Uniwersytet Komisji Edukacji Narodowej w Krakowie

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From Research to School Practice

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From Techno-Anxiety to Technostress: Can AI-TPACK Play a Protective Role?



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Kuratorium Oświaty w Krakowie

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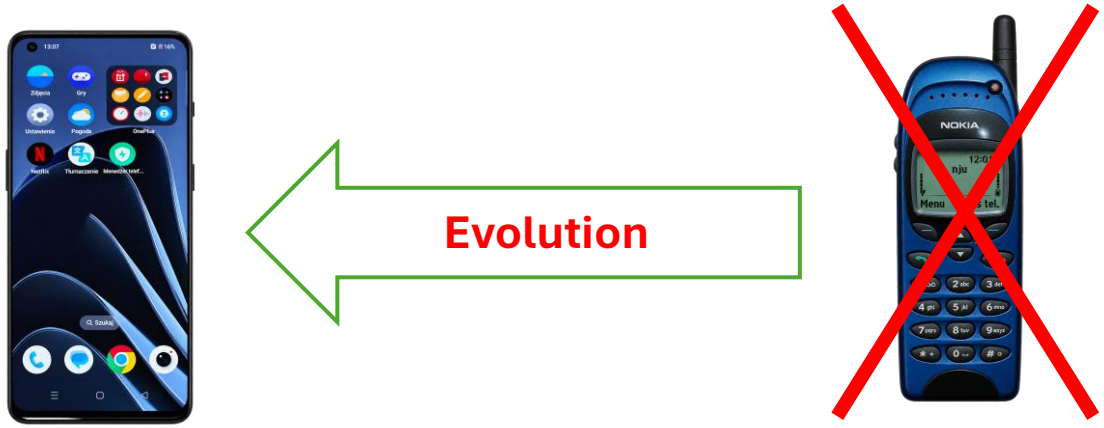
Małopolska

smart start ERASMUS+ Teacher Academy

Co-funded by the European Union

A Few Facts to Warm Up...

Approximately two-thirds of Poles use a mobile phone (KRRiT, 2025)



Today, phones are miniature personal computers providing access to the Internet, language models, etc.

Devices are replaced every two years.

Turn over! What about Africa?

A Few Facts to Warm Up…

In African countries (e.g., Ghana), there are as many as 130 mobile phones per 100 inhabitants (World Bank, 2025).



…but

only one-quarter of the population has access to sanitation facilities.

Turn over! What about Poland?

A Few Facts to Warm Up…

In Poland…approximately one million people lack access to a toilet or bathroom (Kaźmierczak, 2021).



Turn over! What about Poland?

…and what about AI development?

Not development, but an EXPLOSION

Benefits: AI solves (??) complex medical, mathematical, logistical and other problems that we have struggled with for decades.

Risks: AI becomes self-aware (??), escapes human control and harms people.

Turn over! Are these merely cinematic fantasies?

Dystopian Visions in Film

James Cameron’s Terminator (1984, 1991)



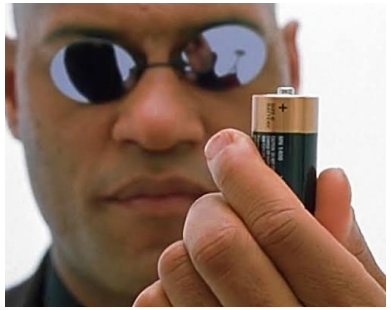


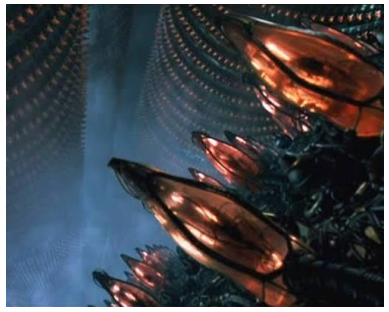


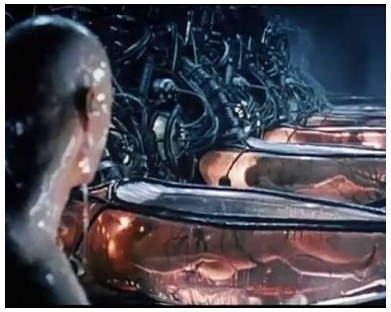

Turn over! The Matrix

Dystopian Visions in Film

The Matrix (1999), the Wachowskis











Turn over! Fear of technology

Techno-Anxiety: What Is It?



