E-learning open seminar on "Human–centered artificial intelligence in education: From theory to practice"

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Abstract

The study focus the impact of AI applications in education, focusing on improving education quality and enhancing teaching methods. The Laboratory of Advanced Learning Technologies in Lifelong and Distance Learning (EDIVEA) at the University of Crete implemented an ICT-based distance learning program titled "Human-centred AI in Education. The pedagogical dimension: From Theory to Practice," involving 1883 teachers from all education levels. The analysis showed that trainees effectively used the training material in their teaching practices, demonstrating its practical value and importance in distance learning. The study also highlighted the significance of support and communication between tutors and trainees in addressing pedagogical issues. The research underscores the critical role of anthropocentric training programs focused on teachers' needs. The successful application of the training material in real teaching scenarios validates the program's effectiveness. The findings suggest that well-designed, human-centered AI training programs can significantly enhance teaching practices. Ongoing support and communication between tutors and trainees are crucial for the successful implementation of distance learning programs.

1. Introduction

The need for effective, flexible and reliable training activities, independent of time and place, is at the heart of the scientific community's interest, with Information and Communication Technologies (ICT) offering significant opportunities to respond to the demand for flexible training (Anastasiades, Kotsidis, Synnefakis, & Spanoudaki, 2021).

Nowadays, Artificial Intelligence (AI) has attracted the interest of the educational community for its potential to improve the quality of education and enhance teaching and learning methods (Hwang & Chen,

2023). The humanistic and social aspect of AI is a critical factor for the education sector, as the emergence of the human-centred nature of AI is a prerequisite for the transformation of our education systems to enable them to respond critically and creatively to the demands of the new era (Andersen, Mørch, & Litherland, 2022).

Focusing on the above and examining the possibilities of using AI in educational practice, we proceeded to design the training program in order to equip the participants with basic theoretical / pedagogical training and on the other hand with methods, tools and skills related to the use of Human-Centred AI in Education with emphasis on collaborative exploration and knowledge building, creativity and critical thinking. The aim of the study is to explore the views of the participating teachers regarding their participation in this training program and to assess the main factors that make it innovative and effective.

2. Theoretical Framework

Artificial Intelligence (AI) refers to an artificial system consisting of computer algorithms and programs, capable of performing tasks that usually require human intelligence (Chan & Colloton, 2024; Kitcharoen, Howimanporn, & Chookaew, 2024). According to experts and philosophers in the field of AI, it has already undergone significant changes and extensions (Shao, Zhao, Yuan, Ding, & Wang, 2022) with new capabilities continuously building on previous developments, aiming to create increasingly sophisticated systems. AI has the potential to improve the educational process in ways that are still being studied (Holmes, 2024). Its use in education can offer significant benefits. AI technologies can contribute to learning analytics, personalised education, providing intelligent feedback, enhancing student engagement and improving curriculum design (Kitcharoen et al., 2024).

Based on the study of the literature in the field of artificial intelligence, there is a significant shift from the technological to the human-centered dimension, as many researchers now recognize this necessity as a prerequisite for the cohesion and smooth development of modern societies (Shneiderman, 2022; Zhao, Liu, Zhou, & Yin, 2023).

At the same time, the need to develop critical literacy in teachers is highlighted in order to address the social consequences of AI (Stewart, 2023). Furthermore, the need to implement people-centred policies to address the challenges that AI brings to education is highlighted, where AI systems are transparent, reliable and promote human skills and well-being (Fischer, 2017). Human-centred AI (HCAI) must reposition people at the centre of its focus with the aim of improving human performance in ways that are reliable and safe, while allowing for high levels of human control (Ozmen Garibay et al., 2023). The creation of an integrated pedagogical framework is essential in this direction to promote AI in education, with an emphasis on collaborative inquiry, critical thinking development and creativity (Anastasiades, Kotsidis, Stratikopoulos, & Pananakakis, 2024).

3. Case Study Description

Artificial Intelligence (AI) applications have attracted the interest of the educational community regarding their potential to improve the quality of education and enhance teaching and learning methods (Hwang & Chen, 2023). The Laboratory of Advanced Learning Technologies in Lifelong and Distance Learning [EDIVEA] of the Pedagogical Department of Primary Education of the University of Crete designed and implemented ta free distance training program on the topic: "Human – Centered Artificial Intelligence in Education: From theory to Practice" in which 1883 teachers of all levels participated and completed.

3.1. Pedagogical Framework

The pedagogical approach of this distance learning program had as main axes:
1. The flexibility of the trainee in terms of space, time, pace of learning and study of the multimedia educational material.
2. The respect for the formation of the trainee's educational physiognomy.
3. The social construction of knowledge through collaborative activities and learning environments, with emphasis on meeting the learning social and cultural needs of the trainees (Matsangouras, 2006).

This training program was based on the methodology of Distance Education and the basic principles of the Major Training Program (Anastasiades, Kotsidis, Synnefakis, & Spanoudaki, 2023). Each training cycle of the program included 3 3-hour synchronous training sessions via videoconferencing, which enabled tutors and trainees to interact via audio, video and data in real time regardless of the geographical area in which they might be located (Kotsidis, 2019).

