
The Role of Chatbots in the higher education sector

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Abstract.

Technology advancement has provided various tools to the users of AI. The use of chatbots has gained popularity and acceptance over time. The different sectors like banking, healthcare, and E-commerce are already using it to provide services to their customers. Chatbots have the potential and the reach to deliver personalized services to many clients. However, the potential of chatbots in education "remains to be investigated."

With the advent of AI, chatbot systems can now be integrated into several forms of teaching. This mechanization is now frequently being used in teaching. Everyone in the industry, including students and staff at institutions, has the potential to benefit from chatbot technology in terms of providing quick and personalized services. This paper provides various applications of Chatbots in the education arena. This E-chatbot model is all about how it is beneficial to the students in the higher education sector regarding the query being handled, counselling, assignment help, and faculty help. This paper is based on a proposed conceptual model based on the review literature.

Keywords. Artificial intelligence, Chatbot, counseling, higher education sector

1. INTRODUCTION

A chatbot is a software program that is used for online chat using text or text-to-speech. [1][2] Higher education is considered to be a relatively new business by several emerging technologies. Conversational AI (Artificial Intelligence), commonly referred to as AI-powered chatbots, is a good example of this. Many schools and institutions are taking advantage of the immense potential that conversational AI has to enhance the student experience by implementing artificial intelligent chatbots. A chatbot is an (AI) interactive interface that can have a full conversation with a person. Data is fed to chatbots, which are configured to process information that has already been given to them. AI chatbots can help higher education institutions accelerate their future by chatting with their students and future students in a similar way they communicate with Alexa or Siri at home. [3] Indeed, Chatbots can be used for education in a variety of ways beyond marketing. The first point of contact, however, has the most impact on how prospective students and parents view and evaluate your institution. The world-changing events of 2020 hold the key to finding the solution. The old forms of inquiry are obsolete, as evidenced by the failure of both public and commercial institutions to respond quickly to a wave of inquiries. [4] The pandemic compelled schooling to take place online. As a result, even conventional institutions and colleges, which rely on a range of in-person activities, were compelled to focus solely on being digital. You cannot afford to subject your potential customers to a search across countless pages in a field where gaining or losing even one customer can affect the thousands

of dollars available to the. Additionally, you cannot afford to always have a large staff on hand to respond to inquiries. [5] One of a person's and their family's biggest financial and life investments is attending college or a university. Stressful application procedures are not beneficial, particularly during a pandemic outbreak. Educational institutions must be able to connect and communicate with students and their parents in real-time to react to the decision's importance and the stress it may cause them. [6] The top manufacturer of chatbots, Landbot, emphasizes the significance of chatbots in the customer journey, which is customer-centric both in theory and in practice and ranges from lead generation to customer care.

- a. Making it simple for potential students to contact you instantaneously through a website campaign landing page, social media, or messaging app.
- b. Although the phrase "qualification" is very marketing-oriented, it refers to knowing your application pool as a whole and on an individual basis. It involves discovering who they are, what interests them, and what they require at a specific stage of their path.
- c. The recommendation focuses on using the information you gained during the qualification process to persuade prospects to schedule an interview or submit an application.
- d. Although it is accessible at all times throughout the procedure, support is listed last on this list. Conversational marketing enables you to quickly address reservations and issues. [7] Education marketing tactics involve accelerating and enhancing the process from a prospect knowing about your school/program to applying. Going digital is important, but doing so in a way that seems human is even more important.

2. LITERATURE REVIEW

Higher education institutions (HEIs) must constantly implement innovative business strategies to maintain a market position in the face of intense competition from government funding, internationalization, and new trends toward a thriving online education market. Current research on the competitiveness of HEIs reveals the market's uniqueness in comparison to other businesses in which these institutions fulfill a traditional societal function and provide a professional working class while treating students as consumers with high-quality goods and services for which they pay [8]

