

Attitudes of High School and University Students Towards AI

Postoje středoškolských a vysokoškolských studentů k umělé inteligenci

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Abstract:

This article addresses the current topic of high school and university students' attitudes towards artificial intelligence (AI), with a focus on generative language models such as ChatGPT. We are interested in how high school and university students perceive the use of AI in everyday life, education, and society in general. Understanding students' attitudes, biases, and expectations regarding this innovative technology contributes to a deeper understanding of its role and relevance in today's digital environment.

Keywords:

Artificial intelligence; attitudes; high school students; university students

Abstrakt:


Příspěvek se zabývá aktuálním tématem postojů středoškolských a vysokoškolských studentů k umělé inteligenci (AI) se zaměřením na generativní jazykové modely, jako je například ChatGPT. Zajímá nás, jakým způsobem vnímají studenti středních a vysokých škol využití umělé inteligence v běžném životě, ve vzdělávání a ve společnosti obecně. Pochopení postojů, předpokladů a očekávání studentů k této inovativní technologii přispívá k hlubšímu porozumění její role a významu v současném digitálním prostředí.


Klíčová slova:

Umělá inteligence; postoje; středoškolští studenti; vysokoškolští studenti

Introduction

As with many revolutionary inventions, AI was developed to advance human innovation, simplify tasks, and meet the growing demand for capabilities that align with the complexity of our world. Just as there was once a need to automate manual labour, today's world, characterised by an overwhelming amount of information, requires tools to filter, interpret, and effectively utilise these data. For instance, writing a bachelor's thesis has changed significantly over the years. In the past, students relied primarily on books that

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were considered sufficient sources. However, with the advent of the Internet and the increased availability of foreign periodicals, a visit to the university library is no longer adequate without access to online resources. Language models like ChatGPT open up new possibilities for communication and interaction between man and machine. They enrich virtual environments where they are used to solve a wide range of tasks. Their ability to adapt to different situations and users and to communicate like a human raises a number of questions about human communication itself, the trustworthiness of responses, ethics, the shape of the labour market, and the future of society and human interaction in general. The aim of this research is to explore how high school and college students view these issues, how they integrate them into their lives, and what this means for them in their daily school, academic, and even professional lives. We draw on the theoretical background and research findings obtained during the implementation of the bachelor's thesis (see Hašek Dóšová, 2024).

1 Attitudes

Attitudes play a key role in our perception of the world. They are essential in decision making and have a direct influence on human behaviour. Through attitudes we evaluate objects, phenomena, or ideas from positive to negative. These evaluations are a combination of affective, cognitive, and behavioural elements that interact with each other (Hogg & Vaughan, 2014). Attitudes are dynamic in nature. They can change in response to new information, experiences, and learning. They emerge as part of the socialisation process (Oskamp & Schultz, 2014). One of the basic functions of attitudes is to adapt to the environment. Katz (1960) associates different attitudes with different functions. The four basic functions are: knowledge function, instrumental function, value-expressive function and ego-defensive function.

Hogg and Vaughan (2014), as well as Řehan (2007), provide three basic divisions of the attitude structure:

- **One-component structure:** the main role is played by emotions and feelings. In Thurstone's conception, attitudes are defined by affect for or against a psychological object (Thurstone, 1931). Thus, the key question is whether we like the object or not.
- **Two-component structure:** to Thurstone's model, (Allport, 1935) added another component, which is mental readiness. This is a predisposition that has a fairly consistent influence on our decisions about right and wrong. The two-component model was also discussed by Bagozzi (1981). In his conception, attitude is not shaped by the affective (emotional) or cognitive component alone, but by a combination of the two.
- **Three-component structure:** assumes that attitudes consist of three basic components: affective, cognitive (thoughts and beliefs about the object), and conative (behavioural). The three-component structure of attitudes was discussed by Ostrom (1968), who emphasised the importance of these components, their interactions, and their influence on behaviour. Martin Fishbein, together with Icek Ajzen, developed a number of theories based on a multidimensional conception of the components of attitudes. Among the best known are the theory of planned behaviour and the theory of reasoned action (Ajzen, 2012).