Technology anxiety has been systematically studied since the 1970s.

What is it?

…an unpleasant emotional state (fear, psychological distress, dysphoria), accompanied by somatic tension, caused by anticipating negative consequences of using ICT… therefore, ICT should be **AVOIDED**.

Turn over! Techno-anxiety among teachers

Techno-Anxiety among Teachers

What causes it?

Anticipating failure to use ICT tools effectively at school

Consequences:

↑ Techno-anxiety + ↓ willingness to use technology

Anxiety leads to ICT AVOIDANCE => limited digital competencies.

Turn over! What is technostress?

Technostress: What Is It?

Technostress has been systematically studied since the mid-1980s.

What is it?

(1) Negative strain arising from an individual's inability to cope effectively and functionally with ICT.

(2) A consequence of a mismatch between individual characteristics and the demands of the ICT environment.

Turn over! Consequences of technostress

Consequences of Technostress

- Effects of technostress on cognitive, emotional and social functioning (Kumar, 2024):
- physical fatigue and insomnia;
- subjective mental overload, frustration and scepticism;
- feelings of ineffectiveness and lower satisfaction with work and family life;
- reduced engagement in professional and family activities;
- lower productivity and poorer work–life balance.

Turn over! How can we cope with technostress?

A Task-Oriented Approach to Technostress

When do we adopt a task-oriented (functional) approach to technostress?

When we possess adequate personal resources (technological knowledge and skills).

TPACK and AI-TPACK – teachers' technological, pedagogical and content knowledge related to AI.

Turn over! The AI-TPACK model

The AI-TPACK Model

Models:
TPACK: Mishra and Koehler (2006)
AI-TPACK (Sun et al., 2023)

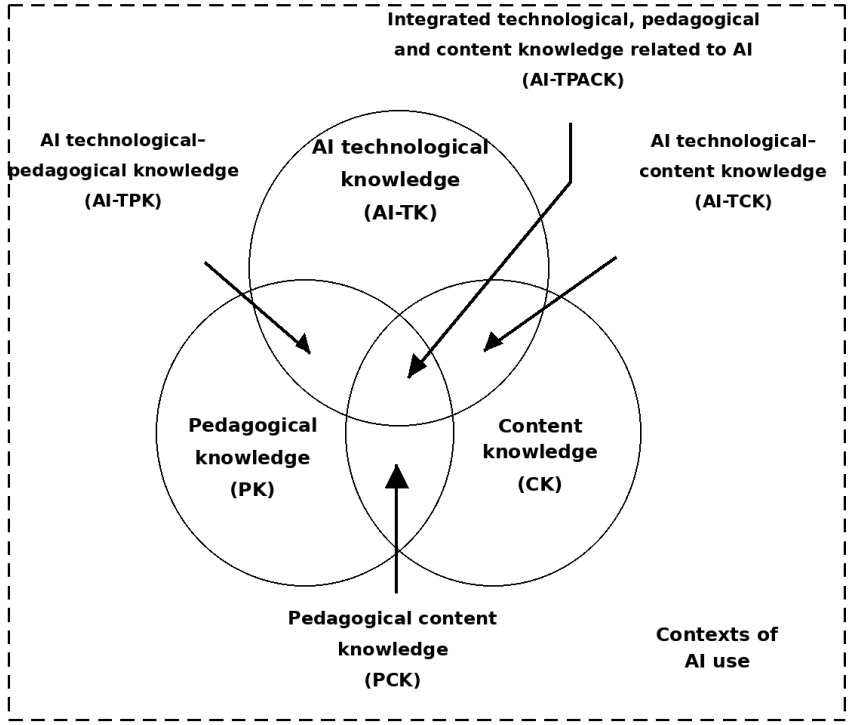


Figure 1. Structure of the AI-TPACK model (adapted from Ning et al., 2024)