Text messaging is preferred over phone calls by millennials because it is more convenient and straightforward. Chatbots, where texting is the primary mode of communication, could provide self-service options, handle simple tasks, and be available to customers 24 hours a day, seven days a week. Chatbots have been used in the education sector for a variety of purposes. Many colleges are using chatbots to answer common enrolment questions. This paper employs a single example of a program of study Facebook Page to demonstrate the benefits of chatbot implementation. From beginning to end. This Chatbot was created using Google Dialog flow as an NLU platform, and Facebook Messenger, as well as the platform interface, is discussed. The database contained 807 sentences submitted by 125 users. [9]

The popularity of chatbots is increasing as it is used for chatting in various fields due to the internet and the exponentially growing smartphone market. This study examined how university students used chatbots for educational/learning purposes. Although extensive research has been conducted into the use of chatbots in the service industry, there is still a

gap in the use of chatbots in education for effective learning. The study validates two newly added constructs to use path analysis. The Technology Adoption Model attempts to understand the reasons for the intention to adopt chatbots. This study is critical for researchers, policymakers, e-learning platforms, teachers, and students to ensure effective learning. [10] The curriculum of pre-service teacher training in educational sciences, like most curricula in the humanities and social sciences, frequently includes time-consuming reading and writing tasks that promptly require high-quality support and prompt feedback. One well-known One-on-one mentoring is one method of providing this assistance to students. This contribution investigates how, using an interdisciplinary approach, Personal mentoring can be made available to as many students as possible with the help of technology. taking into consideration the didactic, organizational, and technical frameworks at universities [11]

Today, every organization relies on information and communication technology (ICT) for efficient service delivery and cost-effective application of technology and technological assets, with a growing preference for Artificial Intelligence acceptance in global business operations in India and abroad. The global Chatbot market will proliferate in the coming years. The Chatbot market is booming in the AI era with extraordinary expansion due to increased demand for Smartphones and the increased use of messaging apps. In recent years, Chatbot technology has been adopted by the food delivery industry, finance, and the eCommerce industry. One of the industries that can significantly benefit from the educational sector is utilizing this technology. Education can be advantageous from the development of chatbots as it can boost productivity [12] Chatbots are becoming increasingly common in various fields, including medicine, the product and service industry, and education. Chatbots are computer programs that can hold audio or text-based conversations. A growing body of evidence suggests that these programs can effectively alter students' learning and information-gathering methods, particularly in large-scale learning. Chatbots can solve the problem of overcrowding in scenarios with more than 100 students per lecturer. Individual student assistance, However, there has been no systematic, structured overview until now because of their educational value; as a result, the purpose of this paper is to conduct a systematic literature review. based on a multi-perspective framework from which we derived preliminary search questions [13] There are existing studies related to Chatbot usage in HEI for academic and non-academic purposes. Specifically for academic purposes, studies are more related to language-related challenges[14] and academic implementation challenges. Studies are focusing on using Chatbots as a language learning medium to overcome the challenges students face across the courses [15]. Further, there are attempts to assist teachers in classroom research, using Google dialog flow evaluated by teachers' performance[16][17]. The non-academic purpose studies also discuss the use of chatbots for student services [18] and chatbot usage for digital library services using Node.js and AngularJS, evaluated with K fold cross-validation [19]. This paper aims to talk about intelligent learning environments and present the FIT-EBot, a chatbot that automatically responds to students' questions about the subject. The educational system provides services for the benefit of the academic personnel. The Chatbot can function as an intelligent assistant who offers solutions to higher-education institutions to improve their current services, cut labor costs, and create new ones [20] The current study encompasses the usage of chatbots for academic as well as non-academic purposes, including learners' challenges as well as the teacher's assistance

2.1 *METHODOLOGY*

The process and the content for developing Chatbot for Higher education is discussed in this section.

Conversational Marketing: Adoption of Full-Cycle Chatbots

Five lessons to help higher education use chatbots

1. Get to know your audience better: With a website, you can easily keep tabs on things like:

- how many prospects visited it?
- How did they arrive?
- For how long did they linger?
- The number of pages they view.
- Where do they come from?