Finally, there were optional activities and assignments, so that theory and practice were directly linked.

3.2. Tutors

The tutors supported the trainees and fostered a positive atmosphere among the participants by encouraging their initiative and creativity. Regular interaction with the trainees through synchronous and asynchronous communication channels reduced their anxiety and increased their self-esteem, thereby achieving their activation and self-directed learning (Holmberg, 2023).

3.3. Educational Material

The online environment was enriched with interactive educational material , activities and assignments – with an expected study time of at least 50 hours – and was specially designed using the distance learning method, aiming to support the trainee in his/her study and with the main pillar of promoting new pedagogical approaches, with the ultimate goal of transforming traditional "teacher-centred methods" into flexible "learner-centred" processes, thus highlighting the direct relationship between ICT and adult education (Mouzakis, 2008).

The educational material was multimodal, adopting the principles for Multimedia Learning (Mayer, 2017). Each module contained expected outcomes, keywords, estimated study time. The learning material was presented step-by-step, through interactive guides that utilized both video and image, with the ultimate goal of facilitating users with no previous experience in this type of training. The training materials guided the learner in their study and facilitated reflective learning by providing various types of exercises and activities for continuous feedback and exploration. Finally, specially designed activities encouraged the connection between new knowledge and its application in practice for each trainee.

4. Methodology

4.1. Aim and Research Questions

The survey aimed to investigate the participants' views on three main axes, which constitute the three research questions of this paper.

1. To what extent do the participants consider that the objective of the training program was met (identification of fundamental concepts of A.I., pedagogical utilization of A.I. applications, building critical attitude regarding the pedagogical utilization of A.I.)?
2. How satisfied are the participants about the educational material of the training program?
3. How satisfied are the participants about the tutors of the training program?

4.2. Type and Duration

The survey is applied action research which is synchronic fieldwork and is classified as mixed methods. The survey was conducted in February 2024.

4.3. Data Collection Tools and Processing of Results

The data collection tool used was an electronic questionnaire, a Google form, containing both closed and open-ended questions. Data were processed using the statistical processing program "SPSS 20.0 for Windows". After quantifying the trainees' opinions through a five-point Likert scale the quantitative data were compared by calculating the means of each question.

4.4. Sample

The sample of the survey was the 1,353 participants who completed the training program on the topic: "Human – Centered Artificial Intelligence in Education: From theory to Practice".

Table 1 shows the characteristics of the sample by gender:

Table 1. Gender of participants.

	N	%
Men	274	20.3
Women	1.079	79.7
Total	1.353	100

Table 1 shows that there were 1,353 participants, of whom 274 were men and 1,079 were women.
Table 2 shows the characteristics of the sample in terms of teaching experience:

Table 2. Teaching experience of participants.

	N	%
0 – 4 years	97	7.2
5 – 10 years	103	7.6
11 – 20 years	450	33.3
21 – 30 years	518	38.3
> 30 years	185	13.7
Total	1.353	100

Table 2 shows that of the 1,353 participants, 97 have 0 to 4 years of teaching experience, 103 have 5 to 10 years of teaching experience, 450 have 11 to 20 years, 7 have more than 20 years of teaching experience and 185 have more than 30 years of experience.

Table 3. Participants' level of use of AI applications (Before training).

	N	%
low level of use	787	58.2
medium level of use	472	34.9
high level of use	94	6.9
Total	1.353	100

Table 3 shows that of the 1,353 trainees, 787 classify themselves as low-level users of AI applications before the start of the training, 583 classify themselves as moderate-level users of AI applications and 94 classify themselves as high-level users of AI applications before the start of the training.

Table 4 shows the level of use of AI applications by the trainees after the end of the training.

Table 4. Participants' level of use of AI applications (After training).

	N	%
low level of use	79	5.8
medium level of use	832	61.5
high level of use	442	32.7
Total	1.353	100

Table 4 shows that out of the 1,353 trainees, it appears that out of the 1,353 trainees, 79 classify themselves as low level users of AI applications after the end of the training, 832 classify themselves as moderate level users of AI applications and 442 classify themselves as high level users of AI applications after the end of the training.

5. Results

Regarding the first axis, Table 5 presents the results regarding the first research question, which investigates the extent to which the trainees consider that the objective of the training program was met and specifically regarding the recognition of the fundamental concepts of T.N, to identify the basic characteristics that govern the pedagogical use of artificial intelligence applications, to plan in practice innovative educational actions and to build a critical and informed attitude regarding the pedagogical use of artificial intelligence applications.

Table 5. Participants' views on the achievement of the purpose of the training program.

	N	M	S.D.	p
Recognize the fundamental concepts of AI.	1.353	4.41	0.652	0.018
Identify the key features governing the pedagogical use of AI applications	1.353	4.29	0.691	0.019
Design innovative educational actions in practice	1.353	4.18	0.757	0.021
To build a critical and informed attitude about the pedagogical use of AI applications.	1.353	4.29	0.713	0.019

The participants seem to be very satisfied with all questions related to the degree of coverage of the objective of the Training Program with an average of between 4 and 4.5.

