PERCEPTIONS OF THE DESIGN AND USE CHATBOTS FOR EDUCATIONAL PURPOSES: A DIALOGUE PARTNER

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ABSTRACT

This study aims to analyze how professionals preparing to use technology in education reflect on the phenomenon of chatbots as learning objects. The study is divided into two parts. For the first part of the study, 17 studies indexed in the Web of Science database that focus on using chatbots in education were selected for a systematic review. From this study, six discourses were identified: a Chatbot is not human; a Chatbot is developed iteratively; a Chatbot is a solution to a specific educational problem; a Chatbot is a technological issue; a Chatbot is constituted by narrative and a distinct "psychology"; and a Chatbot is always available with the correct information. In the second part of the study, the responses of 29 respondents (12 teaching librarians and 17 students of the Educational Technology course) to questions about chatbots were processed by qualitative analysis. The analysis used the discourses obtained from the review study and examined their specific perception among this particular group. A key result was that even though the respondents worked with three chatbots without AI, they mentioned similar characteristics in their evaluation that they would apply to a live teacher. Thus, they understand chatbots as part of their learning environment without differentiating between living and nonliving systems.

Keywords: *review study, chatbot, qualitative research, librarian, artificial intelligence.*

INTRODUCTION

Chatbots or text-based dialogue systems have applications in many areas of human life (Brandtzaeg & Følstad, 2017; Jain et al., 2018; Shum et al., 2018). While their use in marketing or various information systems seems to be seamless and not very problematic, their application in education is widely discussed in the literature but at the same time insufficiently reflected by practice. We are getting better at designing systems using artificial intelligence in responses that recognizes the needs of the discussants; however, we need to answer other important questions for education, such as How should a chatbot be designed to make the user feel comfortable when interacting with it? What feelings do students have associated with using chatbots for education? Education is a social-psychological process that should also be reflected in the design and implementation of the chatbot and the speech interaction design for the user.

This study will aim to analyze the discourses that emerge in this area in education. Thus, the study views the chatbot as an actor in the educational process. The study is divided into two parts. First, 17 studies focusing on chatbots in education are analyzed and six discourses or approaches that emerge in this field are selected from this analysis. In the second part, users' experiences working with three specific chatbots are analyzed. Their experiences are studied through the six discourses to verify to what extent these discourses are also present in the reflections of professionals

preparing to work with educational technologies. This research is qualitatively oriented.

Therefore, the study relies on three essential starting points: a theoretical overview study, three developed and tested chatbots, and a research data analysis. In this respect, it offers a broader reflection on the issue than has usually been seen in other studies on the topic (such as Mokmin & Ibrahim, 2021; Tamayo et al., 2020; Topal et al., 2021; Vázquez-Cano et al., 2021).

Research questions:

- What approach to a chatbot can be found in the selected papers?
- Are these approaches also present among Czech respondents (educational technology professionals)?
- How to approach the use of chatbots in education? Are there differences between respondents' perceptions and the approaches specified in the literature?

Chatbots

A chatbot (a text-based conversational robot) is a program that is built on a text-based conversation between a user and a machine (Vázquez-Cano et al., 2021). The idea that a computer (machine) should communicate with a human comes in its current form from Alan Turing (Adamopoulou & Moussiades, 2020; Turing & Haugeland, 1950/2004). Turing viewed the ability to communicate through language or text as a fundamental manifestation of intelligence, thus building on the insights of the philosophy of language, which strongly links language to thinking (Pereira et al., 2016). The creation of an intelligent chatbot as an intelligent conversational device was seen as a definite goal of technology and technical development (Dale, 2016).

The first chatbot was Weizenbaum's ELIZA concept (Natale, 2019; Weizenbaum, 1966) from the mid-1960s. It was based on the simple manipulation of ideas in conversation to give the impression of never-ending inquiry about what the user is typing. A distinction can be made between chatbots that use artificial intelligence and chatbots with preprepared discussion paths. Since progress has been made in voice-to-text software, it is also possible to work with voice input chatbots (Dharwadkar & Deshpande, 2018; Inupakutika et al., 2021). Although Topal et al. (2021) considered only an entity with artificial intelligence to be a chatbot, the actual definition is probably broader (Tamayo et al., 2020).

Currently, there are numerous areas in which chatbots can be used: in marketing (Quah & Chua, 2019), healthcare (Cameron et al., 2018), tourism (Hasan et al., 2021), and even the field of education (Smutny & Schreiberova, 2020). Chatbots are used for a wide range of educational activities (Georgescu, 2018; Molnár & Szüts, 2018; Vijayakumar et al., 2019; Winkler & Soellner, 2018).

According to Reyes-Reina et al. (2020), chatbots are characterized by four elements: (a) they simulate human speech; (b) they communicate via chat; (c) they have no physical image; and (d) they do not represent a human being in the virtual world. This definition can be helpful because it shows that they are not a human substitute (Duncker, 2020) but a specific form of educational object intended to perform a specific educational function through the simulation of human speech in a textual interface (FAO, 2021). One of the goals of chatbots in education is to support the learning process (Jeno et al., 2019; Touimi, 2020; Vázquez-Cano et al., 2021).

The actual definition of education practices is unclear (Heidig & Clarebout, 2011; Huang et al., 2021; Palasundram et al., 2019; Schroeder et al., 2017; Vázquez-Cano et al., 2021), but there are several examples from specific fields such as mathematics (Grossman et al., 2019; Tärning & Silvervarg, 2019), languages (Jia, 2009; Kowsher et al., 2019), science (Carlander-Reuterfelt, 2020; Topal et al., 2021) or medicine (Kaur et al., 2021; Marsh, 2018).

Tamayo et al. (2020) listed the roles that a chatbot can play in education. Each item is accompanied by references to other studies along similar lines, clearly showing the relevance of this issue:

- Intelligent tutoring system (Clarizia et al., 2018)
- Improving student engagement (Ranjan et al., 2021)
- Intelligent feedback (Lee & Fu, 2019)
- Immediate assistance to the student (Berger et al., 2019)
- Alternative to learning management systems (Tamayo et al., 2020; Villegas-Ch et al., 2020)
- Teaching assistant (Hien et al., 2018; Tamayo et al., 2020)

- Mentor (Neumann, et al., 2021; Stuij et al., 2020; Wollny et al., 2021)
- Skills training (Lin & Chang, 2020)

Some researchers (Heller et al., 2005; Lee et al., 2019; Ruan et al., 2020; Wilcox & Wilcox, 2013) emphasized that the role of chatbots is determined through the support of a narrative approach. This narrative component influences the overall emotional design of a lesson (Chaves & Gerosa, 2021) and the interaction with the chatbot (Wilcox & Wilcox, 2013).

Securing chatbots is currently an important topic (Lai et al., 2019) that has not received sufficient systematic, standardized attention (Ye & Li, 2020). These issues are related to the user part of the application, the communication module, the response generation module, or the database (Ye & Li, 2020). As Følstad et al. (2018) pointed out, the issue of security is integrally linked to the issue of trustworthiness in its social, technical, and ethical dimensions. Finding appropriate ways to secure chatbots is crucial for their continued use and presents the ethical question of the ability to implement these technologies in the educational process.

Review Study of Chatbots in Education

Chatbots are becoming more common, because of either the growing experience with this technology or the increasing availability of technical solutions for their creation. More than 1,414 publications on chatbots can be found in the Web of Science database (WoS), mainly concentrated in the areas of computer science and information science. Our overview study focused on education and the temporal distribution of the results by year are 2017 (4), 2018 (14), 2019 (29), 2020 (35), and 2021 (24). The indexing of proceedings and journals increase over time, showing that this is a fast-growing topic. However, a glance at the individual studies shows a significant fixation on specific solutions and the absence of broader synthesizing frameworks.

The following procedure was performed to retrieve the documents for the review study from Web of Science:

- Data from the WoS database were used.
- The search query "chatbot" was used.
- The results were limited to the humanities and education.
- The search was not limited in time to the past but ends on October 16, 2021, when the dataset of analyzed texts was created.
- The results were limited to Open Access studies regardless of form.
- Irrelevant studies were excluded.

Justification of the individual filtration steps. The WoS database is the most prestigious database of scientific findings. The research focuses on the analysis of current scientific knowledge more than, for example, specific didactic inspirations for lessons or reflections on teaching. WoS indexes results worldwide, and even though it prefers English as the dominant language of scientific discussion, it provides a good overview of the current state of scientific research.

