Exploring the Potential Impacts of Chatbot Software/Apps (ChatGPT) on Education: Benefits, Drawbacks, and Future Prospects

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ABSTRACT

With a focus on the advantages, disadvantages, and potential applications of this cutting-edge technology, this study investigates how chatbot software and apps may affect education. Using the text or voice communications, chatbots are computer programmes that mimic human-to-human communication. Artificial intelligence and natural language processing are combined in chatbot software/apps to quickly understand user requests and provide information, support, and extra services. In the context of education, chatbot software and apps have the ability to promote student engagement, increase access to knowledge, and offer a more affordable option than paying human teachers. Yet, there are issues with chatbots' inadequate comprehension of difficult subjects, their incapacity to support pupils emotionally, and the potential loss of jobs for human teachers. This research examines the effectiveness of Chatbot software and apps in various educational settings using case studies and examples. This paper ends with a discussion of the possibility for additional advancement and innovation in this area as well as how Chatbot software/apps have the power to change education as we now know it.

Keywords: Chatbot, ChatGPT, Software, Apps, Transform Education, AI, Natural Language Processing.

INTRODUCTION

The rise of intelligent systems based on machine learning and artificial intelligence is having a profound impact on information systems across many areas. These intelligent systems are being used to automate and optimize a wide range of processes, from data analytics and decision-making to customer service and fraud detection. In the field of information systems, machine learning and artificial intelligence are being used to develop intelligent patternsthat can make predictions or recommendations based on the learning [1]. It is essential to approach AI critically and realistically because of how significantly AI will affect education. Although it offers intriguing possibilities, its drawbacks and difficulties must be taken into consideration because it is not a cure-all. These technologies also bring up significant ethical and societal challenges, like bias, privacy, and data security, which must be addressed. We must carefully assess the effects of these intelligent systems as they develop and become more integrated into our daily lives, and seek to ensure that they are applied in ways that benefit society as a whole [2].Also, there is a chance of exaggerating the potential of AI in education, which could result in inflated hopes and disillusionment. It's crucial to take a balanced approach and take into account both the possible advantages and restrictions of AI in education. By doing this, we can make progress towards utilising AI to improve both student and teacher learning. While chatbots and AI systems have the potential to revolutionise education, there has been a huge increase in interest in their integration. Students can receive individualised learning experiences, immediate feedback, and on-demand support via AI systems and chatbots [3]. Additionally, by automating administrative activities like scheduling and grading, these technologies can assist educators so they can concentrate on instructing and supporting students. Concerns exist, though, on how AI will affect education. For instance, there is a chance that AI could feed prejudices or maintain educational disparities.

Furthermore, as AI systems advance, there are worries about the potential job displacement of educators. The adoption of chatbots and AI systems in the academic setting has the potential to completely transform how we teach and learn, but it is crucial to approach this technology from a critical and ethical standpoint. We must carefully weigh the potential advantages and drawbacks of AI in education and try to create solutions that make sure AI is applied in ways that are advantageous to the whole community [4].

The main of this paper is to examine chatbot software's and applications' efficacy in various educational contexts. The article offers insights on the use of chatbots in education via case studies and examples. In the case studies we discussed, real-world scenarios or problems are described and then examined to determine the main aspects or difficulties that affect them.

To illustrate how chatbots have been employed in educational contexts, the difficulties encountered, and the advantages gained from their employment, case studies are used in this study [5]. The case studies give readers a hands-on

understanding of the applications of chatbots in various educational contexts and the results of those applications. Examples are real-world situations or examples used to illustrate a concept or notion. Examples are provided in this paper to demonstrate how chatbots have been applied in various educational contexts and how they have addressed particular issues.

The examples give a good idea of how chatbots might be utilised to promote student engagement, enhance learning, and simplify administrative work.

The study gives a thorough analysis of the efficacy of chatbot software/apps in various educational settings using case studies and examples. Making educated decisions about the usage of chatbots in education can be made easier for educators, researchers, and policymakers thanks to the case studies and examples' insights [6].