Then, Table 6 presents the results regarding the second research question, which investigates the degree of satisfaction of the trainees with the educational material of the Training Program. In particular, the scientific coherence and documentation, the contribution to the simple and comprehensible presentation of the subject matter, the usability in navigation, the support - guidance of the trainee in his/her study, the encouragement of the trainee to express his/her own opinions on important issues, the encouragement of the trainee to express his/her own questions on important issues are investigated, the encouragement of the trainee to exchange views with other trainees, the encouragement of the trainee to reflect by fostering critical thinking, the encouragement of the trainee to relate the new data to his/her own reality, the encouragement of the trainee to apply the new knowledge to his/her own reality and the contribution of the trainee to the development of the assignments and the learning scenario.

Table 6. Participants' views on the educational material of the training program.

	N	M	S.D.	p
The scientific consistency and documentation of the material (Bibliographic documentation. use of different bibliographic sources. etc.)	1.353	4.47	0.678	0.018
The contribution of the material to the simple and comprehensible presentation of the cognitive object (Friendly writing style. simple language. etc.)	1.353	4.59	0.620	0.017
Usability	1.353	4.55	0.640	0.017
The support - guidance of the trainee in his/her study (Providing advice. explanatory comments - instructions etc.)	1.353	4.45	0.720	0.020

	N	M	S.D.	p
Encouraging the trainee to express his/her own opinions	1.353	4.43	0.728	0.020
Encouraging the trainee to express his/her own questions	1.353	4.36	0.770	0.021
Encouraging the trainee to exchange views with other trainees	1.353	4.04	0.982	0.027
Encouraging the trainee to reflect by cultivating critical thinking	1.353	4.41	0.727	0.020
Encouraging the trainee to relate the new data to his/her own reality	1.353	4.35	0.757	0.021
Encouraging the trainee to apply the new knowledge to his/her own reality	1.353	4.34	0.755	0.021
The contribution of the material to the development of the tasks	1.353	4.34	0.769	0.021

Participants seem to be very to very satisfied with the quality of the training material in terms of its contribution to the simple and understandable presentation of the subject matter and its usability in navigation with averages of 4.59 and 4.55 respectively. They also seem to be very satisfied regarding all the other factors related to the educational material, as the mean is between 4 and 4.5.

Finally, Table 7 presents the results regarding the third research question, which investigates the degree of satisfaction of the trainees with the tutors. It explores the participants' views on the tutors' scientific competence, subject matter knowledge and pedagogical approach. At the same time, the tutors are evaluated in terms of their respect for the trainees' personalities, the creation of a positive relationship with the trainees, the recognition of the trainees' training needs and their ability to solve the trainees' questions.

Table 7. Participants' views on the tutors of the training program.

	N	M	S.D.	p
The tutor has scientific competence - knowledge of the subject	1.353	4.71	0.545	0.015
The tutor has an appropriate pedagogical approach	1.353	4.67	0.580	0.016
The tutor shows respect for the personality of the trainees	1.353	4.81	0.469	0.013
The tutor creates a positive relationship with the trainees	1.353	4.68	0.589	0.016
The tutor is capable of identifying the training needs of the trainees	1.353	4.55	0.682	0.019
The tutor is capable of solving the trainees' questions	1.353	4.58	0.661	0.018

Participants seem to be very to very satisfied about the role of tutors with an average of more than 4.5.

In summary, participants seem to rate their level of use of AI applications higher after the start of the program than before the start of the program. Specifically, 32.7% of participants consider their level of use to be high and 61.5% moderate after the start of the program, compared to 6.9% and 34.9% respectively before the start of the program. Finally, only 5.8% of trainees consider their level of use to be low, compared to 58.20% before the start of the program.

6. Conclusions

The paper adds its own data by strengthening the reflection on the efficient and at the same time correct use of AI in education, but also the need for further empirical investigation at the national level, as only through the systematic study of all the dimensions of the phenomenon will the research community be able to guide the state in the formation of a broader institutional framework, which will be human-centred what Shneiderman (2022) refers to as "Human-Centered AI". Regarding the first research question, it seems that the program met the training needs of the participants, as they learned the learning objects and acquired skills to apply them in the classroom. Participants also reported that the seminar has provided them with knowledge that they can use in the educational process. This element is an important factor of positive evaluation of a training seminar as mentioned in Furman Shaharabani and Yarden (2019).

According to the second research question, it seems that the trainees were not only satisfied with the quality of the training material, but they used it directly in their educational work. The above findings are in line with other research (Lionarakis, 2006) according to which the educational material is the main driver of teaching in distance training programs. At the same time, according to the responses regarding the role of the trainers, it emerged that the trainers enabled the participants to use the potential of the tools taught with their students. The above findings are consistent with similar research (Kotsidis & Anastasiades, 2023) and confirm the role of training seminars in order to meet the needs of the trainees and to cover a large part of their learning needs.

It is necessary to point out that the generalisability of these findings needs to be confirmed by future research efforts. The pedagogical use of AI applications in the field of teacher training needs further research in order to formulate an integrated framework for the qualitative and effective development of distance training programs with a human-centred orientation.

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