One of the aims of this study is to analyze the situation about education through research data. Given the time distribution of the study publications we looked at on WoS, setting a different time filter is unnecessary. The only older study in our research is Wilcox and Wilcox (2013); otherwise, the studies we analyzed are concentrated in 2021 (8), 2020 (5), and 2019 (3) and provide a very recent view of the issue. The fact that the study was conducted October of 2021 makes it impossible to include more recent studies.

Most problematic is the restriction of results to Open Access, which reduces the number of studies found from 46 to 17. The Open Access approach is well justified by the requirement to make studies freely available, which is ethically justified and at the same time allows readers to access these studies free of charge and without unnecessary barriers about methodological transparency.

These steps yielded a total of 17 studies, which are presented in the results section and a list of them can be found in a table in the appendix. Given the limited number of studies, our approach was qualitatively oriented. We looked at whether it was possible to formulate more general conclusions from the available studies that allow us to describe the current state and future development of this technology in educational settings.

Several comments can be made on the table in the appendix. Eight of the studies work with a chatbot using artificial intelligence and emphasize the importance of artificial intelligence for working with these objects, while four studies work with the notion of preprepared dialogue and highlight

the convenience and quality of such an approach. Thus, the data show a paradoxical situation in which studies emphasizing the importance of AI state that further development is needed for chatbots to achieve better results, but non-AI studies, such as Tamayo et al. (2020) or Vázquez-Cano et al. (2021), emphasize the chatbots' simplicity and, above all, their functionality.

There are few purely theoretical studies in the sample analyzed outside of Duncker (2020) and review studies or meta-analyses that do not work with developers or empirical experience. This means that we do not have enough theoretical studies about chatbots, but purely theoretical studies are likely to be very problematic. To think about chatbots in a structured way, a creative experience with them is essential.

Similarly, it is not possible to say that one type of research design predominates the sample studies. Quantitative studies (5) are more common than qualitative studies (2), with a high proportion of different reflections and self-testing of the development of a system (5). Similarly, there is no preferred area of chatbot implementation, as is evident in technical and linguistic and other issues. Thus, chatbots can be thought of as a kind of universal learning object.

In the following overview, each study is given one paragraph describing the essential information from the study relevant to our research. These are not annotations or abstracts, nor are they intended to identify the most important information from the study in general. Instead, they identify the kind of information that will allow us to answer what an educational chatbot should look like and whether such an educational object has any relevance.

Touimi et al. (2020) state that chatbots can serve as a good tool for facilitating a course or learning process, but their capabilities are currently insufficient to compose free chat. MOOCs (Massive Open Online Courses) provide enough data for analysis of student questions, which can be valuable for developing other chatbots and course innovation, but they need to be supplemented with systems for working with big data.

Topal et al. (2021) argue that chatbots have little impact on students' academic skills, but they allow students to learn outside of school. Students receive feedback from chatbots and find them to be subjectively exciting and fun learning objects. The chatbot positively affects the student's learning process and should be used where face-to-face teaching cannot work, as in the COVID-19 pandemic.

According to Mokmin and Ibrahim (2021), chatbots provide quality information on health issues and support students' academic achievement. The chatbot reduced dropout from the course and had a positive impact on course completion. Students found that they could learn new information from the chatbot and support their learning process, despite not always understanding the answers to their questions.

The uses of chatbots in education are being explored, report Palasundram et al. (2019). This is not primarily an educational consideration but a technical one: What are the models, data, and technologies that are strong enough to do? What can we change through these tools? Even relatively small experiments can have a significant impact on the quality of a particular AI implementation. In other words, the current capabilities of chatbots in a few years will be fundamentally different thanks to the cumulative experience of developers.

Wilcox and Wilcox's (2013) study shows that if chatbot development is successful, it must include a truly literary quality design, as is the case with prosaic literature. The authors talk about the fact that a chatbot must have its own story, emotions, and typical reactions, and at the same time be technically superior. The development of the chatbot encounters various problems, e.g., rude behavior or sexual innuendos on chatbots, which reduces the possibilities of their practical use and leads to considering the ethical dimensions of the whole application.

The development of the system is iterative, with more and more features added over time, Tamayo et al. point out. (2020). The original goal of making content accessible and tutoring fast was to add administrative issues to the system and work with basic concepts in the field. Thus, a permanent teaching assistant was created, but the chatbot is not a replacement for the teacher. Still, agendas can be delegated to an assistant to the teacher so the teacher does not need to attend to them, allowing the teacher to focus on other vital aspects. At the same time, the chatbot can be easily accessible to any user whenever they need it.

According to Vázquez-Cano et al. (2021),

students show better results in the specific phenomena practiced, have a higher level of engagement, and find learning more enjoyable. Chatbots support self-regulated learning and allow for scaling of content. An appropriate didactic design is key to success, as is improving the ability to work with content relevant to students, which leads to better academic skill development.

The study by Huang et al. (2021) identifies pedagogical situations in which chatbots can be used, i.e., as conversation partners, as a simulation of a situation, for knowledge transfer, and as helpers and sources of recommendations. At the same time, the study also analyzes the technical limits and shortcomings of chatbots and justifies the possible choices presented by different solutions. Chatbots can be a helpful tool for foreign language learning, provided that didactic recommendations and practices derived from previous research are followed in their development. An evidence-based approach should sustain developments in the field.

Berger et al. (2019) created a prototype chatbot to help people find the information they need for their studies through conversing with it. Students reported satisfaction with the chatbot. The development shows that while the prototype is of good quality and successful, further content and technical development aree required for full implementation. They stress that information for learning communicated in this form can be helpful for users.

There are currently many chatbots in use in the field of education, Smutny and Schreiberova (2020) note. Their meta-analysis systematically sorts and evaluates the chatbots, focusing on those that work in Facebook Messenger. They draw attention to the fact that the level of chatbots is highly heterogeneous and simple standardization is not possible. Future work may focus on supporting developers of these systems and researching custom dialogues that can provide valuable pedagogical data. They also note that many systems are short-lived, often being created only for study purposes, which reduces the possibility of further systematic scientific research in this area.

The chatbot can serve as a tool for reducing stress and other unpleasant feelings and problems that occur during studying (Herrmann-Werner et al., 2021). The authors of the study think of it as a digital personal assistant available to the student at any time. Further research for specific educational institutions would be to name the individual components the chatbot should reflect, though there already is considerable knowledge to construct its general framework. The paper is more an analysis of needs rather than a practical experiment, which significantly weakens the evaluation of the data and the relevance of the research.

Malik et al. (2021) seek to find out the students' perspectives on the phenomenon of using chatbots for education. In doing so, they use the Technology Adoption Model and emphasize that adaptability is possible when enough experience is gained, which is currently lacking. Therefore, the goal should be to seek experimental approaches that extend knowledge in this area so that chatbots can be implemented in a wide range of applications. The study highlights the lack of sufficient research data and expertise. Thus, working with chatbots is still relatively intuitive and focuses on similar problem areas such as improving academic skills and productivity, or providing entertainment. At the same time, there is a lack of focus on the learner and an increasing focus on form, technology, or content.

Stuij et al. (2020) compared oncologists' access to traditional elearning and chatbots. There was an apparent inclination towards classical forms of education in their evaluation. At the same time, the study shows that a system working with notifications or as a student coaching system does not work in this target group. What is appreciated, on the contrary, is the possible personalization of content, but this should not lead to eclectic education. The study reveals a more general problem in that users are not familiar with chatbots, which makes it significantly more difficult for students to use them and affects their feelings when working with chatbots.

Ranjan et al. (2021) focused on a survey of high school students that showed that 61% of them consider chatbots to be a personal assistant in education and were satisfied with it. The study further shows that chatbots can have a good effect on academic performance. The topic of chatbots is only peripheral, but it clearly shows that a chatbot and a live tutor or teacher are not mutually exclusive but complementary. The design of this complementarity is crucial for the successful adaptation of chatbots in education.

The study by Tärning and Silvervarg (2019)

focuses on what level of self-efficacy in communication acts is advantageous for a chatbot to have as a virtual teacher. It points out that lower self-efficacy is better for students, especially those who perform worse in tests. The researchers show how complex the process of preparing a chatbot is and that there is a need to consider its "psychological" or "social" dimension written into self-efficacy.