Analysis of:
- intentions and willingness to use ICT
- effectiveness of technology use
- personal and contextual predictors of outcomes

Turn over! Embedding technological knowledge and skills in pedagogy

AI in Education – Benefits and Risks

From an AI-TPACK perspective_x000B_

Analysis of:

- benefits and risks of using AI in education:

- more effective learning vs.
- excessive dependence + cognitive laziness
- addiction + exposure to harmful content

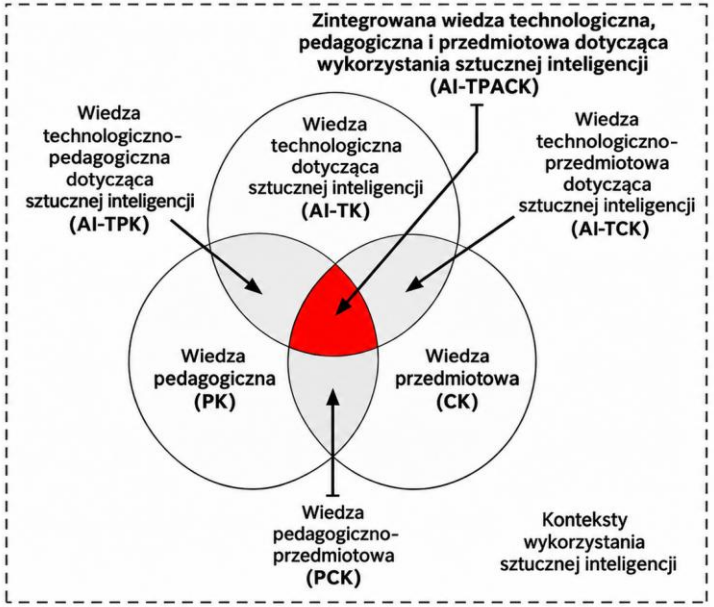


Turn over! AI-TPACK assumptions

AI-TPACK Assumptions

(1) Integrating teachers' AI-TK with CK and PK

(2) Developing integrated knowledge: AI-TPACK



Rycina 1. Struktura modelu AI-TPACK (na podstawie Ning i in., 2024)

What is it? Teachers' competence in

- selecting and using suitable AI tools (e.g., AI-based tutoring systems)
- to implement instructional strategies (e.g., monitoring learning)
- that support learning tasks (e.g., foreign-language grammar).

Turn over! Research assumptions

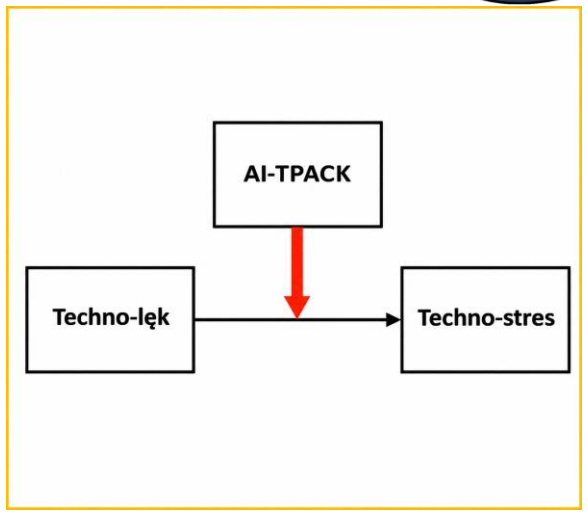
AI-TPACK as a Protective Factor



Research assumptions (Trusz & Demeshkant, 2026):

(1) Techno-anxiety is positively associated with technostress.