Although this information doesn't reveal much about their requirements and preferences, you definitely have a basic sense of who your target audience is. A higher education chatbot, also known as a conversational assistant, can initiate and carry out thousands of conversations while gathering qualitative data, including:

How much a potential student is drawn to your school or course?

What is it they are looking to do or accomplish? (e.g., browse courses, talk to someone, check references, learn more about the environment or professors)

What are the pain points they are experiencing at that instant or see in your proposal?

Asking them instantly when it's fresh and most relevant is the easiest and most accurate way to go about it. You could believe that a straightforward form would suffice. You neglect the fact that most people don't really like recordings, though. They are less likely to be finished the longer they are. Chatbots are effective because they take action without waiting for prospective students or their parents' initial initiative. [22]

2. Connect with your audience on the appropriate channel: It's time to explore beyond those pages now that you have a better grasp of who is interested in your organization and what concerns they have when they first visit your website. The most effective communication techniques go to their audiences rather than waiting for opportunities to find them. Put another way; you must begin speaking with your prospects on their terms. Analyze your traffic metrics first. While a lot of leads can find you through Google searches, you'll see that social media and direct entries also play a big part. Word-of-mouth marketing is the greatest and most effective kind of advertising for education, other than demographics and course selection. That word of mouth still exists today. These days, word-of-mouth spreads via social media and messaging services like WhatsApp and Messenger. But for most educational institutions, email continues to be the most popular form of communication. Asking for the email address is OK, but don't end there. Demonstrate to them that you are able and willing to meet them where they are most at ease. You may approach potential students on Facebook, Instagram, WhatsApp, and other messaging platforms with higher education chatbots. [23]

3. Boost Engagement in the Most Human Way Possible: Today, messaging apps and social media sites are used to spread word of mouth. How to Increase Engagement in the

Most Human Way. Websites for universities and colleges are renowned for having pages and pages of content. Content is frequently either too hazy, too wordy, or too disjointed. These websites have drawbacks that make them challenging to use. In higher education, chatbots can streamline your content marketing efforts and increase interaction, which will help you convince and convert more readers. In point number one, we discussed how you could use conversational assistants to discover more about your audience. The next stage is to use this knowledge to enhance the experience of potential students by redesigning the website to take into account the needs and preferences you identified or by simply developing total conversational proficiency. Alternately, after determining the important pages, be sure to replace the online forms with chatbots. Instead of asking people to fill out a form and wait for a response, this method of clicking on a CTA will start a conversation with immediate consequences. Last but not least, you can intelligently link students and parents with your personnel by using chatbots. [24]

4. Make your application process frictionless: The busiest time of year is during application season because everything happens at once. You can streamline and control that process with the aid of conversational technologies. For instance, you may use unofficial channels to your advantage by employing rule-based or AI bots to automatically follow up with prospects who have shown interest in the application process. By addressing their concerns and offering advice on the channels they regularly access, they may assist them in the beginning and concluding of the process. Additionally, chatbots for higher education are constantly accessible to speak with potential students. Even tell which candidates have a higher chance of succeeding, thriving, and becoming ambassadors. [25]

5. Bring Life to Your School's Spirit (Brand): Whatever the size or makeup of your educational institutions, your marketing plan must be distinctive from those of rivals. Together, marketing initiatives can get dull. However, conversational marketing offers you a special chance to show your brand identity in ways other than through the school's emblem and colors. Conversational assistants have the ability to express feelings and personalities that best reflect your company and the educational experience that they are about to embrace. [25]

3. RESULT

How Can Land Bot Support Your Chatbot Marketing for Higher Education Implementation?