A theoretical study by Dunker (2020) focuses on the issue of working with language, specifically the ability of a chatbot to have a real dialogue. The author argues that a chatbot can communicate at the sentence level, but not in a broader context. The external resemblance to a chat between two people should not be confusing, but instead it should lead to considering for what a chatbot can be used. The study points out that working with chatbots does not make it possible to instruct teachers. A chatbot is a specific technical tool that can be further worked with; it is not a less qualified human or teaching assistant but a technological entity.

Xu et al. (2021) show that children's interactions with a chatbot and an adult human are different. With a live human, their speech interactions are more developed, but the chatbot and its questions can help develop their text comprehension and active reading. The study's authors see great potential in the use of chatbots as a supplement to working with literature, not as a replacement for a live human. The study focuses on kindergarten children (the average age was 4.8 years) and recognizes their different response patterns and expectations. This leads to a natural request to look for broader connections between the chatbot itself and the design of the whole educational situation in which it is used.

Analysis of the Review Study

In any qualitatively oriented study, the analytical part is necessarily subjective. Our research aims to analyze the potential use of chatbots in education. Through this lens, our research focused on the most important findings of the review study that can be used for the actual development of chatbots. From the analysis, we identified six areas that are relevant for the development of these applications.

A chatbot is not a person. Duncker (2020) points out that human-chatbot communication is always limited and specific. The understanding, thinking, and language capabilities of a chatbot are always different from a human. This means that we can look for a particular position for chatbots in the educational process, but it cannot substitute for a living human. Xu et al. (2021) point out that the interactions between young children and chatbots are different. This should lead to a reflection on how this kind of object can be handled. Ranjan et al. (2021) point out that students would like to work with chatbots even though they are not human. Similarly, Berger (2019) points out that "inhumanity" need not be detrimental to functionality or user satisfaction. Mokmin and Ibrahim (2021) point out that students interact differently with a chatbot as a technical entity than with a live human, but this does not mean that such interactions are not beneficial. Topal et al. (2021) suggest working with chatbots where it is impossible to work with humans directly.

The chatbot is developed iteratively. The chatbot is not a standardized, off-the-shelf technology (Smutny & Schreiberova, 2020), but educators are looking for ways to use and design it appropriately. Similarly, Huang et al. (2021) offer a broad, yet exhaustive, list of educational situations in which chatbots can be used, noting that technical shortcomings may still be perceived as problematic. Tamayo et al. (2020) clearly describe the process of incrementally adding features and tools, and Vázquez-Cano et al. (2021) do the same. Thus, a chatbot is not a ready-made and well-standardized product, such as a text prop or PowerPoint, but is gradually improving and changing. Therefore, an emphasis on publishing small shifts, probes, or partial experiences can also be seen (Berger et al., 2019, Malik et al., 2021; Palasundram et al., 2019; Touimi et al., 2020).

A chatbot is a solution to a specific educational problem. A chatbot is an ordinary educational object and should perform the particular functions for which it is intended. This is the approach taken by Stuij et al. (2020) in the education of oncologists, Vázquez-Cano et al. (2021) in preparation for university studies in Spanish language teaching, Tamayo et al. (2020) in microeconomics education at university, and Topal et al. (2021) for science education in grade 5. There is a clear section of topics and needs that these objects are intended to fulfil for these cases. At the same time, however, Berger et al. (2019) and Tamayo et al. (2020) argue that part of the study is also the possibility of gaining information about the

survey itself. This administrative part of the study is essential for students, and chatbots can be very useful. Touimi et al. (2020) look for ways to facilitate the educational process in MOOCs.

The chatbot is a technological thing. Chatbots have been the subject of systematic development, mainly relying on artificial intelligence (Palasundram et al., 2019; Wilcox & Wilcox, 2013; Berger et al., 2019). This technical perspective can also be seen in Huang et al. (2021), who stress the need to work with an evidence-based approach. The chatbot allows all dialogues to be tracked, and good research can positively impact the whole field (Mokmin & Ibrahim, 2021). The need to share the data collected for the technological and pedagogical part of the professionals is emphasized by Smutny and Schreiberova (2020). Palasundram et al. (2019) go even further and emphasize that the development of chatbots themselves should be concentrated in areas where there is big data, given the evidence-based approach and data availability. Touimi (2020) emphasizes that there needs to be new technological ways to deal with big data processing in chatbots.

A chatbot is made up of a narrative and a specific "psychology." Wilcox and Wilcox (2013) carefully analyze what needs to be thought through and written down in terms of the chatbot's narrative. Its communicative expressions and aspects of working with a chatbot liken the creation of a chatbot to the creation of a character in a literary work. Tärning and Silvervarg (2019) emphasize the importance of the psychological and social dimensions of the chatbot and conducted research on the communicative acts associated with the self-efficacy of the chatbot and its impact on student learning. Topal et al. (2021) talk about reducing distance and supporting students' psyche, which is also partially supported by Herrmann-Werner et al. (2021), who talk about reducing stress, and Ranjan et al. (2021), who work with the positive impact on students' academic performance. In contrast, an example of the mismatch between psychological and social determinants between users and chatbots can be found in Stuij et al. (2020).

The chatbot is always available with the correct information. The chatbot can play the role of an information manager in the educational process because it is always available. Mokmin and Ibrahim (2021) reported that through the transfer of information, their chatbot reduced student failure in a course and, therefore, had a positive effect on course completion. Berger et al. (2019) created a chatbot purely to convey information and support learning agendas, and they report that students appreciated it. Stuij et al. (2020) point out that the key to effective implementation is good design and working with the target audience. Presenting information alone will not bring quality to the educational process. Tamayo et al. (2020) started with a chatbot to convey organizational and administrative data and gradually expanded its functions. Therefore, this aspect can also be seen as a steppingstone for further development of dialogue systems.

The six approaches can be seen in Table 1, which includes a brief description and reference to the studies in which each approach appears (see also Table Ap1 in the appendix). The table lists the authors that can be assigned to the approaches (one author can be listed for multiple approaches) and provides a brief description of each approach (or discourse of thinking about chatbots) obtained by abstraction from the studies.

METHODOLOGY

This study is based on a qualitative analysis of respondents' answers, which is structured through six discourses presented in the review study above. For these reasons, the methodology, results, and analysis are processed separately, and then fully interconnected in the discussion and conclusion.

While chatbots can be used in different areas of education, our research focuses on information literacy (Kubiatko, 2007; Turusheva, 2009), which is interesting because it combines education's technical and humanities elements and fits in the teaching of computer science in a Czech context. It is qualitatively oriented research that follows the work of Herrmann-Werner et al. (2021), Stuij et al. (2020), and Mokmin and Ibrahim (2021).

The study focuses on early career professionals (educational technology students and librarians) and their professional vision of the use of chatbots. At the same time, it builds on the research discourse set out by Tamayo et al. (2020) and Berger et al. (2019), who work with reflections on self-created chatbots. While previous research has focused exclusively on the users of a given chatbot, the perspective of the potential creators or educators that

Table 1. Different Approaches in the Articles, their Definitions, and List of Relevant Studies

Approach	Description	Studies
The chatbot is not human.	A chatbot has no human features in communication. Communities and developers need to create a specific space for chatbots. Technical difficulties are a secondary area to focus on in development.	Duncker (2020), Xu et al. (2021), Ranjan et al. (2021), Mokmin & Ibrahim (2021), Topal et al. (2021)
The chatbot is developed iteratively.	A chatbot is never created as a finished product. It is constantly being improved, modified, and changed or extended. Even technically, there is no final concept of how a chatbot should work.	Huang et al. (2021), Smutny & Schreiberova (2020), Tamayo et al. (2020), Vázquez-Cano et al. (2021), Touimi et al. (2020), Palasundram et al. (2019), Berger et al. (2019), Malik et al. (2021)
The chatbot is a solution to a specific educational problem.	The chatbot should respond to a particularly existing learning problem or deficiency and try to fix it. It is not appropriate to create a one-size-fits-all solution—look for ways to remedy a specific issue instead.	Stuij et al. (2020), Topal et al. (2021), Vázquez-Cano et al. (2021), Tamayo et al. (2020), Berger et al. (2019), Touimi et al. (2020)
The chatbot is a technology thing.	A chatbot is primarily a software entity and should be treated as such. The goal of the development is to improve the work with data, artificial intelligence, and technology to the point where a technically universal, widely implementable, solution is created.	Palasundram et al. (2019), Wilcox & Wilcox (2013), Berger et al. (2019), Mokmin & Ibrahim (2021), Smutny & Schreiberova (2020), Touimi et al. (2020)
The chatbot is made up of a narrative and a specific "psychology."	A chatbot as a communication partner must have certain features and characteristics to make communication motivating, supportive, fun, and functional. It is advisable to pay special attention to this area because it is essential to design the whole educational environment of which the chatbot is a part.	Wilcox & Wilcox (2013), Tärning & Silvervarg (2019), Topal et al. (2021), Herrmann-Werner et al. (2021), Ranjan et al. (2021), Stuij et al. (2020)
The chatbot is always available with the correct information.	The chatbot never sleeps, is never bothered by anyone, but is always ready to provide the necessary information about the study, the course, the learning materials, etc. This information has an impact on students' learning success and overall comfort during the learning process.	Mokmin & Ibrahim (2021), Stuij et al. (2020), Berger et al. (2019), Tamayo et al. (2020)

use them in practice as learning librarians is crucial for this research.

