DIALOGEDUSHIFT

DialogEduShift: Transforming Higher Education Teaching and Evaluation Approaches in the Era of AI ChatTools

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WP2 – National report

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Introduction

The creation of computer systems that are capable of carrying out activities that normally require human intelligence is known as artificial intelligence, or AI. This include comprehending natural language, identifying patterns, making judgments, and learning from experience (machine learning). In order to generate predictions or carry out particular activities, artificial intelligence (AI) processes enormous volumes of data, looks for patterns, and applies algorithms. Natural language processing is a type of artificial intelligence (AI) that is used by chatbots like ChatGPT (NLP).

It learns to comprehend and provide responses that are human-like through training on a variety of written text datasets. Here, the model, GPT-3.5, is a deep neural network made out of a huge data base with multiple parameters that allows it to understand context, respond contextually, and mimic meaningful dialogues. The model is exposed to a variety of instances during the training process, which helps it pick up on the subtleties of language and context. Newer models, such as GPT-4.0 have an updated data base and extended analysing patterns.

To put it another way, ChatGPT functions by ingesting large amounts of text, applying that knowledge to comprehend and produce responses that mimic human speech. Complex algorithms and neural networks are used in the underlying technology to interpret language patterns and enable meaningful interactions.

State-of the-art desk research of current situation in Germany

The study primarily focuses on students' utilization of AI-based tools, examining both academic and personal contexts. In total, 63.4% of surveyed students acknowledge employing AI-based tools for their studies.

An in-depth analysis of usage patterns reveals that 25.2% of students use AI-based tools frequently or very frequently, while 47.8% use them minimally or occasionally. Interestingly, 36.6% of students report not using AI-based tools at all, resulting in a nuanced overall usage profile with an average score of 2.93.

When categorizing usage intensity across academic disciplines, noticeable variations emerge. The highest usage rates are found in engineering, mathematics, and natural sciences, with 75.3% of engineering students, 73.4% of arts and art sciences students, and 71.9% of mathematics and natural sciences students utilizing these tools. Humanities students (61.0%), as well as those in law, economics, and social sciences (58.4%), and human medicine and health sciences (52.7%), also show significant usage. The usage rate is slightly below half (47.6%) for students in agricultural, forestry, and nutrition sciences, as well as veterinary medicine. Notably, 87.5% of sports students use AI-based tools, while slightly more than half (56.8%) of students in other study areas use these tools.

In terms of specific tools, nearly half of all surveyed students (49%) mention using or having used ChatGPT/GPT-4. Approximately 12% of respondents note using DeepL, while 4% mention DALL-E, around 3% mention Midjourney, and about 2% mention Bing AI. Other tools mentioned by students are used by less than 1% of the surveyed population.

The utilization of AI-based tools by students across various academic disciplines in Germany is emphasized in the study, revealing widespread adoption. Almost two-thirds of the surveyed students have engaged with or are currently using such tools. Notably, the fields of engineering, mathematics, and natural sciences demonstrate the highest intensity of usage. The active promotion of these tools within these disciplines may be a contributing factor, alongside the possibility of a heightened technological affinity among students in these areas.

Examining potential gender-specific differences in usage rates suggests that the observed high utilization might be linked to a greater proportion of male students in these academic domains. When considering the higher usage figures within the context of private use of AI-based tools, it implies a potential increased utilization in the context of study and education.

Specifically, nearly half of the surveyed students explicitly mention ChatGPT or GPT-4 as their chosen tools, indicating the widespread adoption of this particular tool. A nuanced examination of usage patterns across academic disciplines illustrates the diverse applications of AI-based tools by students. Furthermore, the results indicate that students have varying perspectives on the essential characteristics that ideal AI systems should possess.

Further exploration in this context should focus on understanding the "gap" between the significance of scientific rigor, identified by nearly three-quarters of the students as the most relevant criterion, and the importance of logical argumentation (e.g., answers are comprehensible) (about 50%) and the explainability of decisions (e.g., White-Box vs. Black-Box) (about 35%). One possible explanation is that students are primarily interested in generating "scientific output," with less concern about the intricacies of the generation process. This underscores the responsibility of universities not only to produce scientific output but also to emphasize the importance of a comprehensible, logical, and transparent scientific process.

In the context of AI usage, students may not yet fully grasp this concept, highlighting the need for universities to educate students on using AI as a tool while clearly outlining the limitations associated with its usage.

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Analysis of survey results

Survey Development

The survey structure was collectively developed by our partners during a collaborative virtual meeting where we discussed the overall design. To conduct the survey, partners initiated the process by thoroughly reviewing relevant literature, specifically focusing on the application of artificial intelligence chat tools in higher education teaching and evaluation methods within their respective countries. This involved identifying prevalent issues, established practices, and existing policies within the educational frameworks of each nation. Subsequently, an in-depth analysis of these six countries was conducted, leading to the creation of survey questions that encompass common aspects across all regions. The comprehensive synthesis of responses gathered from these six countries, addressing the standardized survey questions, is elaborated upon in the following sections.