Consequently, here are some research questions that could be explored in this paper on the potential impacts of chatbot software/apps on education:

1. What are the drawbacks of using chatbots in education, and how can they be addressed? How do students perceive the use of chatbots in education, and what factors influence their perceptions?
2. How can chatbots be designed to enhance student engagement and motivation in learning? What are the ethical considerations involved in using chatbots in education, and how can they be addressed?
3. How can chatbots be integrated with other educational technologies (e.g., learning management systems) to improve student outcomes?
4. What is the potential impact of chatbots on the workload of educators, and how can this impact be mitigated?
5. How can chatbots be used to personalize learning experiences for students, and what are the implications of this for education?
6. What are the future prospects of chatbots in education, and how are they likely to evolve in the coming years?

OVERVIEW OF CHATBOT SOFTWARE & APPS IN EDUCATION

History of Chatbot Software & Apps

These software and apps have come a long way since their inception. Here's a brief history of their evolution:

- Eliza (1966) - Joseph Weizenbaum created the initial chatbot named "ELIZA" in 1966, which uses pattern matching and replacement techniques to mimic human conversation.
- Parry (1972) - In 1972, psychiatrist Kenneth Colby developed PARRY, a computer program that simulated a patient with schizophrenia. The program used natural language and attempted to replicate human thought processes [7].
- A.L.I.C.E. (1995)–1995 was the time when Richard Wallace generated a chatbot, A.L.I.C.E. (Artificial Linguistic Internet Computer Entity) that can converse in any language and employs heuristic pattern matching to do so. Asthis was the first application to run on a computer with the name Alice, the programme was first known as Alicebot.
- Smart Child (2001) -The Smart Child, an early version of Siri, was created in 2001 as a chatbot that could have light-hearted discussions and offer simple access to a variety of services. It catered to young adults in the US between the ages of 18 and 24, and was available on both AOL Instant Messenger and MSN Messenger. Although AIM usage has decreased over time, Microsoft has also developed a Smart Child that focuses on particular subjects [7].
- Siri (2010) -Siri was created by Apple in 2010. Its development represented a crucial turning point for chatbots and personal assistants, opening the door for later AI bots and PAs.
- Google Now (2012) -Google launched Google Now in 2012 at the Google Inch event. The AI bot makes recommendations, provides information, and carries out activities by submitting queries to different web services [8].
- Alexa (2014) -Amazon developed Alexa, which is a smart personal assistant, and unveiled it in 2014. It is included in a number of gadgets, including the Amazon Echo, Echo Dot, and Echo Show, and it may also be accessed through the Alexa app. Moreover, devices with Alexa capability have been created by independent producers.
- ChatGPT (Current) -In 2021, OpenAI created the ChatGPT, a sizable language model. It is made to help users create text that looks like it was written by a person. The concept can be applied to a variety of tasks, including dialogue generation and language translation. The generated text frequently resembles human-written language due to its intensive training on a large amount of data. For its capacity to produce natural-sounding language and its potential for usage in a variety of applications, ChatGPT has received high praise [8].

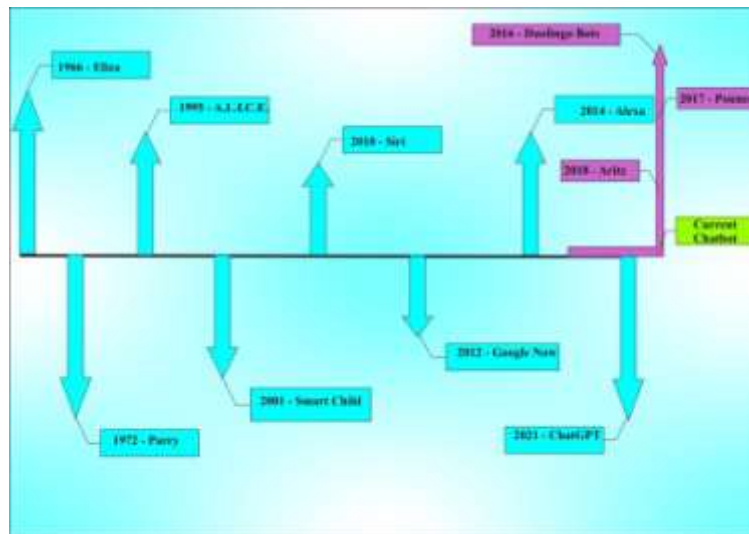**History of Chatbot Software & Apps in Education**

Figure 1 History of Chatbot Software & Apps

Figure 1 is showing the history of chatbot software and apps in general and in education sector.
They have started to acquire popularity in the educational sector in recent years. In recent years, chatbot software and apps have begun to acquire popularity in the educational sector. They are being utilised to offer individualised support and help to students, such as assistance with homework, academic counselling, and even mental health support [7].