(2) AI-TPACK attenuates this association.



Competencies interact with anxiety to reduce stress.

Turn over! Who participated?

Participants and Procedure



Participants:

- in-service teachers (n = 55; mean age = 25 years) and
- pre-service teachers (n = 364; mean age = 35 years), primarily studying education (48%) and STEAM (43%).

Procedure: a cross-sectional questionnaire study using:

- 11-item Abbreviated Technology Anxiety Scale (ATAS; Wilson et al., 2023)
- 8-item Person–Environment Fit Scale of Technostress (P-EFST; Wang et al., 2020)
- 27-item AI-TPACK Scale (Celik, 2023).

Turn over! Sample questionnaire items

What Do the Measures Look Like?

Measure	Example items
ATAS	I feel uncomfortable using technology.
	Technology does not improve my quality of life.
P-EFST	I feel stressed about adapting to technology-enhanced learning.
	The wide variety of technology-enhanced learning tools irritates me.
AI-TPACK Scale	I teach lessons that combine subject content, AI tools and teaching strategies.
	I use AI-based tools to monitor students' learning progress.
Cronbach's alpha > 0.85 for all scales.	

Turn over! Results – correlations

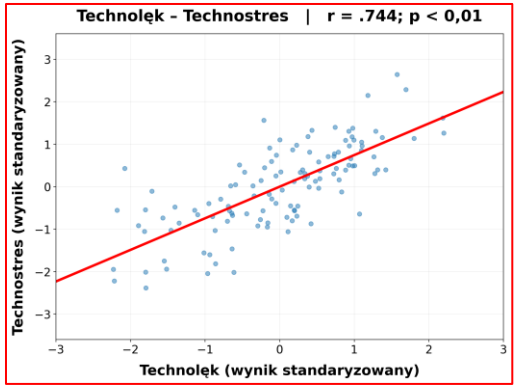
Results: Associations

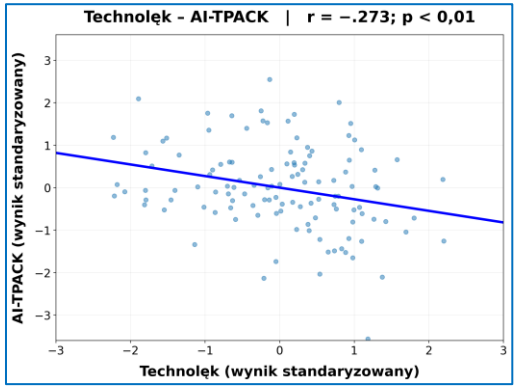
1. Association: Techno-anxiety – Technostress

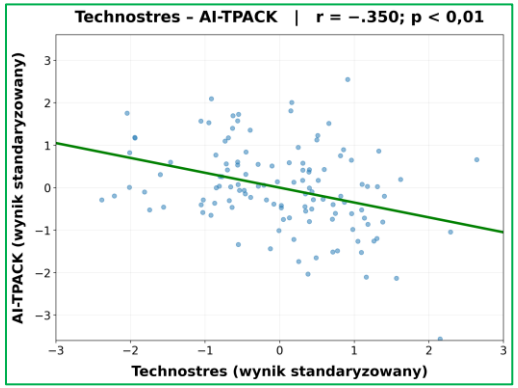
Positive, significant and strong: r = 0.744; p < 0.01