Research Questions

The research study was designed to address the following research questions:

- ***Demographic questions:*** Country, age, gender, education level and position.
- ***Area 1:*** Are you familiar with the concepts such as Artificial Intelligence (AI), Generative AI, data science, machine learning and AI chatbot? Besides one more open-ended question about to collect detail information on Artificial Intelligence knowledge and understanding.
- ***Area 2:*** Have you used or encountered these AI tools in your daily life such as AI chatbots, Image generator, Image/ video editor, Video generator, Sound and music generator and Computer vision? Besides one more open-ended question in order to gather information about the usage situations and ways.
- ***Area 3:*** What AI chatbots do you use such as ChatGPT, Google Bard and Bing Chat?
- ***Area 4:*** Do you think AI technologies could help improve the study process in higher education? Besides two more open-ended questions 1) How could AI technologies, in your opinion, help improve the study process in higher education? 2) Could you provide examples or share experiences when AI tools were helpful or necessary in study process? (Only for academicians)

- ***Area 5:*** There are six statements regarding AI in the education process with 5 Likert scale which are below:

Do you use AI tools in the assessment process? **(Only for academician)**
Do you use AI tools to create personalized learning approaches? **(Only for academician)**
Do you have sufficient knowledge and skills for the use of AI technologies in the study process? **(Only for academician)**
Do you feel the need to enhance your knowledge and skills in using AI technologies in the study process if they were available? **(Only for academician)**
Do you agree that AI creates **opportunities** for the improvement of the education/study process?
Do you agree that AI poses **challenges** to the education/study process?

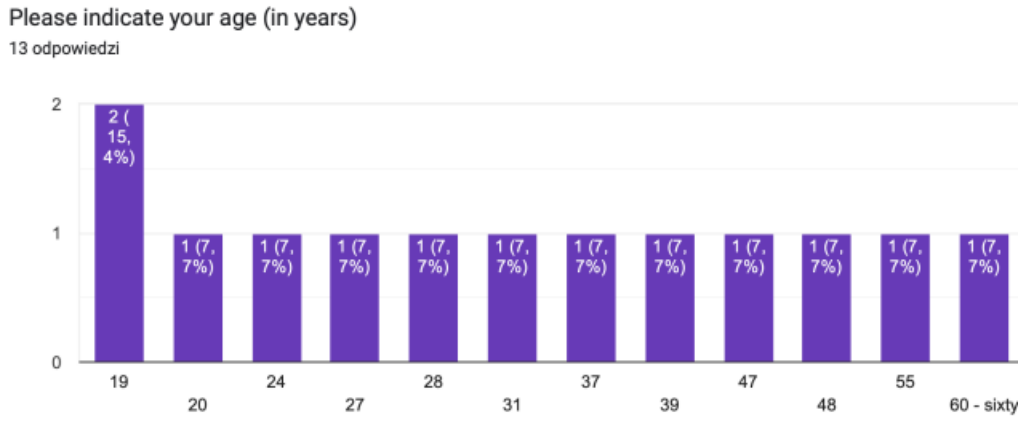
- ***Area 6:*** There is a SWOT analysis in order to analyse the strengths, weaknesses, opportunities, and threats that the participants believe AI can create in the higher education studying process.

Description of Data Collection

The survey was conducted in Germany and Poland and included 6 surveys with academics,1 with university administration and with 7 Expert in the field

Demographics:

The participants predominantly consist of men, making up 80% of the respondents, and over 30% of them hold high school degrees, and those with master degrees, doctor degrees and bachelor degrees are each 23% . All are of different ages as shown in the chart below



Area 1: Awareness and Understanding of AI:

Generative AI: More than 70% of respondents confirm their familiarity with generative artificial intelligence. Only one person (from a university administration) does not confirm their familiarity with the concept. This result suggests that most respondents have a general awareness of artificial intelligence.

Data Science: The results are very similar to before. 80% have understanding of data science. Two people say their attitude is neutral, and Only one person (from a university administration) does not confirm their familiarity with the concept.

Machine Learning: Of the three people surveyed, as many as eight expressed familiarity with the Machine Learning (ML) area. Five people did not express familiarity with the Machine Learning area.

AI Chatbot: Of those surveyed, only one (a university administration employee) is not familiar with the AI chatbot concept. All others are familiar. Chatbots are a pragmatic approach to artificial intelligence, widely used in different sectors for customer service, information discovery and performing many other functions.

Area 2: Utilization of AI Tools:

The majority of academics have encountered or utilized AI-enabled devices in their everyday lives. More than eighty percent of those polled said they've had a personal encounter with AI tools, indicating their widespread application in the academic realm.

A significant number of participants emphasized the multidisciplinary nature of AI, pointing out its focus on algorithms and computational models that resemble human intelligence.

Learning, reasoning, problem solving and perception are some of the cognitive functions that artificial intelligence mimics.

Learning from experience, adapting to new things, and growing over time are some of the things AI is known for.

Machine learning is a key method within AI, according to several researchers, who are aware of the technologies driving advancement in AI.