Land Bot is a potent no-code platform for building chatbots and automating conversation. The "no-code" features are its key benefit because they let university marketers build chatbots themselves. By removing the code barrier, Land Bot makes conversational marketing accessible to those with the most expertise in it, enabling them to create compelling conversations and experiences without waiting for the IT department. Because modifications, updates, and tweaks to campaigns and bots can be made immediately and while in use, agility offers a significant benefit. By empowering your marketing team, your institution or university may be visible everywhere, including on the web, social media platforms, and messaging apps. [26]

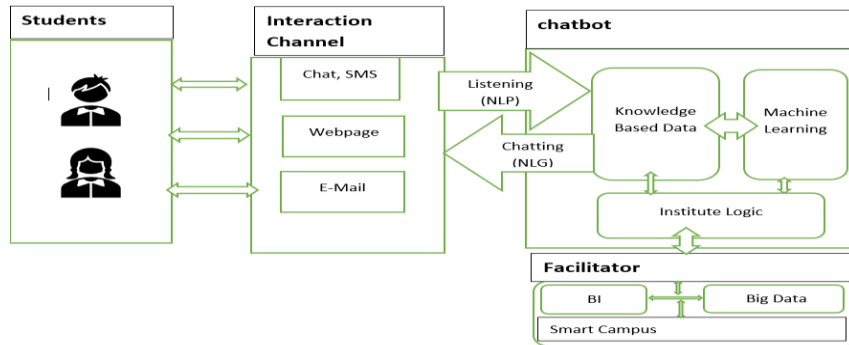


Figure 1: Schematic representation of Chatbot

The above model is an answer to higher education's current and future needs. This model has been conceptualized and presented after reviewing the literature of 20 papers. The model is a schematics representation that explains that students having a query regarding the institute can interact with the Chatbot through Chat, SMS, Webpage, and Email. The question goes to the Chatbot and then searches the knowledge-based data and, with the help of Machine learning, uses a database already fed with logical answers from the institute and responds either through listening (NLP)-Natural Language Processing or chatting (NLG)-Natural language generation. The facilitator for all these answers is the vast database. The BI (Business Intelligence) converts the Bigdata and makes the responses ready logically and transports them through Machine learning to Chatbots to answer. This system makes the campus intelligent, leading to a better higher education system. A chatbot can provide immediate responses to library requests and sign students up for new classes or direct them to the admissions department, making self-service more streamlined and appealing to impatient students. Chatbots can respond to questions via messenger, allowing students and university staff to stay on the same page. Because chatbots never sleep, international students can contact the university office any day or night, regardless of the university's local time. Chatbots can act as agents and sift through thousands of enrolment documents in seconds, delivering the right information when needed. They are ideal for answering basic questions from prospective students about enrolment, financial aid, residency availability, and various other institute-level queries. Adapting chatbots in higher education can make the process much more streamlined, faster and efficient resulting in more student satisfaction and business. Along with students, faculty and staff can also be integrated to interact on different aspects related to teaching and learning, evaluations, admission process, research, etc. The feasibility of this model is yet to be tested.

Process of Voice/Text in Machine learning In general, speech-to-text software listens to spoken audio, records it, then converts it into text. The result is a transcript that is as close to verbatim as feasible. The deep learning model or underlying computer program makes use of linguistic algorithms that run on Unicode, a global software standard for managing text. The primary role of linguistic algorithms is to classify spoken auditory data and encode them as Unicode. [27]

1) Analog to digital conversion: When people speak or generate other noises, different vibrational sequences are produced. These vibrations would be especially detected by a

speech-to-text algorithm because they are analog signals in theory. These vibrations are then fed into an analog-to-digital converter, which transforms them into a digital language.[27]

2) Filtering: The audio files created by the analog-to-digital converter are in a format that can be read by machines. The converter does a thorough analysis of the audio file and accurately measures the waves.[27]

3)Segmentation: Phonemes, linguistic elements that distinguish one word from another, are used to segment speech. The segmented words in the input audio are then compared to this unit of sound to match and anticipate potential transcriptions. In the English language, there are about 40 phonemes, and there are thousands of different phonemes in all languages.[28]

4) Character Integration: The speech-to-text program uses a mathematical model made up of several words, phrases, and sentence permutations and combinations. The phonemes move via a network made up of mathematical model components so that the most prevalent components can be compared to these phonemes. At this stage, the likelihood of the likely textual output is calculated by combining the parts into cohesive sentences.[12]

5) Final Transcript: Based on deep learning predictive modeling, the most likely transcript of the audio is displayed as text at the end of this procedure. The built-in dictation features of the device being used for transcribing are then employed to create a computer-based demand from the probability mentioned above.[28]