Chatbots can also be utilised to deliver information on classes, grades, and campus services, as well as to respond to frequently requested inquiries. A chatbot can assist students with their academic objectives, language acquisition, and career counselling. Chatbots have a lot of potential in the realm of education. Student support and advice can be improved by integrating chatbots into the educational system, which could ultimately result in increased engagement and academic success. Additionally, chatbots can speed up access to help and streamline administrative procedures, making it simpler for students to navigate their academic careers [8].Below is a synopsis of their development:

- Duolingo Bots (2016) -The well-known free language-learning platform Duolingo today released three new language "tutors" in its iOS app. The AI-powered chatbots are marketed as a method for users to learn a new language without having to pay for pricey classes. Users can exchange texts to practise a foreign language, providing them with a constantly forgiving, uncritical tutor [9].
- Pounce (2017) -Pounce, a ground-breaking chatbot with artificial intelligence enhancements from Georgia State University, is highly known within the institution for assisting prospective students in navigating the challenging world of financing, registration, and just getting started in college. Georgia State is now observing increases in student performance when classrooms use the chatbot to maintain communication [8,9].
- Aritz (2018) -A chatbot dubbed "Aritz" was developed at the University of Deusto in Spain to help students with their academic work and provide personalised comments on their assignments.
- Chatbot (Current) -To offer pupils individualised guidance and assistance, chatbot technology is still being researched and employed in education. They are utilised to offer academic advising, assist students with their assignments, and even support their emotional health [7,8,9].

Advantages of Chatbot Software & Apps in Education
Each learner has a different preferred pace, learning style, and learning preferences. While the standard educational system is intended to serve the typical student, some children might not get the help and attention they require to achieve. As a result, the standard of education given to kids has been compromised. Yet thanks to the development of technology, we now have resources like chatbots that can assist in solving this problem. By compiling data about students' learning preferences and behaviours, chatbots can offer customised learning experiences. This enables them to suggest appropriate books, programmes, and study materials.

Moreover, chatbots can adjust to a student's learning style and speed, giving them the assistance they need to better absorb the material [10].

By making learning more engaging and participatory, chatbots in education can help to enhance students' learning experiences and raise their enthusiasm in learning. Here are several methods chatbots can use to accomplish this:

Chatbot Software & Apps as a Tool for Learning & Education

The most advantageous and desired use of AI is the automated, intelligent tutoring system, which provides a specific learning environment to study in and then analyses students' responses and their patterns of engagement with the artificially intelligent learning content. Chatbots can be developed to deliver educational material and engage in dialogue with students. Students who like to learn at their own pace or may find it challenging to access conventional educational resources may find this to be a beneficial tool [11]. Also, based on a student's reactions and development, chatbots can offer rapid feedback and individualised learning experiences. The usage of chatbot software and applications, which are computer programmes that mimic conversations with human users, as a learning and teaching aid is growing. Chatbots are growing more sophisticated as technology develops and are able to offer students tailored, interactive, and interesting learning experiences. The potential of chatbots to offer tailored learning experiences in education is one of their main advantages. Chatbots can analyse a student's learning habits using machine learning algorithms and modify their teaching methods accordingly [12]. This can involve delivering extra materials or explanations to assist students comprehend complex ideas or giving individualised feedback on tasks and tests.

Chatbots can assist students in realising their full potential and maximising their academic performance by customising the learning experience for each unique student. They receive all the essential learning materials from the chatbot, just like in a traditional classroom, before taking quizzes or examinations and reporting their results to their teachers. They determine the grades and offer feedback. This facilitates tracking student performance more easily and speeds up the procedures. This facilitates tracking student performance more easily and speeds up the procedures [13].