Measuring attitudes is a complex task. We should ideally capture all their components - affective, cognitive, and behavioural (Ajzen, 2012). The exploration of attitudes is

strongly related to the ways in which they are measured. Quantitative methods offer two different ways, explicit and implicit. Traditional explicit scales rely on self-assessment. Implicit measures of attitudes offer indirect methods such as evaluative priming or the Implicit Association Test (IAT). These methods focus on reaction time and associations, which are not as easily consciously influenced compared to explicit methods. Qualitative approaches in measuring attitudes, such as interview and observation, offer a more detailed view of attitudes and can better capture their different layers. Using them, interpretations can be better explored and attitudes explained. An additional advantage of qualitative methods is their ability to place attitudes within a broader context (Šafránková & Kocourková, 2011).

2 Artificial intelligence (AI)

The understanding of *artificial intelligence* (AI) has evolved over time. The first to use the term was John McCarthy in 1955, who described it as the science and technology of creating intelligent machines. It is common to compare the nature of AI with human intelligence; however, it is important to remember that human intelligence is inherently fallible. The description to which science leans is the quality of artificial intelligence understood through the key concept of rationality. Russel and Norvig (2022) describe two approaches. One understands intelligence as thought processes and reasoning, i.e., it is internal. The other focusses on behaviour, and hence is an external characteristic. It is also important to distinguish the terms artificial intelligence and machine learning. Machine learning is a subfield that falls under AI that deals with the ability to improve performance based on experience (Domingos, 2015).

The history of artificial intelligence dates back to the 20th century. The earliest work on AI, though not the most well known, was McCulloch and Pitts' 1943 theory of neural networks, which continues to serve as the foundational concept for neural networks in AI. The popularisation of AI at its beginning is mainly associated with the names of Alan Turing, John McCarthy and Marvin Minsky. They are among the pioneers who laid the foundations of AI. The Turing test remains a current tool through which machine and artificial intelligence is evaluated. John McCarthy's definition laid the foundation for the development of the field of AI, as did Marvin Minsky's exploration of simulating human thought. In 1969, Minsky published research with Papert focussing on neural networks and machine learning, building on the work of McCulloch and Pitts (Minsky and Papert, 2017). Another major breakthrough was the finding of Newell and Simon, who in 1976 formulated the physical symbols system hypothesis, which states that any system exhibiting general intelligence, human or machine, must operate on data in terms of being symbols (Gugerty, 2006). In the following years, attention turned to connectionism, focussing on the simulation of neural networks and the learning process, as is the case with the human brain. Its goal is to create an artificial network without direct programming for specific tasks. It is also key to the development of *deep learning*.

A significant development was the advent of the Internet, which made it possible to create huge data sets (a phenomenon known as *big data*). This data includes billions of words, images, hours of spoken language and video, social media content, and other conceivable forms of information. Although deep learning has played a role since the 1970s (LeCun et al., 1995), it was not until 2011 that the first language and visual object recognition emerged (Krizhevsky et al., 2012). Deep learning has outperformed humans in visual tasks, language recognition, machine translation, medical diagnoses, and gaming

abilities (LeCun et al., 2015). These significant advances have popularised AI in society, science, among students, and have attracted the attention of companies and countries. Deep learning has pushed programming towards self-learning and is of great importance for the development of *large language models* (LLM), which include ChatGPT3 (and later versions) and other models. The ability to generate and understand natural language is crucial to their development. Large language models, such as ChatGPT, have revolutionised natural language processing. The text generated by them is, with few exceptions, indistinguishable from human language; LLM can understand context, conversation styles, and can search for information, synthesise, draw conclusions, and reason abstractly.

3 Attitudes towards AI

Attitudes towards AI and attitudes towards technology could easily be confused, and the assumption is that methods for measuring attitudes towards technology apply to AI. However, AI is specific in some ways and, especially in the area of concerns, as a relatively recent innovation, it currently has more relevance than the existence of computers, the internet, or mobile phones. Within a few years, AI has penetrated many areas of everyday life without our consent or choice. The term *Artificial intelligence anxiety* (AIA) has emerged - a phenomenon that had to follow logically with the advent of AI. Wang and Wang (2019), building on previous studies, identified four areas of concern: concern about having to learn to work with AI; concern about AI replacing jobs; concern about AI being too powerful or misused; and last but not least, concern about the possible future form of AI (e.g., humanoid robots).

How we perceive AI and what we imagine it to be, or what information we have about it and who gives it to us, fundamentally influences our attitudes. As with technology acceptance and success, we evaluate the success of AI based on its acceptance and use (Dillon & Morris, 1996). At the most general level, it can be assumed that if an individual has a positive attitude towards technologies and innovations such as AI, he or she will use them more often and incorporate them more easily into his or her everyday life. Negative attitudes are likely to lead to resistance or hesitation in adopting them. Similar to research on attitudes and technology adoption, the recognition and measurement of attitudes towards AI is done using different methods and tools, questionnaires, scales, and interviews that assess different aspects of attitudes. Through these, we should be able to better identify the key factors that influence attitudes towards AI, i.e., its acceptance and use. At the same time, they can offer valuable information on how to improve these attitudes, how to formulate positions towards AI or how to define oneself in relation to it.