Given the nature of the research data and the qualitative nature of our research, the aim was to find out whether Czech users reflect on chatbots in all the identified approaches and topics, how they think about working with them, and how they may feel about it. This research is intended to inform future research on larger samples that are quantitative or that can use sentiment analysis. Our sample size is too small for the relevant data in sentiment analysis (the English language responses preclude machine analysis using data mining methods), but the research results do show some findings, although further research would be needed to generalize them.

Research Sample

To evaluate chatbots in this area it was necessary to define the research sample appropriately. The research aimed to offer the perspective of experts on the topic and knowledge about the technological aspects. Therefore, there were two groups of users that both met these conditions and were available to us.

Students of the Educational Technology course. These students were enrolled in the continuing Master of Library and Information Studies (LIS) program and took this elective course. Their focus was educational technology, so they were familiar with the chatbot phenomenon and technology in education in general. They also had a good understanding of information education issues from their previous studies.

Learning Librarians. These librarians, who were creating or planning to create online courses took a two-day workshop focused on elearning in general and discussed various learning objects. These librarians routinely practice information education and see it as essential to developing educational technology. Participation in the course was voluntary; it was not an employer-mandated course. The university offered the workshop as part of librarians' lifelong (professional) education. Data collection was a secondary objective of this course. In it, students practiced working with

Table 2. The Table Captures a Description of the Research Sample in Terms of Occupation, Gender and Age.

Group / Designation	Women	Men	Total	Age (20–29)	Age (30–39)	Age (40–50)
Librarian [L]	7	5	12	3	6	3
Student [S]	12	5	17	15	2	0
Total	19	10	29	18	8	3

various learning objects in two four-hour blocks and, in their free time, created their objects or worked with those already made (e.g., the tested chatbots).

These two groups can give expert opinions, evaluate the developed chatbots, and offer insights into the broader perspectives of their use in this field. Table 2 presents the primary distribution of respondents and their demographic characteristics. Due to the anonymity of the research, we use in the results section the respondent labels [S] referring to students and [L] referring to librarians.

The research was based on data from 29 respondents, of whom 19 were women and 10 were men. Most respondents were in the 20-29 age-range category, so the population was younger than the average age of librarians in the Czech Republic.

The only demographic data obtained included gender and age. The research was conducted from October 19 to November 1 in 2021. The chatbots were part of a project developing information literacy skills in high school students and were created during the 2020-2021 school year. Their use is long term and not fixed, unlike many other studies, such as Smutny and Schreiberova (2020), who reported for the research study only.

Research Tool

To explore the perception of respondents, they must have specific experience with the chatbot. At the same time, this experience must be fixed to the particular approach or solutions that users are evaluating. The implementation of chatbots in education can take such a different form (see Tamayo et al. (2020) and Berger et al. (2019)) that they cannot be compared. Respondents in the research worked with three chatbots (each respondent tried all three) and answered the following questions based on their experience:

1. What learning objectives (knowledge, skills, attitudes) can it be used to develop? Is it more suitable for reflection or for developing competencies? For knowledge? In your opinion, can it help to change attitudes?
2. Do you feel that using a chatbot increases the feeling of being active on the topic being discussed?
3. Can you compare it with other available educational objects? Does it have any advantages or weaknesses compared to a textbook, worksheet, test, presentation...?
4. Can you name the main benefits of a chatbot for education? What could it be good for? What would you use it for?
5. Can you name its major drawbacks and weaknesses? In what situations would you not use it?

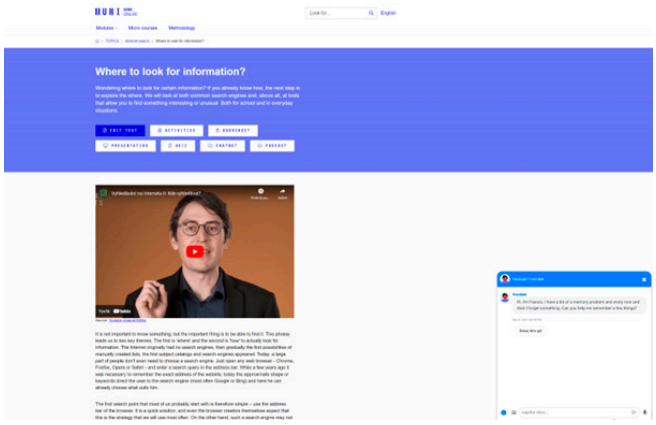
The questionnaire was sent out and responses were collected anonymously. This allowed respondents to be critical of the test chatbots. At the same time that the research questions were submitted, the respondents were informed that their answers would be used for research purposes.

The three chatbots (Table 2) were devoted to topics that generally fall within information literacy education (Figure 1). In the Czech environment this is reflected in the subject Informatics or Information and Communication Technologies (the designation of subjects in secondary schools is the responsibility of the particular school). Therefore, it is a topic closely related to the STEM field, but at the same time it emphasizes issues in information literacy, which does not always have to be understood as a technical or scientific field, and in the development of which libraries are generally strongly involved.

The chatbot is located on the left side of the web page as an add on. In the picture it is active in the learning dialog.

The Snatchbot.me application allows free creation of chatbots without programming knowledge was used to create the chatbots (Figure 2). The

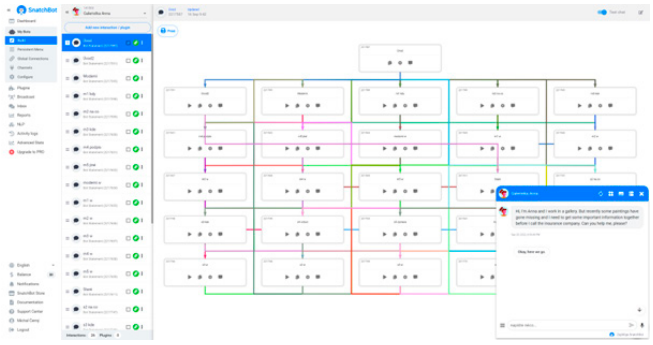
Figure 1. Integration of Chatbot into a Web Environment Designed for Information Literacy.



approach to platform selection was identical to that of Tamayo et al. (2020) and Vázquez-Cano et al. (2021). The difference was that the chatbots did not focus on presenting resources for learning or administrative tasks but took a more hands-on approach to what Tamayo et al. (2020) refer to as the second phase of their development, i.e., working with learning content. The tool chosen for the research combined free text responses (in which keywords are then searched for) and answer selection using buttons (provided with a short text to structure the dialogue in advance). Table 3 lists the three chatbots tested. In addition to the chatbot's area of work and a brief description, the number of interaction fields, i.e., chatbot responses, that can be heard during specific user responses is also given.

The chatbots were integrated into a website with educational content, allowing respondents to work in an environment commonly available to the high school students for whom the chatbots are intended. The implementation was accomplished by embedding JavaScript in the web page.

Figure 2. Development Environment Used to Create all Three Chatbots (Snachtbot.me).



Participants in the research were asked to go through all three chatbots and perform the tasks given to them by the chatbots. The scope of the chatbots' work was information literacy. The focus of each chatbot was as follows:

- **Chatbot for information retrieval:** The respondent had to use various tools and unusual search procedures to retrieve the specific information necessary to continue the dialogue. There were several options for answering the questions, but working with WolphramAlpha, orsearching the Land Registry, Google, or Wikipedia was expected.
- **Chatbot for an information evaluation:** The respondent was asked to read a text from a disinformation server and, in the course of the dialogue, identify the various problematic aspects of the message. They had to find out who the article's author was, what sources and information they used, what language they used, and how they tried to influence the reader's emotions. The aim was to analyze the text gradually.
- **Chatbot for virtual museums and galleries:** The respondent had to use image searches and gallery pages and, with this data, answer individual questions related to the painting's description. The dialogue aimed to develop the ability to search for visual information and work with it appropriately.