Chatbot Software & Apps as a Tool to Increase Student Engagement

Apps and software that use chatbots can be an effective tool for raising student engagement in a variety of ways. To start, chatbots can give pupils a more engaging and individualised learning experience. Chatbots can maintain students' interest and motivation to learn by offering quick feedback and adjusting the learning experience to each student's needs [14]. The usage of chatbots can foster a more cooperative learning environment. Chatbots can promote collaboration and create a feeling of community among students by promoting group discussions and enabling them to exchange ideas and thoughts with one another. By gamifying the learning process, chatbots can help students find it more interesting and enjoyable. Chatbots can encourage students to interact with the subject and work to improve their performance by integrating elements of competition and reward into the learning process. Apps and software for chatbots can be a useful tool for boosting student engagement and enhancing the educational process. By utilising chatbots' capabilities, educators can develop a more engaging, dynamic, and collaborative learning environment that promotes student achievement [15].

Chatbot Software & Apps as a Tool to Provide Smart feedback

Real-time intelligent feedback can be given to students via chatbot software and apps. Smart feedback is customised feedback that is catered to each student's unique needs. Chatbots can assess student responses and give feedback tailored to their strengths and weaknesses using artificial intelligence (AI) and natural language processing (NLP) technology. For instance, if a student is having trouble with a certain subject, a chatbot can offer personalised comments and extra resources to help them advance [16]. Additionally, the chatbot can modify its comments in response to how the pupil is doing, presenting increasingly difficult information as they show mastery of the subject. Chatbots can offer fast feedback in addition to individualised input. Students who might be reluctant to ask questions in a regular classroom situation will find this to be especially helpful. Chatbots can keep students interested and motivated to learn by giving quick feedback. Chatbot software and apps can be an effective tool for giving pupils insightful feedback.

Chatbots can assist students in achieving their academic objectives by using AI and NLP technology to deliver personalised, quick feedback that is tailored to each student's specific needs [15,16].

Chatbot Software & Apps as a Tutor

Chatbots can be a tutor and have a number of advantages. By automating repetitive operations like grading and responding to frequently asked inquiries, they can help educators save time. This frees up teachers to concentrate on more original and interesting areas of instruction, such developing engaging lesson plans and activities. In order to give students individualised and interactive learning experiences, chatbot software and apps can be utilised as tutors [17].

Chatbots can be developed to provide educational content in a conversational way, answering inquiries from students and giving them feedback on how they are doing. Chatbots can be a great tutor because they have a number of advantages. They may first give each student individualised attention while tailoring the learning process to suit their unique needs and learning preferences. Students who struggle with regular classroom instruction or who require additional support to meet their academic objectives may find this to be of special benefit [18]. Chatbots can be used by teachers to monitor pupils' development and spot areas where they might need further guidance. This can be especially useful in large classes where it might be challenging for teachers to provide each student individualised attention.

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Chatbot Software & Apps as a Students Companion

- Responds to General Queries: Course schedules, exam dates, library hours, and campus events are just a few of the often asked issues that can be addressed by a chatbot that has been designed to respond to them. This can save students time by allowing them to easily get the data they require without having to conduct independent research [19].
- Individual Assistance: By taking into account each student's academic standing and areas of interest, chatbots can provide individualised support. For instance, a chatbot can recommend appropriate courses or programmes depending on a student's educational choices and professional goals [19].
- Study Advices: Students can get tips from a chatbot on how to study more efficiently and get ready for tests. This can involve advice on reading material, time-management techniques, and invitations to join study groups.
- Assignment & Projects Help: Students can effectively manage their homework and projects with the aid of chatbots. To assist students in effectively completing their assignments and projects, chatbots can give reminders to them about approaching deadlines, offer comments on their draughts, and suggest good sources of information.
- Emotional Assistance: By offering them tools for stress management and self-care, chatbots can help students take care of their mental health. Also, if necessary, they can direct students to school resources for counselling and support [19,20].