4 Exploring attitudes of high school and university students towards AI

The development and integration of artificial intelligence (AI) into everyday life raises a number of issues in the context of psychology. These concern attitudes, perceptions, expectations, but also implications for society and academia (Dwivedi et al., 2023; Cotton et al., 2024). To date, there has been no qualitative study in the Czech Republic that examined how students navigate this new reality, their approach to the use of AI in both everyday and academic contexts, their motivations for using AI, and the extent to which

the absence of clear regulations³ influences or constrains their decisions. Innovations in the field of AI and its continuous development open up new topics and areas for research.

The aim of the research is to map the attitudes of high school and university students in the Czech Republic towards AI, with a focus on large language models (LLM) such as ChatGPT and its variants, and to provide insight, deeper understanding, and connection of their experiences with the use of AI tools through an overview of topics that resonate among students. For the purposes of the research presented here, semi-structured interviews with ten participants (five in each group) on attitudes toward AI, either through face-to-face interviews or through an online platform, were chosen for data collection and production. Direct experience with language models was not required for participation in the research, as even limited or no experience in this area is considered a valuable contribution to the general understanding. **A key factor** in the selection of participants was familiarity with language models such as ChatGPT and others. The age range of the participants from high school students was 16-19 years, while for university students the age range was 26-38 years (both full-time and combined students were represented). Before the interviews started, the participants were informed of the purpose of the research, the interview process, and the principles of processing and protecting the collected data. At the same time, participants were guaranteed anonymity, voluntary participation, and the possibility to terminate the interview at any time without giving any reason. Participation in the research did not involve any financial compensation. Informed consent was obtained verbally.

5 Results of research on attitudes of high school and university students towards AI

Based on the **thematic analysis** of the interviews with participants, nearly twenty main themes emerged, reflecting the individual attitudes of each respondent and their general perception of AI as a positive, neutral, or negative tool. We identified the following themes **as positive**: simplifying and speeding up work in a school or work environment, saving time in gathering and sorting information, facilitating routines, ease of adaptation and integration into life, innovation and technological breakthrough, part of a historical moment, and fascination with the discovery of AI. Among the **negative** themes we included: over-delegation of competencies, rapid and uncontrolled development, limitations of AI competencies, non-transparent investment in AI, underestimation of ethical regulation, production of manipulative misinformation content, and misuse of AI. **Neutral** themes also emerged, namely: the need for education, the importance of understanding, correct use, the legislative framework, and trademarks.

AI as both a potential risk and a tremendous benefit to society captures well the **central theme** for most respondents - finding a balance between the risks and positive aspects of AI. These responses allow us to track broader social and cultural trends in the adoption of AI tools. We also looked at the broader context of **perceptions of AI** and **LLM**. The four main themes emerging from the analysis are communication with AI, AI, as an entity, trust in AI and understanding how AI works. Based on the research conducted, it can be inferred that the interactions with LLM, their methods of addressing them, and their levels of trust or emotional attachment are interconnected aspects that influence each other. As the interviews revealed, it is not uncommon for participants to treat AI as an entity that

³ At the time of the study.

"deserves" respect and courtesy compared to search engines such as Google Search. Common human modes of communication, such as addressing, asking, and thanking, proved to be a valid form of communication towards AI as well. However, this also carries with it certain characteristics of behavioural advocacy on the part of the participants, in both directions - positive and negative behaviour. From the interviews, there is a sense that even the participants themselves are not sure what the right, individually and socially positive response is.

LLM are tools that, by their very nature, do not always provide reliable or truthful answers. The experiences of our participants with these tools confirm this issue. LLM sometimes generates responses that are fabricated or not based on accurate information, which can lead users to temporarily lose interest and foster resentment among participants. In contrast, this imperfection highlights the need to validate the outputs provided by LLM. Paradoxically, this characteristic can be beneficial, as the ability to error is perceived as 'human,' which helped build trust among participants. This leniency toward AI-generated inaccuracies is also linked to participants' understanding of how LLM operates. Those who had even a superficial grasp of LLM and generative AI principles understood the reasons behind such responses. The interviews revealed a consensus on the importance of critical thinking and the need to compare AI results with reality.

