 1-3) from a transactional analysis perspective

ChatGPT Use Case	Impact on Child (Ego State)	Impact on Teacher (Ego State)
Answering student questions in a friendly advisor style	Activation of Curious Child and Adult – enhances reflection and exploration.	Activation of Curious Child and Adult – enhances reflection and exploration.
Generating stories based on student's words	Strengthening Free Child and creativity - develops self-expression.	Strengthening Free Child and creativity - develops self-expression.
Using ChatGPT for math quizzes	Adapted Child or Learning Adult – depending on usage method.	Analytical Adult – teacher monitors difficulty and task appropriateness.
Asking AI to complete stories	Natural Child + Adult – creative combination of structures and emotions.	Nurturing Parent – provides feedback, corrects mistakes.
Overusing ChatGPT instead of asking teacher questions	Reduced teacher contact, risk of activating Adapted Child.	Critical Parent or Concerned Adult – threat to interpersonal relationship.

Source: own research.

Discussion of Results

ChatGPT accurately addresses the application of AI in education from a transactional analysis perspective. It correctly identifies individual ego states and their interrelationships, properly outlines associated risks, and proposes mitigation strategies from the standpoint of potential disruptions to these states. The system recognizes the challenge of maintaining appropriate proportions in AI utilization within the learning process.

ChatGPT appropriately specifies methods for employing its capabilities and their dual impact on both students and educators. It accurately describes anticipated changes in relational dynamics resulting from acquiring effective prompt formulation skills, particularly regarding communication patterns, authority structures, and learning processes – noting these may lead to relational disturbances.

The information provided by ChatGPT is substantiated by existing research. The current version reliably references scholarly literature, with most citations correctly aligned to the discussed topics. This section presents only selected queries and responses, which may serve as:

1. A foundation for further in-depth studies
2. A basis for implementing appropriate interventions at present

Recommendations and Interventions

Based on the literature and presented research, we can outline recommendations for using GenAI within a transactional analysis framework:

- Maintain balanced AI usage supporting learning: 20–30% AI-assisted work versus 70–80% independent work (J. Wang & Fan, 2025).
- Both teachers and parents should guide students in AI usage, fostering awareness, critical thinking, and information credibility assessment (Holstein & Aleven, 2022).
- AI should be used for analysis, comparison, and testing to develop the *Adult* ego state, not for copying ready-made solutions (Khosravi et al., 2022).
- Avoid evaluative or moralizing AI unless students are prepared to receive such feedback with detachment (Berne, 1964) – preventing activation of the Critical Parent.
- AI tools are valuable for experimentation, creative writing, and simulations (Graesser, Chipman, Haynes, & Olney, 2005), strengthening the Creative Child.
- Overdependence on AI may limit student autonomy (Khosravi et al., 2022). Excessive AI as *Parent* can reduce motivation and foster over-compliance (Berne, 1964). Using AI for ready solutions lowers reflection and higher-order thinking (J. Wang & Fan, 2025).

Excessive AI reliance risks *metacognitive laziness* – losing independent critical thinking (Fan et al., 2025). The recommended solution is developing students' conscious approach to AI as a learning partner rather than an *infallible authority* (Holstein & Aleven, 2022).

Based on this, we can formulate intervention proposals using TA:

1. Teacher training in recognizing *ego states* in AI contexts;
2. Developing prompt formulation skills as *Adult ego state* exercise;
3. Designing tasks minimizing *psychological games* risk;
4. Creating exercises strengthening student autonomy (*Adult ego state*).

Conclusions

GenAI itself **does not disrupt** relationships in TA – it is **people** who assign it roles (e.g., as a *digital Parent*). The key lies in **conscious management of ego states** when interacting with technology and maintaining *Parent* and *Teacher* re-

relationships as primary, while AI should serve as a supportive assistant in the overall process.

Educational *transactions* require redefinition in the GenAI era, necessitating new methods for detecting *psychological games*. A fresh approach to *educational games* is needed, along with maintaining balance between participants' *ego states*. GenAI significantly impacts the dynamics of educational *transactions*, making monitoring of *ego states* essential.

Teachers require training in TA within the context of new technologies, particularly for designing educational transactions that account for AI's role. Emphasis should be placed on exercises that strengthen autonomy (*Adult ego state*). Unlimited use of AI degrades the learning process, while excessive dependence creates risks of losing independent critical thinking, which disrupts *ego states*. The use of AI should be limited to approximately 20-30% of total learning time, with the remaining 70-80% reserved for student-directed cognitive engagement.

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Edukacja w dobie generatywnej sztucznej inteligencji: perspektywa analizy transakcyjnej

Streszczenie

Edukacja w erze cyfrowej ewoluuje w kierunku wykorzystania nowych technologii takich jak generatywna sztuczna inteligencja, która w coraz większym stopniu uwzględnia psychologiczne aspekty uczenia się. Obecnie może ona oferować spersonalizowane i skuteczne środowisko edukacyjne, które dostarcza spersonalizowanych informacji zwrotnych. Może jednak zaburzać procesy poznawcze i relacje oraz generować i rozpowszechniać dezinformację czy utrzymywać uprzedzenia. Analiza transakcyjna, opracowana przez Erica Berne’a, opiera się na modelu komunikacji międzyludzkiej, który pozwala na identyfikację i modyfikację wzorców zachowań w relacjach interpersonalnych. Połączenie obu tych dziedzin tworzy potencjał do bardziej efektywnego wspierania procesów edukacyjnych. W artykule analizowany jest wpływ ChatGPT na procesy edukacyjne przez pryzmat *analizy transakcyjnej* (AT), ze szczególnym uwzględnieniem dynamiki *stanów Ja* oraz *transakcji* w relacjach nauczyciel–uczeń. Dlatego też ważne jest pokazanie różnych aspektów wykorzystania AI – szczególnie w kontekście wpływu na relacje.

Słowa kluczowe: edukacja cyfrowa, genAI w edukacji, spersonalizowane uczenie, analiza transakcyjna.