Disadvantages of Chatbot Software & Apps in Education
Although chatbots can be a useful tool in education, their use also has certain potential drawbacks. The following are some drawbacks of chatbot software and apps in the education:

- Diminished Personalization: Even while chatbots can be trained to mimic conversation and offer individualised guidance, they cannot take the place of a human instructor or counsellor in terms of empathy and emotional support. Students might feel better at ease discussing their private problems with a genuine person who can relate to their emotions and respond to them in a kind and sympathetic way. Consequently, it's crucial to use chatbots in education as an additional tool rather than as a substitute for face-to-face connection [21].
- Diminished Understanding: A chatbot's algorithm is programmed with specific keywords and phrases that it is supposed to comprehend and reply to. On the basis of the facts they were trained on, they can only offer pre-set responses. A user's question may be difficult for the chatbot to understand and respond to if it falls beyond the parameters of its programming or if they use a language that it is unfamiliar with. Chatbots might also be unable to offer nuanced responses that call for a better comprehension of the context or emotional intelligence. To find a more individualised and practical solution in certain situations, it might be necessary to escalate the conversation to a live customer support representative [22].
- Tech Problems: Technical problems can occasionally prohibit chatbots from functioning properly. These technological problems may be brought on by a number of things, such as server outages, software bugs, or network problems. Students who require urgent assistance may find it frustrating when these technical problems occur. Because of this, it's crucial for businesses using chatbots to have backup plans in place for handling any potential technical issues. This can involve setting up a specialised IT team to keep an eye on the chatbot's functioning and address any issues, as well as offering other ways for students to get assistance, such phone support or email [23]. Additionally, businesses can proactively lower the risk of technical problems by routinely checking the software and hardware of their chatbots, updating them as needed, and doing tests to make sure the chatbot is operating properly. Organizations can reduce the likelihood of technological problems and guarantee that students can get the assistance they require when they require it by adopting these actions [23].
- Overconfidence on Technology: The potential to acquire critical thinking and problem-solving abilities, which are crucial for success in higher education and beyond, may be lost on students who rely only on chatbots for academic support. Chatbots can answer particular questions for kids, but they are unable to have the same degree of conversation and discussion as a real teacher or guidance counsellor [24]. Organizations that employ chatbots can urge kids to seek out further assistance from real professors and counsellors as needed to allay this worry. They can also give students access to materials and tools like online tutorials, interactive learning exercises, and peer-to-peer support networks that promote critical thinking and problem-solving. In the end, the use of chatbots in education should be intended to enhance rather than take the place of human help. Organizations can establish a more effective support system that caters to the various requirements of kids by giving students access to both chatbots and real professors and counsellors [24].
- Expensiveness: The cost of creating and maintaining chatbot software may make it difficult for some educational institutions to use them extensively. Educational institutions might investigate several alternatives for creating

and adopting chatbots to solve this challenge [25]. Using pre-existing chatbot platforms or outside services is an option that can be less expensive than building a custom chatbot from start. The pre-built templates and integrations offered by these platforms and services are frequently adaptable to the unique requirements of the educational institution. Before scaling out to a bigger deployment, another approach is to start small and pilot chatbots in particular areas, such as student services or academic advice. Before spending money on a more extensive implementation, this strategy can assist educational institutions in testing the efficacy of chatbots and identifying areas for improvement. Finally, educational institutions can think about cooperating with other businesses or looking for financing sources to promote the creation and use of chatbots. For instance, scholarships or funding opportunities may be accessible through public or private foundations that support cutting-edge educational technologies [26].

Case Studies & Examples of Chatbot Software & Apps in Education
There are many case studies of chatbot programmes or applications being used in classrooms. Here are a few illustrations:

Duolingo - With the use of artificial intelligence and gamification, the language learning programme Duolingo, users may learn a new language. The app's chatbot, which interacts with users in a conversational style to mimic a real-world discussion with a native speaker, is one of its primary features [27].

The chatbot will pose a series of questions in the target language to users as soon as they start a lesson on Duolingo. The chatbot will offer feedback and corrections based on the user's responses, assisting them in honing their language abilities. The chatbot will provide clues and explanations if the user needs assistance understanding a specific word or grammar rule. Together with the chatbot, Duolingo also has other tools including interactive games, listening and speaking practise, grammar and vocabulary drills, and speaking and listening exercises. Users of all ages and skill levels will find learning a new language to be interesting and fun because to the app's interactive and engaging design [28].