With one exception, all of our participants had **direct experience** using AI (LLM) tools. The frequency and extent of their use appear to be related to their field of study and the associated demands. Both high school and university students incorporate AI into their daily routines. We observed that their usage patterns were influenced by periods of increased demand, such as exam times, deadlines for term papers, or attendance at specialised AI-related training sessions. The intensity of use was also related to the novelty of tools such as ChatGPT. The participants mainly used ChatGPT as their LLM of choice. The popularity and usage of LLM were often tied to new releases or updates (e.g., Gemini), work-related requirements, or a desire to explore alternatives to ChatGPT, such as Perplexity AI, Bing Chat, DeepL, Snapchat's My AI, or Midjourney for image creation. Among the participants, the unpaid version of ChatGPT 3.5 was the most frequently used, despite the availability of version 4.0 at the time of the research.

A major topic discussed was the **ethical, security, and regulatory aspects of AI**. According to the participants, addressing these issues is crucial to ensure that the benefits of AI outweigh its potential risks. The participants considered ethical issues from various perspectives. These included the use of AI tools to improve efficiency in study and work, concerns about copyright, the enforcement of ethical standards, and the potential misuse of AI to spread misinformation, political manipulation, and in conflict situations. Participants also noted a clear solution to the dilemma of using AI in education: integrating AI as a legitimate and effective tool within educational settings. They emphasised that the ability to work effectively with AI tools is **a significant value in itself**, potentially even surpassing the importance of the content-related aspects of tasks. Furthermore, it is crucial to ensure that teaching staff receive proper training in these areas.

Although AI tools have the potential to positively impact society, they also pose significant risks, particularly in the absence of adequate control, regulation, and accountability. Participants expressed **concerns about several issues**, including diminished critical thinking leading to susceptibility to manipulation, data misuse, and unchecked advancements in AI technology. They also worried about the creation of artificial consciousness and the deterioration of interpersonal relationships.

Furthermore, participants speculated about the future development of AI, particularly the possibility of interacting with anthropomorphised AI or AI as a distinct entity, which could introduce numerous moral and legal dilemmas.

Conclusions

Most research on attitudes toward AI is quantitative, focussing on specific aspects of AI usage (compare Biswas, 2023; Peters et al., 2023; Rane & Choudhary, 2024). However, qualitative methods also play a crucial role in AI research. They provide insights into the current state and mood, capturing opinions and attitudes in a deeper way. In the Czech Republic, research on students' attitudes toward AI is minimal. Despite an active public debate on this topic, we found no relevant studies in the Czech context.

The aim of this research was to map the current attitudes of high school and university students toward AI and to identify and present specific themes that resonate with them. Attitudes are central to AI research, especially as technology evolves and becomes integrated in both personal and commercial spheres, impacting millions of people globally and within the Czech Republic on a daily basis. This mapping revealed a variety of topics, underscoring their urgency, priority, or, conversely, marginal interest. We identified six main themes, each with additional sub-themes:

- Individual attitudes towards AI (positive; negative; neutral).
- Perceptions of AI (communication with AI; trust in ChatGPT and other LLM; understanding how AI works).
- Mode of use and experience with AI (experience and frequency of use of AI and LLM; types of LLM used; mode of use - efficiency and time saving, access to information and educational tool; inspiration and entertainment; coding and programming tool; AI in therapy).
- AI education (education gaps; institutional attitudes towards education; student attitudes toward using AI tools).
- Concerns and threats from AI (loss of self-reason; lack of critical thinking; manipulation and misuse of data; unstoppable progress; deterioration of interpersonal relationships; aggression and war).
- Ethics and regulation (copyright; regulation and transparency; individual responsibility; AI abuse; AI as an entity).

Based on the nature of the topics, we identified two areas:

- Topics related to your own experience and your personal experience with AI.
- Topics related to AI and society and its direction.

In general, our research shows that older studies that pre-date 2022 often make claims that are inconsistent with current knowledge. The fluid nature and speed of change that the new world brings with it, with the presence of AI in daily life, raises the question of how long the results of these studies will be valid in the future. However, we achieved the primary objective, which was to capture and map student attitudes and capture a moment in the historical development of AI, with a particular focus on LLM such as ChatGPT. Mapping the current attitudes of high school and university students is also important with respect to the future direction of human-AI collaboration. It is this generation that will be responsible for the future outcomes and future direction of humanity. Only the future will tell us which direction we will take.

Project affiliation

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