AI-driven digitization has always improved industries, and it may now improve education as well, mostly through conversation. AI. The various ways AI-driven chatbots can help are as follows:

Streamlining Student Admission: A normal student enrolment process can be cumbersome even in the best of times. The excessively long admission lines in schools and colleges, a deluge of documentation needs, and credential verification requirements make the process tedious for everyone involved in it, specifically for education can make some of the challenging aspects of the industry simpler. Even in the best of circumstances, the enrolment process for students can be challenging. Everyone participating in the process finds it frustrating because of the unnecessarily long admissions lines at schools and colleges, the mountain of data needed, and the stringent credential verification procedures. Introducing chatbots for use in education can help to overcome some of these issues. Educational chatbots are configured to respond to certain cues to facilitate communication between institutions and applicants. Automating communication between institutions and applicants greatly helps admission logistics. For instance, a chatbot could request that students present their identification and educational credentials before a machine learning-based system verifies their legitimacy. Student admission can be facilitated by a chatbot's ease of processing information and delivering it to users, which can speed up the process. More significantly, it gives the people working on the process more time to work on other, potentially trickier admission-related duties.[29]

Individualizing the Learning Process: Too frequently, instruction in schools and colleges is delivered broadly for students, each of whom may comprehend a particular idea at a different rate and in a variety of ways. The delivery of personalized educational content to each student by sophisticated future educational chatbots can increase the degree of customization in the teaching process. Such systems can also address each student's

questions and doubts on an individual basis, adapting to their rate of learning and assisting them in getting more from their curriculum. Chatbots though utilized extensively still has some drawbacks that need to be fixed. However, as we've seen above, they can eventually result in genuinely major changes in the field of education.[29]

4. CONCLUSION

Higher education Institutes face the challenge of student connectivity and interaction and thus realize the need for an interactive digital-first strategy for competitive advantage. Advanced technology using Artificial intelligence and Virtual Reality like chatbots will be the standard practice for faculty, staff, and students to be on the same platform in their academic progression. [28] Depending on the institution and its capacity to capitalize in the latest technology for its students would ensure equal access to the technology and resources. [28]The HEI facing the digital divide is a known fact, and the type of school having technology and AI integration usage also poses a huge disparity in the opportunities for the Institutes. Its consequences for students can lead to higher discrimination leading to profound socio-economic division.[28]Their other challenges are there as well, which are at the individual level. The anticipation of sharing huge amounts of data with the AI and the security and accessibility of the data to everyone is also one of the limitations for the institutions seeking privacy and confidentiality of these information banks.

Earlier studies highlighted that Chatbots have been for educational purposes, classifying those with educational intentionality and those without. The one with educational intentionality would be more inclined towards student-teacher interaction whereas Chatbots without education intentionality can be assigned the student guidance and assistance-related administrative tasks.[28] The paper suggested the integration of Chatbot over the Facebook page to have better reach and connectivity with the stakeholders, especially students. The article proposed a solution wherein the operation efficiency of Facebook chatbot assistants would be higher and the response time would be paltry as chatbot assistance would be available 24/7.[12]. Similarly, we have an example of the AI Teaching Assistant at the Georgia Institute of Technology, showcasing futuristic classrooms where the technology could run without human intervention.[28] This is the future that is not far away, and the only option we have is to embrace and apply. Compared to earlier generations, today's youth are exposed to technology considerably more frequently. Recent developments in artificial intelligence (AI), particularly in natural language processing (NLP) and understanding (NLU), have made it possible to expand the use of AI chatbots in education. These tools can now support students not only with administrative tasks or academic advising but also by assisting them and keeping track of how they are doing while they are learning. With a focus on their application and difficulties in the subject of education, this paper offers a survey of the various techniques and tools used in chatbot design. [30]

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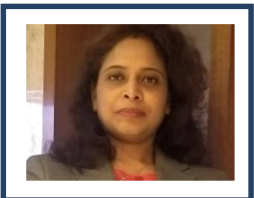
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