- NLP - Natural language processing (NLP) is how Duolingo's chatbot deciphers and responds to user messages. NLP enables the chatbot to decipher the user's purpose and answer in a suitable and beneficial manner.
- Individualization - Each user's learning experience will be tailored by the chatbot. It adjusts to the user's level of expertise and offers suggestions and feedback based on their development.
- Experiential Learning - Also, the chatbot is made to support users' contextual learning. It helps users apply what they've learned in real-world circumstances by teaching vocabulary and grammar principles through scenarios and discussions from everyday life.
- Motivation - The chatbot's goal is to inspire people to keep learning. It offers encouraging feedback and motivates users to keep using and honing their language abilities [28,29].

Quizlet - Users can create and exchange flashcards, study materials, and other study tools on Quizlet, an online learning platform. Quizlet Learn, a chatbot feature on the site, employs artificial intelligence to customise each user's learning experience [30].

The chatbot on Quizlet will pose a series of questions based on the study material when a user begins a study session. The chatbot will use the user's comments to craft a tailored study schedule that concentrates on the areas in which the user needs the greatest assistance. Together with feedback and explanations, the chatbot will offer support as the user works through the study material. The chatbot will provide clues and explanations if the user needs assistance understanding a certain idea.In general, Quizlet's chatbot is made to make learning more engaging and interactive. The chatbot aids users in more effectively learning and memorising knowledge by leveraging artificial intelligence to customise the educational experience [31].

UGAbot - The University of Georgia developed the chatbot UGAbot to assist students with academic counselling. The chatbot is accessible around-the-clock to respond to inquiries concerning course prerequisites, degree plans, and other requirements for academic preparation. Natural language processing (NLP) is used by UGAbot to comprehend user inquiries and deliver precise answers [32]. The chatbot can also handle many queries at once, making it a useful tool for students who require prompt responses to their inquiries. UGAbot can respond to inquiries and offer connections to pertinent resources, including course descriptions and degree requirements. Students can now swiftly and easily get the information they require. UGAbot is a helpful resource for students that require academic counselling in general. The University of Georgia is able to give students immediate access to knowledge and advice through the use of a chatbot, assisting them in making decisions regarding their academic careers [33,34].

Jill Watson - Jill Watson is a chatbot powered by artificial intelligence that Carnegie Mellon University created with the express purpose of assisting students taking online courses. The chatbot is intended to comprehend and respond to

student inquiries, offer help with course materials, and make recommendations to enhance their educational experience [35].

Jill Watson can swiftly recognise and address frequent queries and problems since it has been trained on a substantial quantity of course data and student interactions. The chatbot, which may be accessed through several platforms like messaging applications or web portals, can communicate with students in real-time [36,37]. By giving pupils prompt, correct assistance, Jill Watson hopes to lighten the pressure on human teachers and free them up to work on more difficult assignments. Students can receive individualised assistance and coaching from Jill Watson, resulting in a more productive and efficient learning experience [38,39].

FUTURE OF CHATBOT SOFTWARE & APPS IN EDUCATION

As technology develops and spreads, chatbot applications for education are anticipated to increase in number and complexity. Systems that can determine if pupils understand the study content have already been developed by researchers [40,41].Conversational AI technologies, commonly referred to as AI educational chatbots, were created for use in education to improve collaboration and student-teacher engagement [42]. According to reality, chatbots in education are a game-changer in the field of sophisticated and cutting-edge ed-tech. With the help of conversational AI, educational institutions can give each of their students a customised experience based on their interests, level of knowledge, and preferences [43,44]. AI technologies in the education sector are gaining traction as a result of the quickening pace of technological development [45].

CONCLUSION

Apps and chatbot software have the potential to have a significant impact on education. They can give individualised instruction, prompt feedback and assistance, and improved administrative management for teachers. It's crucial to remember, though, that in the context of education, chatbots shouldn't take the place of human connection and support.

They ought to be utilised as an addition to improve learning. In order for chatbots to give reliable and unbiased information, they must also be carefully built and coded. Chatbot programmes and applications have the potential to be useful teaching tools with the right implementation and development. It is crucial to carry out additional research and explore chatbot software and applications' possibilities in education as they continue to grow in popularity. Studying their ability to enhance student learning outcomes, their effect on student engagement, and how they might be incorporated into current educational institutions are all included in this. Research should also be done on the moral ramifications of utilising chatbots in education, such as bias and data privacy. We can better understand how to use chatbot technology to improve the learning experience for both students and teachers if we continue to investigate its possibilities in education.

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