

**The perception of Higher Education teachers regarding the use of AI-based tools to personalize learning: a pre/post training analysis in Romania**

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# 1. Introduction

- The aim of this study was *to analyse how the HE teachers' perception changes in using AI-based tools to personalize learning, through the training they received in this regard.*
- *Purposive sampling* was used to form the study group.
- *Questionnaire-based quantitative research* was implemented on the study group composed of **24 Romanian HE teachers** who, in April 2024, completed 16-hour training course providing hands-on opportunities to learn *how to personalise their instruction through open source/freeware AI-based and data visualisation tools* that do not require highly specialised computer skills, such as programming.
- *10-item questionnaire*, with multiple choice items on *5-point Likert scale* was administered pre/post-training. *Comparative analysis* was employed to analyse the data.
- The findings of this study are important for universities to understand the acquisition of skills and confidence of their faculty staffs in using the AI-based tools, as a resourceful way to *customize teaching and learning.*



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## 2. Theoretical background

***Personalized learning in HE is crucial*** as it tailors educational experiences to meet the diverse needs and preferences of individual students, thereby enhancing engagement and motivation.

By leveraging data analytics and AI-driven tools, ***educators can customize content, pace, and learning pathways***, which helps address different learning styles and paces (Kamalov et al., 2023). This approach ***improves student retention and success rates*** by providing targeted support and resources where needed [Galbally & Christodoulidi, 2023].

In today's rapidly evolving educational landscape, universities face the challenge of catering to a diverse student population with ***varied learning styles and preferences***. The traditional ***one-size-fits-all approach is increasingly insufficient***, making personalized learning essential to meet individual needs.

As educators strive to enhance student engagement and outcomes, the integration of AI offers promising avenues for customization (Akinwalere & Ivanov, 2022). However, realizing the full potential of AI in HE necessitates ***equipping teachers with the necessary skills and confidence*** to effectively utilize these innovative tools (Moura & Carvalho, 2024).

***Training the teachers on the use of AI tools*** and increasing their AI digital competencies is thus not only relevant but ***necessary in today's educational environments*** (Howard & Tondeur, 2023; Karam, 2023).

### 3. Results (1)



- All participants in the study were HE teaching staffs, 18 women, 6 men (2 university assistants, 12 university lecturers, 9 associate professors and 1 university professor).
  - Their teaching experience in HE ranges from minimum 3 years (for university assistants) to minimum 10 years (for the university professor).
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- The teaching domains of our participants include: foreign languages, Physics, Chemistry, Horticulture/Botany, Agronomy, Sacred Arts, Mathematics & Informatics, Ethnography and Folklore, Aesthetics, Economics, Finance-Banks, Psychology, Sociology, Physical Education & Sports, Philosophy, History.

### 3. Results (2)



- Six questions (items) have been deployed to assess *how confident* the HE teachers feel regarding the utilization of AI tools for personalized teaching and learning.

*The attitude* of the HE teachers related to the use of AI-based tools and learning analytics to achieve effective personalisation of the teaching-learning process was measured through four questions (items).

- The obtained answers were used to calculate the *mean* (M), *mode* (MD) and *mean of the difference* ( $M_{diff}$ ) of the pre/post training scores.





# 3. Results (3)

Participants' **confidence** regarding the AI-based tools to personalise learning

How confident do you feel about:					
Item	M <sub>pre</sub>	MD <sub>pre</sub>	M <sub>post</sub>	MD <sub>post</sub>	M <sub>diff</sub>
1. Using AI-based tools for personalised teaching	2.542	2 4	3.500	4	0.958
2. Selecting AI tools based on their benefits and challenges	2.375	2	3.375	4	1.000
3. Designing human-centred, customised learning activities using AI and data-based tools	2.333	2	3.292	4	0.958
4. Interpreting student data for informed decisions through data visualisation tools	2.292	2	3.375	4	1.083
5. Guiding students on self-regulating their learning by interpreting data visualisation tools	2.167	2	3.375	4	1.208
6. Recognise ethical considerations related to AI integration	2.375	1	3.625	4	1.250

Participants' **attitude** in relation to the use of AI and learning analytics to personalize learning