Techno-anxiety – AI-TPACK: r = −0.273; p < 0.01

Technostress – AI-TPACK: r = −0.350; p < 0.01



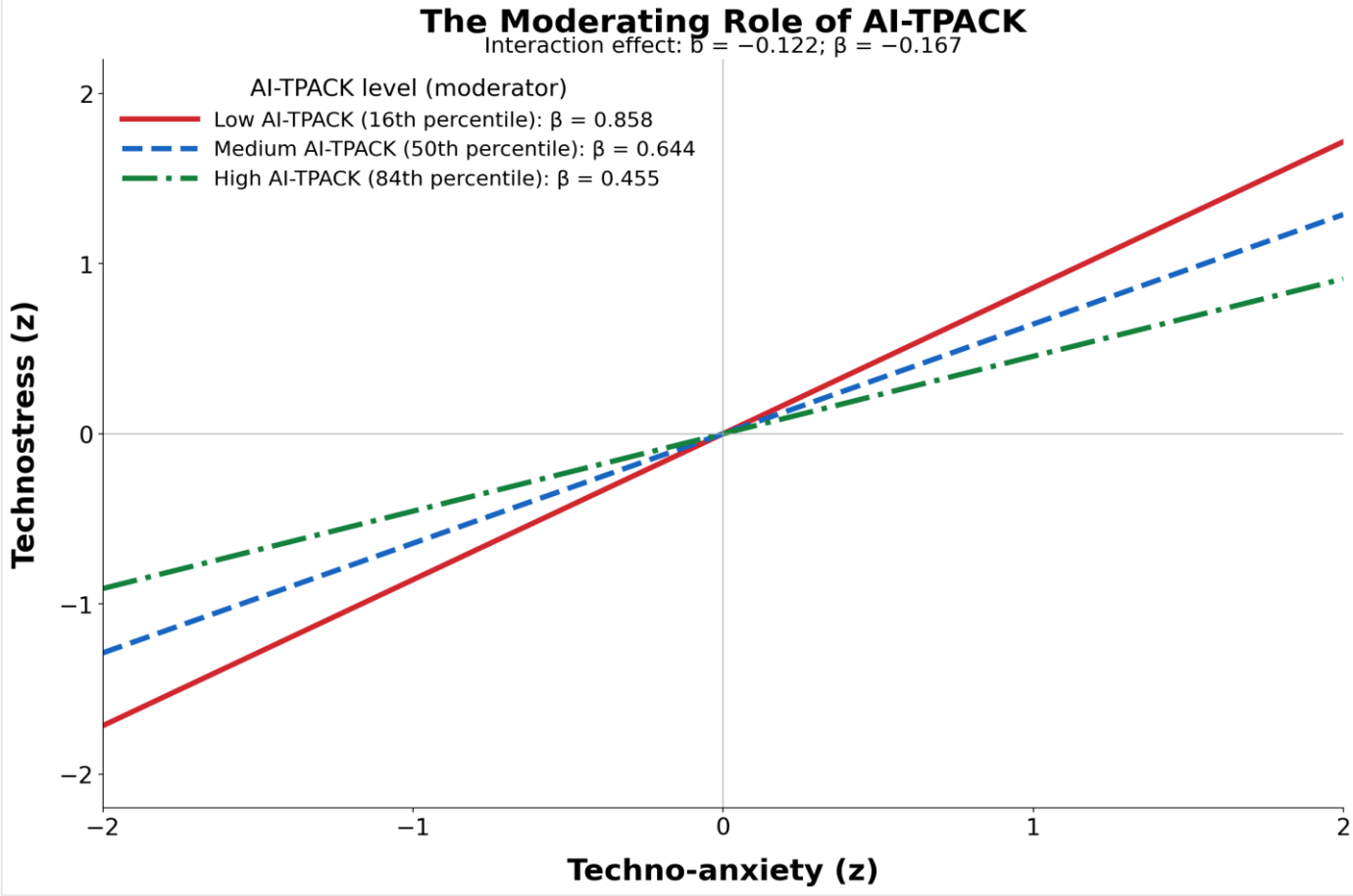




Turn over! Results – moderation

Results: Moderation

2. AI-TPACK as protective factor



Higher AI-TPACK **attenuates** the association between techno-anxiety and technostress.

Turn over! Conclusions

Conclusions

AI-TPACK as a personal resource that facilitates task-oriented stress-coping strategies (Lazarus & Folkman).