Data Processing

Respondents answered in Google Forms. The answers were exported to a spreadsheet and then organized into Student (S) and Librarian (L) responses. The datasets thus created were then imported into the qualitative data processing program Atlas.ti. We then researched whether the discourses that emerged from the overview analysis of the study (Table 4) could be identified in the data, and what was the respondents' overall view of the possibility of using chatbots of this kind (without the use of artificial intelligence) for the field of information literacy development.

Statements directed towards the six discourses were then coded, which identified new

Table 3. The Table Briefly Characterizes the Description of Each Chatbot that Users Tested.

Chatbot's work area	Brief description of the chatbot	Number of fields
Chatbot for information retrieval	The chatbot aims to support competency-based learning. The student has to use different information retrieval tools to get the correct answer, and if they fail and answer incorrectly, they will get feedback from the chatbot to tell them how to proceed next time. It does not force the student to write the correct answer, without which they cannot move on, but it instead alerts them to the way to get to the solution. It works with the narrative principle. The dialogue starts with the sentence, *"Hi, I'm Francis. I have a bit of a memory problem, and now and then, I forget something. Can you help me remember a few things?"* He then puts individual questions in front of the user. The user always types in the answers.	16
Chatbot for an information evaluation	The goal of the chatbot is to practice using the 5W+H (Who? What? Where? When? Why? How?) method of media literacy with a student. The student works with a specific text to look up detailed information about the author and the medium, and evaluates the text's purpose and language. The chatbot works with the narrative concept by starting with the sentence, "*Hi, I'm Veronica Curious; I like to explore things around me... I'd like to ask you what you think about one such thing... it's bizarre, but I was reading this weird article just now... It's this one:* (...) *I have a strange feeling about it. Can you help me understand it?"* The six individual questions combine free response and push-button response choices.	16
Chatbot for virtual museums and galleries	The range's largest chatbot is based on an initial choice of preference for classical or modern art. The student chooses according to their discretion and then has to search for information on a specific work of art (e.g., by the artist and description to find out the title, the location of the signature, the area of the painting in the gallery, etc.). Thus, it is about the development of competencies to search for information about art artefacts. The dialogue starts narratively: *"Hi, I am Anna, and I work in a gallery. But recently some paintings have gone missing, and I need to gather some important information before calling the insurance company. Can you please help me?"*	26

ways of seeing the issue and the advantages and disadvantages arising from interaction with specific chatbots. Detailed work with the codes was not necessary due to the small amount of data. We worked with nine codes, which are given in Table 4 and include the frequency of occurrence. A description of the first six is provided in the analysis of the results.

Despite the code frequency table, it is essential to emphasize that our study is qualitatively oriented. It is not the frequency but the quality and structure of individual responses that are crucial.

Limits of the Study

The limits of the study can be divided into two parts—the limits of the review analysis and the limitations of the empirical study. In the first part, it is clear that the analysis was working with a limited number of studies. By using only Open Access studies, the number of topics and studies

Table 4. Codes Used in the Processing of User Feedback and Their Frequency of Occurrence.

Code	Frequency of occurrence		
	Student	**Librarian**	**Total**
Chatbot is not human	16	4	20
Chatbot is developed iteratively	4	3	7
Chatbot is a solution to a specific educational problem	8	11	19
Chatbot is a technology thing	6	12	18
Chatbot is made up of a narrative and a specific "psychology"	22	4	26
Chatbot is always available with the correct information	4	8	12
A new understanding of chatbot use in education	4	2	6
Benefits of chatbots	45	31	76
Disadvantages of chatbots	28	16	44

obtained was limited. However, 17 studies do represent a reasonable number of texts for a review study, which is not a separate research output but the first research phase in empirical research. At the same time, with the exception of Smutny and Schreiberova's (2020) study, review studies on the use of chatbots in education are lacking. Compared to Smutny and Schreiberova's (2020), our study is differently designed and more up-to-date, though smaller in scope. Wollny et al. (2021) pursue the issue of chatbots from a more technical and less educational perspective.

In the qualitative part of our study, the following limitations can be identified:

- The limited sample (29) of respondents does not represent a sufficient number to draw firm conclusions. However, the study is adequate to form its theory by proceeding qualitatively. The study aims to formulate more general assumptions or ideas about how students perceive educational interaction with chatbots. Although we used a questionnaire, the evaluation of the responses was purely qualitative. The research results suggest that the data collected allow us to form some theory about chatbot-learner interaction that could be quantitatively tested in future research.
- The scope of responses was limited because qualitative research usually works with more extended interviews. However, what is vital for this research is that respondents reflected on their own experience working with the chatbot directly and in structured questions. Even though interviews would have provided additional information, the interview approach we chose is sufficient concerning the research questions.
- The respondents are a specific population. The results of the qualitative study cannot be generalized to the whole population, but the topics on which the research focuses seem to be sufficiently universal.
- Respondents have experience with specific chatbots and their answers are influenced by this. In response to this objection, (a) a significant number of research studies work with this model of experience reflection or prototype analysis, so it is a methodologically common practice; and (b) without experience with a chatbot (a known chatbot), research of this kind cannot realistically be conducted, as a reflection on a specific experience, not general ideas about chatbots or a set of disparate partial experiences is vital for this research.

We are aware of these limitations and have respected them in developing the research design.

RESULTS AND ANALYSIS

The individual results are presented in the manner outlined in the methodology section of the study. We will follow the themes and offer the respondents' understanding through the lens of the individual statements of the two groups of respondents. We do not distinguish the individual respondents from each other; we only differentiate between Students [S] and Librarians [L].

A chatbot is not a human. What makes this discourse interesting is how individual users deal with it. The boundaries between humans and machines are complex to define, so we received statements such as, "Since the chatbot is supposed to mimic a conversation with a real human, it cannot very reliably be used for long explanations" [S], and, "I think most people will still trust humans more than technology" [S], or "the biggest weakness I see is that we may not understand the chatbot" [S]. In this regard, students even lend it a human characteristic: "it is good in the role of the examiner" or "dialogue is always a stronger and more effective method than a monologue" [S].

According to some, a chatbot can replace a human: "I imagine it could simulate a tutor—in some narrowly defined area, of course" [S], but according to others it is limited in this area: "It is a robot, its answers may not match what we need to find out/practice, it may not understand us, which can lead to frustration for the student" [S]. We thus see a certain thematic ambivalence, depending on the particular experience or characteristics of the respondent.

The chatbot can be friendly: "It's an advantage for the younger years to act like a friend" [S], or even helpful: "It enhances that feeling, dialogue about the topic being discussed with a chatbot is useful in certain cases in my opinion" [L], and advantageous: "It has advantages in that

the student is learning interactively, using dialogue with the chatbot" [L].

One can also trace a line towards a deeper reflection of the dialogue: "I can imagine that the chatbot would also help students in the area of competence development, in which case the student would ask questions to the chatbot rather than the chatbot to the student" [S]. The emphasis on constructivist education principles and the genuine mutual dialogue between students and chatbots is evident.

Even though the chatbot is not human, it seems problematic to define and delineate this relationship for respondents. On the one hand, they are aware of the technical limitations and complicated nature of the conversation itself: "The biggest weakness I see is that we may not understand the chatbot, but there is no other person" [S]. On the other hand, it is evident that they project the idea of the communication partner as a real person into the communication.

The chatbot is developed iteratively. This research has an identifiable discourse problem because the respondents were not chatbot developers, nor was this question directed towards development. But we can still find insight into the incremental modification and improvement of the chatbot through the responses: "I think there is a lot of testing and validation involved" [S], "For knowledge development, a huge amount of data would need to be put in with multiple answers. It would mean a lot more work" [S], or "To do its job, the dialogue should build on itself and appear natural. For this, the dialogue must be well programmed in advance. Logically, the programmer is not able to affect all possible types of responses so that the chatbot can respond well when in use" [L].

Interactivity is manifested more in the need to test and find all the correct solutions. At the same time, it was generally negatively evaluated by respondents. The respondents are clearly aware of the difficulty of development and that they still see chatbots as educational objects as something new or experimental, rather than as a regular part of traditional elearning.