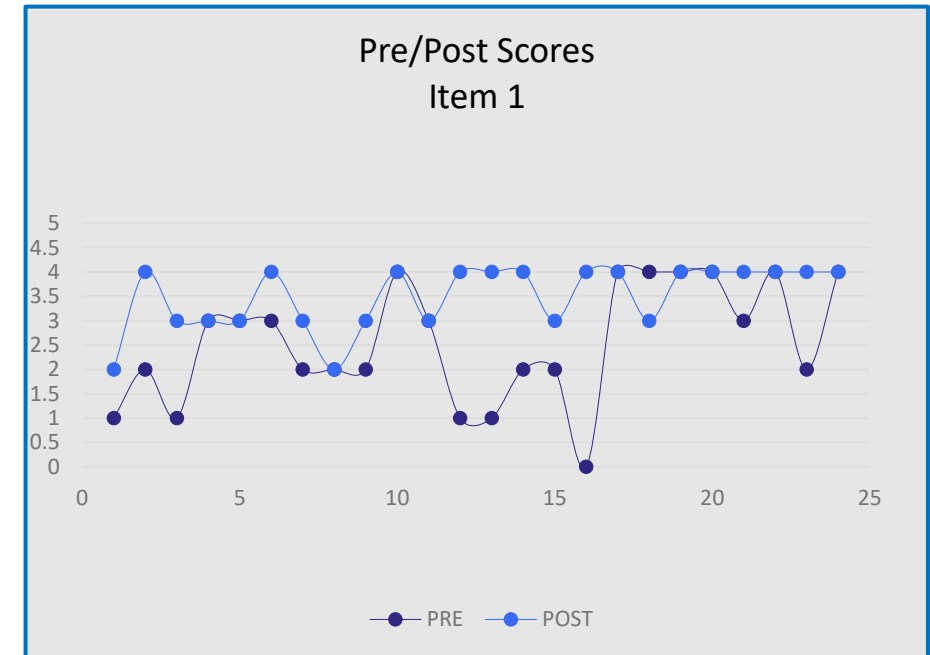
Item	M <sub>pre</sub>	MD <sub>pre</sub>	M <sub>post</sub>	MD <sub>post</sub>	M <sub>diff</sub>
7. I am willing to adapt my teaching practices to accommodate the changes in roles and responsibilities brought about by AI and learning analytics	3.292	4	3.375	4	0.083
8. I intend to use AI and learning analytics in my teaching to offer personalised learning experiences	3.167	4	3.417	4	0.250
9. I am motivated to develop my skills in using AI and learning analytics tools for educational purposes	3.333	4	3.583	4	0.250
10. I intend to seek further professional development opportunities to better understand and use AI and learning analytics in education	3.667	4	3.542	4	-0.125



# 4. Discussions (1)

## CONFIDENCE

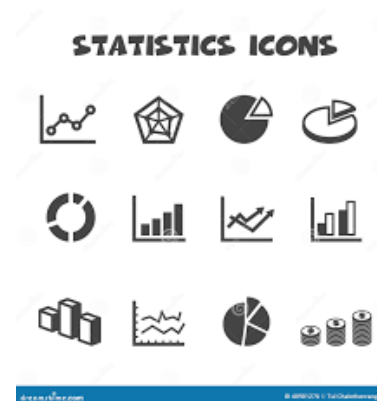
- The results of this study suggest a **significant functional relationship** between the teachers' training and increasing their confidence in the use of AI-based tools for personalized teaching.
- For the post-training scores, the value of the mode is  $MD_{post} = 4$  (that is the maximum) for all items, that is **relevant increase** from the pre-training scores (preponderantly with  $MD_{pre} = 2$ ).
- The mean value of the difference between pre- and post-training scores is quite high ( $M_{diff}$  around 1 or above, for all items) proving **significant improvements in the confidence** regarding:
  - using AI-based tools;
  - selecting AI-based tools;
  - designing adapted learning activities based on AI tools;
  - interpreting data-driven results or guiding students by interpreting data visualisation tools.
- **Direct correlation** between the training and its positive effects on HE teachers' confidence regarding the AI-based tools for customizing the teaching & learning process and for creating learning activities and contents adapted to students' needs, skills and learning paces, is also supported by the curves displaying the evolution of the pre/post training scores, showing **higher post-training scores** across almost all investigated items (one example here):



# 4. Discussions (2)

## ATTITUDE

- The improvements of the HE teachers' attitude were not so significant like in the case of their confidence, as the values of  $M_{diff}$  are relatively small ( $M_{diff} = 0.250$  and even smaller, even with one negative value of  $-0.125$ ).
- Even though the mean of the pre-training scores for each item is high ( $M_{pre} > 3.167$ , with 3.667 the highest) and the mode is maximum (MD = 4), showing that a **high preparedness and intention** of the teachers to use AI existed **prior to the training**, the training itself succeeded to improve teachers' attitude ( $M_{post} > 3.375$ , MD = 4), making them more proactive for using and adapting AI and developing AI skills, in the view of creating personalised learning experiences for their students.
- A paradoxical result was obtained for the item '**Intention to seek further professional development opportunities to better understand and use AI and learning analytics in education**', where the pre/post difference, although small in absolute value, is **negative** ( $M_{diff} = -0.125$ ) (possible causes, not investigated in this study: teachers' overload and lack of time, imbalance between the existing professional training offers and the training needs, or the insufficient support (including financial) received from universities and stakeholders).



# 5. Conclusions

- The study emphasizes on the *practical value of the training* of HE teachers with direct effect on changing confidence and attitude regarding AI-based tools used in HE for personalisation of the students learning.
- Based on the results from pre- and post-training tests we may conclude that AI training generates *positive perception* in HE teachers, regarding:
  - (i) the knowledge about AI-based tools and how these can be used to personalise learning in HE,
  - (ii) the need for achieving new skills for identifying, analysing affordances and selecting most suitable AI-based tools and
  - (iii) motivation to learn how to effectively access and use such tools and integrate them in their teaching process, in the view of increasing students' academic performance and of designing more adapted learning materials and support.
- HE teachers' *perception* on using AI tools to personalise learning *significantly improved due to the training*: they are more confident, more able to select appropriate AI tools based on their affordances and benefits, and in general more capable to design customised learning activities using AI and data-based tool.





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