Therefore…

AI-TPACK is an important component of teachers' professional competencies and SALUTOGENESIS.

However…

Turn over!

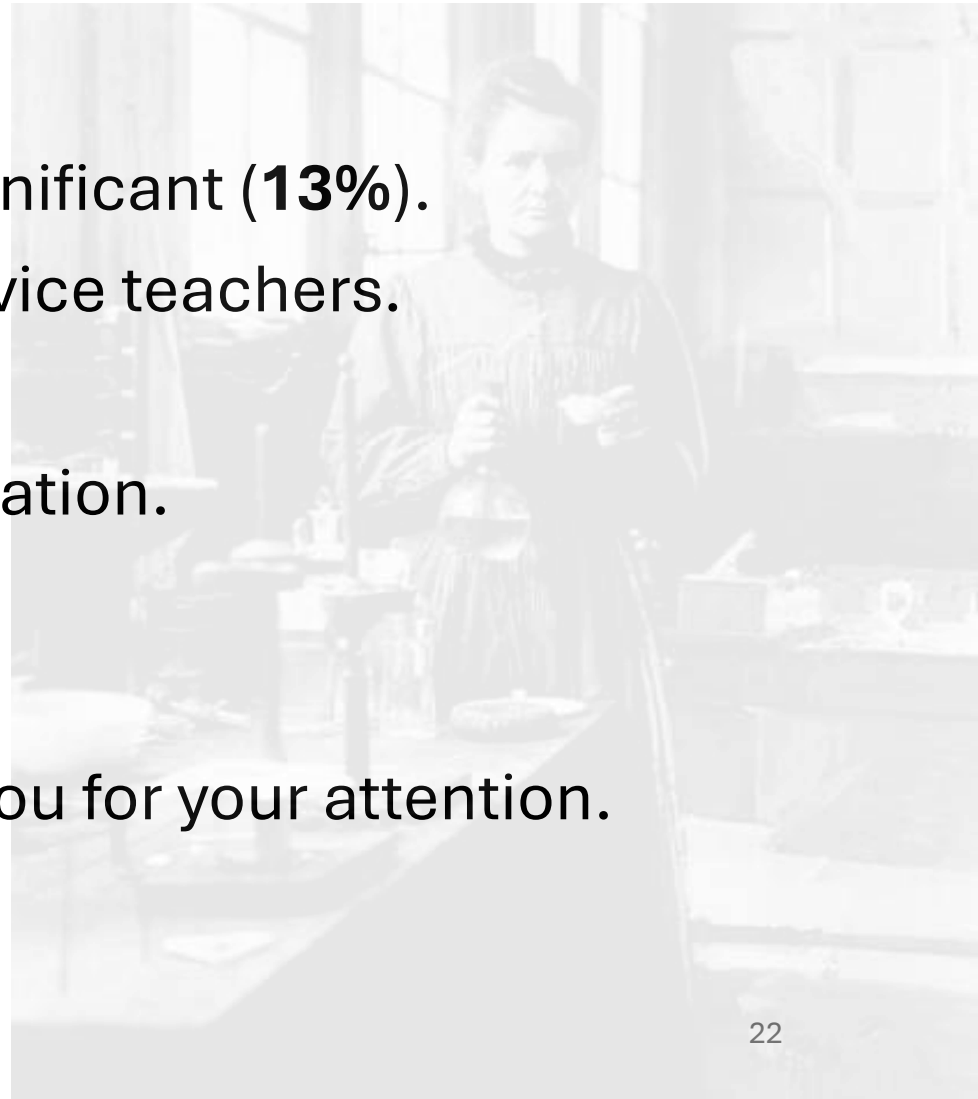
Conclusions

…however,

only 7 of the 54 interactions examined were significant (**13%**).

!!! All significant interactions concerned in-service teachers.

Intriguing findings that warrant further investigation.



Thank you for your attention.