A chatbot is a solution to a specific educational problem. This discourse is linked to the particular experiences of the respondents: "I liked it best in the variant of working with one specific text" [S], "It is suitable for working with texts where the learner's attitudes need to be probed and changed" [S], "It is more suitable for developing competencies or testing knowledge" [L], and

> I would use it as a supplementary piece of information to a text, where it should also function as a quick overview of whether students have taken anything away from the text. But it should be short, but at the same time, the conversation should cover the most important ideas from the main text, and if it is to be a review, the answers should be specific about the minimum words [S].

Elsewhere, librarians state, "For smaller subject areas, it is appropriate, such as chatting about a not-so-large article or a narrowly focused topic" [L], or "I think it might be fine for practicing foreign languages" [L].

The last statement is significant because good targeting affects student motivation, fun, and engagement. Working with a specific text, competence, or knowledge was significant for respondents. This shows that they think of chatbots as a component of the educational process.

The chatbot is a technological thing. This discourse is present in the respondents as a negative definition of the whole issue. If a chatbot malfunctions, fails to respond to questions, or has other problems, it is a technical issue. In contrast, for example, artificial intelligence is only minimally mentioned by respondents:

> Sometimes we often don't control how a student answers - in a traditional test, for example, we have options, or a human source scores the real answer. If we set up closed questions in the chatbot, the problem usually does not arise, but open questions, grammar, punctuation and other things that a real teacher would tolerate, for example, can play a role. In short, there is a greater degree of sort of error rate [S].

Further, "it has to be fine-tuned so that users are not put off by technical problems, nonrecognition of answers, etc." [L], "the limitation I see is artificial intelligence, which still has its limits" [L], or "the error rate—not all answers that a student may write can be predicted, misunderstanding of the question may occur, there may be processing errors where, e.g., the chatbot will not be able to skip to the next question, etc." [S].

But the technique itself can also be subject to criticism:

> Sometimes personal contact and communication are preferable. So while technology can make things easier, sometimes less is more. We can then get into issues of technostress, digital wellbeing, etc. I have already mentioned the disadvantages of the chatbot itself in an earlier answer - the need for equipment, the difficulty of handling open-ended responses [S].

In other words, part of the technical solution is finding appropriate ways to have a broad enough dialogue that is natural and of high quality, without mistakes and with a minimum of misunderstanding. The goal is to minimize errors. On the other hand, even this approach may not be entirely practical because the use of technology in education is not always the ideal way of working with educational content.

A chatbot is made up of a narrative and a specific "psychology." This narrative was probably the richest and most interesting, which is also undoubtedly related to the design of the chatbots used by the respondents. Respondents naturally expanded from the chatbot's narrative and psychology to the user's narrative and psychology. This extension is logical because this discourse is fundamentally propositional and interactional. There is no isolated narrative or isolated psychology of the chatbot:

> Even though I may not be into all topics, I find it great with chatbots that even though I didn't fully understand a topic, I was always curious about what they would answer. First of all, I was curious about the right answer, but more importantly, I was curious about what it would say. Would it be funny? Would he ask any further questions? Will he be angry if I answer wrong? I'm sure even little things like that can motivate students to action [S].

Respondents further said, "I felt drawn into the topics by having it delivered in quite an interesting way" [S], or that the chatbot "Acts as a partner in communication. This is both a strength and a weakness. Suppose you can keep it going from start to finish, great. If not, then frustration can set in" [L].

On the other hand, this may not always be positive: "It is not easy to set up a chatbot to be able to respond adequately to a variety of responses, which raises the issue of chatbot authenticity" [S], and "It does not always feel natural. The student will not learn more detailed information than the chatbot can" [S].

From all these answers, the psychological dynamic between the user and the chatbot is crucial for the user. This dynamic leads to greater motivation of the learner, which the respondents rated as a positive feature. However, this anthropomorphic understanding of chatbots increases the demands on the quality of the creators' execution, authenticity, and responsibility. The research shows that, along with the absence of technical problems, this is a crucial aspect of the whole development of dialogic educational systems. Therefore, it must also be given greater attention.

The chatbot is always available with the correct information. This discourse can be divided into two parts: the possibility of individual access and motivation of the student and administrative, organizational, and informational interaction with the student. The respondents reflected both parts of the discourse:

> I could see a good use for history, geography, literature ... You can practice names, works, years, and important events. If a student doesn't know, the chatbot can offer a hint, and the student will then remember the correct answer just by using the hint [S].

Also, "Maybe partly for searching information in the text. It could be very easy to program for activities like 'Tell me what you prefer, and I'll tell you what book to choose'" [S]. Both of these statements are pointing towards personalized learning as seen in the fact that a chatbot can provide accurate, tailored information at any time. Other responses referred to specific applications: "I think it can be a better tool for practicing some knowledge or developing search skills if it gives tasks" and "As a supplement to teaching. A playful way to teach students to look for information that doesn't lead off the top of their heads" [L].

In general, the answers regarding interactivity and the constructivist approach that can be

developed with chatbots were necessary for the respondents:

> Attractiveness, novelty, not used much in education yet, it's original. A nice way of reminding yourself of the topic. It can be answered on all devices. It is online, partly reminiscent of social networks. I especially liked the concept of the information assessment, where the student can formulate their own opinions [L].

> Interactivity, speed of answers, some students and others may not be shy to answer because they suggest it to the Chatbot [L].

> I find the chatbot suitable for both reflection and competence development. It also depends on the nature of the person, which learning style suits them better, whether they prefer formal learning or some interactive methods [S].

> If only some interaction even at the level of knowledge, then yes, I would talk about an active approach here as well. If we see "active" only at a higher level of just for example competences, then it depends very much on its grasp [S].

Therefore, chatbots offer great possibilities (or great potential) in the field of active learning. On the other hand, a question to which the respondents did not have a shared answer is to what extent the chatbot can be used for reflection during learning: "I think it is not suitable for reflection, because it is complicated to predict and respond to answers" [S], "I find the chatbot suitable for both reflection and competence development" and "It is suitable for both reflection and competence development. Yes, it can help change attitudes. If one analyzes the text and becomes aware of certain contexts, then change can occur" [S]. This topic should undoubtedly be the subject of further research.

Regarding the administrative and educational part of the discourse, one respondent mentioned, "As I mentioned earlier, it may be most appropriate in FAQs in educational processes. Otherwise, the student may be very stumbling" [S], while others added, "At the same time, the substance can be supplemented with interesting information and facts that make it easier to remember" [S], or "It could change attitudes towards information sources" [L], or "It is useful as an aid to achieving knowledge development, e.g., through referring to good sources of information" [L]. Thus, chatbots can enhance students' knowledge and serve as a comprehensive information service tailored to the student.

Positive perceptions. The benefits of chatbots have been mentioned in the aspects above. Still, in general, it is possible to highlight two aspects that respondents talked about, namely interactivity and novelty linked to fun. Interactivity can be traced; for example, "It has advantages in that the student learns interactively, using dialogue with the chatbot" [L], "The interactive form is more appealing than the worksheet and test that a well set up chatbot can replace" [L], or "Interactivity can increase the attractiveness of the topic, the ability to remember and to solve basic questions promptly" [S]. Interactivity is one of the basic ideas of constructivist education and a clear benefit associated with this form of education.

Similarly, statements focused on the fun and novelty of chatbots can be observed:

> Definitely yes! Chatbot always sparks something new and modern in me [S].

> Chatbots in education are relatively new. From my own and friends' experience, I know that chatting with a chatbot is not boring and can activate the interviewee in a pleasant way. At the same time, communication with chatbots is not difficult and is often playful [S].

> From my point of view, the chatbot is becoming more and more fun as it is something new that is not so worn out in education, or how to say [S].

The statement that Chatbot connects the two levels has an advantage in interaction in that it can be fun and, to some extent, relaxing for students: "A pleasant conversation with a chatbot about a particular topic can make students a little more interested in the issue" [L], or "interaction, highlighting crucial information, the fun practice of new knowledge" [S].

From these statements, we concluded that the respondents perceive the chatbot as an element of the educational environment that is new, accentuates constructivist elements of education, and leads

to greater interactivity and involvement of those who learn through it. Although other responses often emphasize the advantages of different forms of learning (for example, textbooks or worksheets), we see the essential elements of constructivist learning are named in chatbots. Within our research, this is not a general idea but an experience with specific chatbots.