Area 3: The Most Used AI chatbots:

80% participants stated that the AI tool they use the most is ChatGpt.

Area 4: Perceptions on AI in Higher Education:

The majority of participants believe that artificial intelligence technologies can significantly improve learning and teaching processes in higher education.

Some people think that AI can make higher education better. They think it will give students personalized learning, make it easier to get help with math and statistics, accelerate it to study, help with research, and make things easier.

Several folks share real-world examples of AI in action, citing its use in scholarly assistance, coding help, assisting foreign students, crafting course material, and enhancing investigation procedures. The vast majority of them utilize artificial intelligence devices for assessing purposes, employ individualized learning strategies, and express confidence in their capacity to employ AI effectively in instructive settings.

While everyone acknowledges the numerous chances AI presents to enhance the educational landscape, their perspectives on the challenges are diverse. Ethics, misuse potential, and perceived risk of replacing human interaction with AI are some of the issues discussed. This different view shows that it's important to think carefully and use AI in higher education in a way that's right.

Area 5: AI in The Education Process:

A significant majority, exceeding 70% of participants, have affirmed their incorporation of AI tools into their evaluation procedures. At the same time, they say they know a lot about using AI tools well. However, they acknowledge the inherent challenges these technologies may present within the learning process.

Furthermore, a noteworthy eighty percent of participants have reported employing artificial intelligence devices to tailor their educational encounters according to their preferences and requirements.

Moreover, each respondent affirmed the necessity of ongoing training to enhance their comprehension and proficiency in employing AI technologies. They emphasize that AI technologies present a significant chance to enhance learning and teaching processes, as well as a collective commitment to actively participate in the ever-changing world of AI. This unanimity reflects an eagerness to contribute to the swift progress in AI, as well as an appreciation for the necessity for ongoing advancements in this ever-evolving field.

Area 6: Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis:

In examining the landscape of artificial intelligence (AI) in education, a multifaceted picture emerges, showcasing both strengths and potential challenges that accompany the integration of this transformative technology.

AI's strengths manifest in its remarkable capacity to individualize learning experiences, streamline administrative tasks, and optimize various educational processes. Its role in providing valuable data insights, facilitating easier learning, aiding educators, and introducing innovative study approaches is unmistakable. The positive impact of AI extends beyond efficiency improvements; it lays the foundation for a more personalized and adaptive educational environment.

However, delving into the complexities, there are notable concerns that cast shadows on AI's otherwise promising potential. One such concern revolves around the perpetuation of biases within AI algorithms, posing a risk of reinforcing existing inequalities. Additionally, there is a cautious acknowledgment of the potential limitations on critical thinking skills and privacy risks associated with the extensive use of AI in educational settings. The recognition of these weaknesses underlines the need for a balanced and ethical approach to AI implementation.

Opportunities abound as AI emerges as a catalyst for positive change in education. By enhancing accessibility, fostering innovation, and facilitating global collaboration, AI opens doors to new possibilities. Its role in making learning more enjoyable, offering additional support, and connecting students on a global scale represents an exciting frontier in education. The potential for AI to adapt and personalize the learning journey for each student is a transformative aspect that aligns with the evolving needs of the educational landscape.

However, alongside these opportunities, there exist inherent threats that demand careful consideration. Job displacement is a concern, as the automation facilitated by AI may alter traditional roles within the education sector. Ethical dilemmas, such as the responsible use of AI and safeguarding privacy, require constant attention to ensure that the technology aligns with ethical standards. Moreover, the

risk of widening educational disparities and the possibility of AI making incorrect decisions underscore the need for a proactive and vigilant approach.

In essence, while AI brings undeniable strengths and exciting opportunities to the educational sphere, its implementation demands a thoughtful and vigilant management approach. By addressing potential weaknesses and threats, educators, policymakers, and stakeholders can harness the positive impact of AI, shaping a future where technology enhances the educational experience for all.

Conclusions

A recent study in Germany to comprehensively examine the transformative effects of artificial intelligence (AI) in higher education delved into the intricate perspectives of academics, experts and university administrators. This in-depth study not only reveals the current state of affairs, but also illuminates the potential trajectories that artificial intelligence can set for the future of academia in the Polish educational landscape.

In terms of strengths, the survey revealed a palpable enthusiasm among participants for AI's ability to individualize educational experiences. The implementation of artificial intelligence was seen as a catalyst for innovation, streamlining administrative tasks and optimizing various educational processes. Participants expressed optimism about AI's role in providing personalized insights, facilitating seamless learning and introducing innovative approaches to learning. Dynamic synergies between technology and academia were evident, reflecting an evolving era of adaptability and responsiveness to changing student needs.

However, new opportunities were on the horizon. Participants saw artificial intelligence as a powerful tool that could increase accessibility, foster global collaboration and bring a sense of enjoyment to the learning process. The prospect of artificial intelligence offering additional support to students and connecting them globally created a picture of a collaborative and interconnected educational landscape. The survey captured the optimistic spirit of participants,

who envisioned a future in which artificial intelligence would become a cornerstone of positive change in higher education.

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