Negative perceptions. These can be divided into several subgroups. Respondents talked about the difficulty of creating a functional chatbot, the error rate, and other problems: "it is complicated to estimate and respond to answers" [S], "on the other hand, drawing a person into a dialogue can also have negative consequences if they use words or phrases that the chatbot does not recognise, which ends up with the user getting stuck somewhere in the dialogue" [S], and "we often don't control how the student responds" [S], "It needs to be fine-tuned so that users aren't put off by technical issues, non-recognition of answers, etc." [L], and "To do its job, dialogue should build on itself and appear natural. To do this, the dialogue must be well programmed in advance"[L].

They also expressed skepticism towards the creation itself: "Honestly, I don't find it very useful yet, or the energy invested in creating and testing the chatbot doesn't seem adequate" [L]. Thus, respondents perceived it to be essential that the dialogue does not end in error or misunderstanding, and, at the same time, that the chatbot's design and preparation are not too demanding. This tension can only be resolved by seeking some kind of balance in the design between errors and ease of use. Future educators need to be trained and better prepared to work with chatbots in their education.

Marginally, respondents pointed to ethical (or ethical-communication) limits: "I believe that even a chatbot can lead to a change in attitudes, e.g., it overwhelms us with various benefits of a product and we as customers buy the product" [S], "Thus, the user must follow its terms and order, nothing can be skipped, sped up or skipped over" [S], and "The weakness [is] that in a chatbot one does not have the opportunity to dissect one's own opinion ... one does not get individual feedback, and there is no room for discussion" [S].

The analysis of the negatives is related to the respondents' answers to the previous points. The chatbot is perceived as an entity entering into honest dialogue, and with this are demands that are placed on the dialogue. The chatbot is not a textbook or worksheets, i.e., an inanimate learning objects, but it is expected to engage in dialogue as a form of education where there is an understanding of expectations on both sides of the communication and an ethical dimension of the communication. To create a chatbot is to create an educational object that is not value neutral.

New topics. New topics have already been reflected in the previous points, especially the question of ambivalence, the specific anthropology of chatbots, and the subject of their use for reflection, as well as the need to take into account their internal "psychology" and the psyche and motivations of the students in the design of these objects.

Respondents must work with a specific mindset that needs to be developed in chatbots. "So far, more for clearly definable knowledge and competencies, improvisation in unexpected answers is still very lacking" [S]. This statement highlights that chatbots cannot improvise, one of the most complex and sophisticated forms of human thought. This is followed by another, "Chatbot dynamics are conducive to the associative mode of human thought" [S]. This respondent pointed out that it is not just the chatbot's thinking that is important, but its interaction with the student, which is also confirmed by a librarian who claimed that there is "the temptation to catch a chatbot with an answer it won't be able to answer" [L].

All these answers refer to what was identified as interactivity in the analysis of positives. Only here do they take a specific form. Interactivity shapes the chatbot as an entity having a particular meaning and significance, as an element that, through interaction with the student, teaches something, and, above all, changes the student. The processes of thinking and learning needs to be analyzed more carefully so that the chatbot can perform this transformation in a significant and productive way.

DISCUSSION

Wilcox and Wilcox (2013) have already drawn attention to how people perceive chatbots as persons of lower social status by trying to humiliate them or making sexually explicit advances towards them. A more unfamiliar example of this is the Microsoft Tay project, a Twitter chatbot that users

have turned into a neo-Nazi during conversational interactions (Neff & Nagy, 2016; Wolf et al., 2017). However, all of these systems relied on the concept of machine learning. The respondents' answers show neither the negative aspect of communication nor social superiority nor other negative phenomena. The investigated chatbots did not possess any artificial intelligence, yet the respondents perceived them as a whole part of the dialogue.

Floridi (2013, 2015) pointed out that to describe contemporary society, we must abandon the division between technology and humans and follow the perspective of the inforg. According to Floridi (2013), an inforg is an information organism or information agent, an entity capable of information interaction. While respondents do not explicitly argue that a chatbot has a specific ontological value at the human level, they attribute human features when interacting with it, i.e., the same means of expression could also be used for dialogue with another human or for a general teacher. The results show that this conclusion is not so much related to the internal structure of the entity (the difference between AI and deterministic algorithms) but its form (a chatbot).

Floridi's (2013) conception of interactions between informants (humans, biotic systems, technical systems) as the essential activity of individual objects in the information environment is evident from the respondents' answers. The chatbot serves a primary purpose for learning precisely by being interactive, leading to interactions that change the internal structure of the learner's skills, attitudes, or competencies. Our research experimentally confirmed Floridi's theoretical concept. Respondents emphasized that chatbots inspire motivation, promote interactivity, and provide feedback in a similar way that teachers do. The fact that they felt flustered when dialogue failed to achieve acceptable results confirms Floridi's concept of inforgs to describe information interactions.

Although chatbot communication has its factual and linguistic limitations—as pointed out by respondents and many authors (Duncker, 2020; Fryer et al., 2019; L'Abbate et al., 2005)—it is the conversation that establishes the basic notion of the chatbot as a specific entity and not just one of many educational objects. Although the respondents compare the chatbot to a textbook or a worksheet, they endow it with entirely unexpected qualities of being interactive and fluent in dialogue, and able to motivate, give feedback, lead to reflection, ask questions, etc. In other words, the chatbots seem to have similar characteristics as a teacher. The fact that the dialogue that is not completely clear or contains some errors leads to respondents rapidly giving up dismissal, which is significantly different from other more common learning objects.

Probably the best-known concept for human-computer interaction in dialogue is the Turing test (Elkins & Chun, 2020; Moor, 2003). Turing emphasized that the goal of developing an intelligent dialogue system is not to create a new ontological entity comparable to a human but an algorithmic structure capable of dialogue indistinguishable from the human conversation (Howick et al., 2021; Wheeler, 2020). This approach is crucial for developmental design of chatbots. On the one hand, the dialogue needs to be authentic and believable, but at the same time, it is the specific characteristics of the chatbot (continuous accessibility, high quality and timeliness of information, the feeling of not being bothered by the user, technological attractiveness) that are important for educational results. The simple possibility of dialogue is essential for respondents. This finding is educationally significant because it allows us to create chatbots as learning objects in "small languages," which are much more challenging for developing dialogue based on computer processing of natural language.

This topic is often naively reflected in the literature—a chatbot does not have the same characteristics as a teacher. It is not human and needs to be given a specific place in the educational process (Colace et al., 2018; Huang et al., 2021; Jia, 2004) or in its facilitation of learning (Mendoza et al., 2020). Respondents' answers indicate that there is a need to find ways to use education's human and technical possibilities appropriately. The chatbot is an ethically and educationally responsive element in education, so explicitly separating it from the human element makes no sense. Chatbots should be seen as a jointly interacting part of the educational environment in which learning (i.e., some transformation of the learner) takes place.

This belief among respondents regarding the ontological meaning of chatbots leads to an interesting problem: Respondents expect it to behave ethically. When the ethical aspect of educational objects is contemplated, people usually focus on

gender or ethnic justice or equality (Aikman & Unterhalter, 2005: Cohen, 1969; Horsford, 2016; Tesch-Römer et al., 2008). The same aspect is also mentioned by the United Nations (FAO, 2021). However, there is a need to develop a new, broader framework that addresses not just the ethical focus on specific groups of people but, more broadly, how a chatbot should adequately respond in an educational context, how it should behave, and what its tone of voice should be.

In the literature, much attention has been paid to the chatbot's technological design and the availability of sufficient quality training data, and the appropriate setup of algorithms, for it (Ganesan et al., 2020; Hussain et al., 2019). Thus, chatbots have been viewed as a technical topic of significant interest. However, it is essential to highlight their educational (Hwang & Chang, 2021) and social dimensions (Chocarro et al., 2021). The technical design also was necessary to our research respondents, but their perception differs from the dominant literary discourse. Dialogue functionality is critical so that the user can get along with the chatbot. We believe that chatbot development has come a long way in the last decade, but overall educational reflection and thought about incorporating these systems into education is still limited (Okonkwo & Ade-Ibijola, 2021). Our research is one step in contributing to the growing understanding of the primary educational design aspects of chatbots in education (Fryer et al., 2019).

The interactivity of learning, i.e., the constant conversation leading to the acquisition of knowledge, skills, competencies, or attitudes, is key to the constructivist approach to education (Bada & Olusegun, 2015; Duffy & Jonassen, 2013; Yoders, 2014). It was this aspect of learning with chatbots that respondents repeatedly mentioned. The research and development of chatbots is often based precisely on constructivist principles (Bii, 2013; Chang et al., 2021; Jia & Ruan, 2008), but these principles need to be constantly emphasized. Learning through a chatbot must be linked to activity, as the respondents in our research claim. The fact that user interaction with the chatbot leads to learning and work support was repeatedly discussed by respondents.

One of the critical activities in constructivist-oriented education is reflection work (Desautel, 2009; Nagowah & Nagowah, 2009; Wilson, 1997). Respondents repeatedly emphasized that some of them would also like to use the chatbot to reflect on their educational progress or current state of learning. This component is also represented in the literature (AlKhayat, 2017; Kerlyl et al., 2006). However, our research has brought forward new findings because respondents do not need an AI system for reflexivity but rather see a chatbot as a tool that creates space and structure for them to reflect. This also goes back to Weizenbaum's concept of the first chatbot, ELIZA (Natale, 2019; Weizenbaum, 1966). Reflection is often encountered in various materials (e.g., reflection questions at the end of chapters in elearning), but there is insufficient space to develop them effectively (Dyke et al., 2006; Yilmaz & Keser, 2016). The chatbot as an element of constructivist learning to support the reflective learning process is a theme of both the respondents in this research and the review study, and we conceived the experiment in this paper to be constructivist. Chatbots use different tools, procedures, and knowledge to engage with the respondent's individual preference to have the dialogue. The positive interaction of the chatbot with the respondents shows that the respondents also perceive such an approach to be effective.

The chatbot is described in the literature as a learning object, both relating to its ability to learn and it being an information tool. Both of these aspects are represented in the review study. This research focused only on the role of chatbots as educators. Respondents claim that chatbots can educate them, which is consistent with other research findings (Abbasi et al., 2019; Wollny et al., 2021). A chatbot can play a significant role in the educational process even when it consists of a simple deterministic dialogue (Tamayo et al., 2020; Vázquez-Cano et al., 2021), but the key to its success is the quality and sophistication of its functions, its ability to respond adequately to stimuli, the quality of its narrative and, above all, the reduction of technical shortcomings. The results of our experiment support this finding, and we consider it an important message for future developers of chatbots for educational purposes.

CONCLUSION

The study had two objectives: (a) to determine whether the same themes or discourses would emerge in respondents' responses with specific

experience with chatbots that do not use artificial intelligence as seen in the literature (Research Questions 1 and 2); and (b) to analyze how to create effective chatbots for educational purposes (Research Question 3).

The research has shown that it matters little whether or not an artificial intelligence approach for chatbots is used, at least at the level of the themes emphasized by the respondents and how these compare with the results from the review study. The respondents deepened or emphasized some topics (narrative, humanness of chatbots, user psychology) in more detail than previous research studies.

Research has shown that even chatbots created without artificial intelligence systems can develop users' specific knowledge, skills, and competencies. Some contradictions can be seen with the topic of value development and testing. The use of SnatchBot.me shows that the key to a good solution (in our small sample) is to use cross-curricular relationships in education. We believe (and the review study demonstrates this with specific domain examples) that using chatbots in education is undeniably a positive phenomenon. The existence of simple tools also makes it possible to broaden the portfolio of creators. As much as this study focused on professionals and their professional vision of the issue, an ordinary high school student can create a chatbot. During this activity, they would develop computational thinking and language and communication skills or knowledge in specific areas. Studies beyond Stuij et al., (2020) show that the use of chatbots in education is positive and affects cognitive and metacognitive levels, which is also confirmed by the research data in this study.

Research has demonstrated a lack of an adequate theoretical framework for the full development of chatbots in education, such as Floridi's philosophy of information. Respondents clearly emphasized a constructivist approach to chatbot design, highlighting the dimensions of fun, novelty, and, above all, dialogue. Reflecting on the importance of dialogue for education is a central theme in the philosophy of education, which can be seen already in Socrates or Plato. With chatbots, however, it takes on a new dimension. Respondents in the research clearly show that working with a chatbot has the character of dialogic teaching, which activates and motivates students. The goal of chatbots is not to replace the teacher but to enable the improvement and intensification of the student's educational experience. The data show that chatbots perform this aspect sufficiently.

The research showed that the respondents perceive the chatbot as an educational tool of high quality to engage in informational and social interaction. They recognize that motivation, support, and feedback are a natural part of learning that a teacher provides. At the same time, the respondents agree that they positively understand the prospects of implementing chatbots in education, especially in elearning. It does not seem to be important whether the chatbots are built on systems with or without artificial intelligence. What is critical is a thoughtful and quality dialogue that does not lead to frustration, the underlying negative emotion associated with using chatbots, which has been demonstrated in this research and the literature. According to both the review study and the research we conducted, the fundamental problem facing the development of chatbots is the overall conceptual rethinking of the "anthropology" of chatbots so that these dialogue systems can be used as effectively as possible in the educational process. A significant part of the discussion in this paper focused on this topic.

The last—but not insignificant—result of this study is that even the example implemented in a small language (Czech) coincides in basic parameters with the results from the review study, which predominantly worked with English. The possibility of knowledge transfer with the use of chatbots in education in the context of intercultural dialogue can be partially asserted.

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APPENDIX

Table Ap1 presents the elementary characteristics of the analyzed studies. For each study, we list the author team and year of publication. The table works with the distinction between theoretical (T), empirical (E), and application (A) papers. It can be seen that a large number of studies with both theoretical and empirical overlap are based on a specific applied product that can be further worked with. In addition, we list the research methods used, the area of focus, the number of citations in WoS (Web of Science), the impact factor of the journal in which the study was printed, the country of origin (university department of the first author of the study), and whether or not the authors rely on the AI version of chatbots in their reflections on chatbots.

Table Ap1. The Table Shows an Overview of the Analyzed Studies.

Authors	Year	E/T/A	Methodology	Area of focus	IF	Quote	Country	AI
Touimi, Y. B., Hadioui, A., El Faddouli, N., & Bennani, S.	2020	E/A	System development design using Bayesian statistics	Support in MOOC courses	N/A	5	Morocco	Yes
Topal, A. D., Eren, C. D., & Geçer, A. K.	2021	E	Quantitative research, experiment	Science in 5th grade	2,917	0	Turkey	Yes
Mokmin, N. A. M., & Ibrahim, N. A.	2021	E	Mix design	Healthcare	2,917	0	Malaysia	Yes
Palasundram, K., Sharef, N. M., Nasharuddin, N., Kasmiran, K., & Azman, A.	2019	E/A	System development design	Unspecified	N/A	5	Malaysia	Yes
Wilcox, B., & Wilcox, S.	2013	T/A	Reflection of development experience	Litigation, common discussion	N/A	4	USA	Yes
Tamayo, P. A., Herrero, A., Martín, J., Navarro, C., & Tránchez, J. M..	2020	E/A	Reflection of development experience	Microeconomics	N/A	1	Spain	No
Vázquez-Cano, E., Mengual-Andrés, S., & López-Meneses, E.	2021	E/A	Reflection of development experience	Language learning	4,944	0	Spain	No
Huang, W., Hew, K. F., & Fryer, L. K	2021	T	Meta-analysis	Language learning	3,862	0	China	Irrelevant
Berger, R., Ebner, M., & Ebner, M.	2019	E/A	Reflection of development experience	Orientation in the studio	N/A	1	Austria	Yes
Smutny, P., & Schreiberova, P.	2020	T	Meta-analysis	Unspecified	8,538	28	Czech	Irrelevant
Herrmann-Werner, A., Loda, T., Junne, F., Zipfel, S., & Madany Mamlouk, A.	2021	E	Qualitative research	Orientation in the studio	N/A	0	Germany	Irrelevant
Malik, R., Sharma, A., Trivedi, S., & Mishra, R..	2021	E	Quantitative research, experiment	Unspecified	N/A	0	India	Irrelevant

Stuij, S. M., Drossaert, C. H., Labrie, N. H., Hulsman, R. L., Kersten, M. J., Van Dulmen, S., & Smets, E. M.	2020	E	Qualitative research	Healthcare	2,463	2	Netherlands	No
Ranjan, R., López, J. L., Lal, K., Saxena, S., & Ranjan, S.	2021	E	Quantitative research	Unspecified	N/A	0	Chile	Irrelevant
Tärning, B., & Silvervarg, A.	2019	E	Quantitative research	Mathematics	N/A	1	Sweden	No
Duncker, D.	2020	T	Theoretical study	Language learning	N/A	1	Denmark	Yes
Xu, Y., Wang, D., Collins, P., Lee, H., & Warschauer, M.	2021	E	An experiment, a quantitative study	Language learning	8,538	1	USA	Yes