

HELPHY Bot: Designing Simple Chatbot System for University

Aakriti Gupta¹, Tosif Raja², Subhanshu Chaurasiya³, Dr. Shrddha Sagra⁴

School of Computer Science and Engineering

Galgotias University

Greater Noida, India

Abstract— *Chatbots have gained immense popularity in recent years due to their ability to provide automated and personalized interactions with users. This project abstract outlines the process of creating a chatbot using Python, one of the most widely used programming languages. In the realm of academia, efficient communication and access to vital information, such as the contact details and cabin locations of university teachers, is essential for students and staff alike. However, the conventional means of obtaining this information can often be time-consuming and inefficient, leading to the need for a more streamlined solution. This paper explores the potential use of AI systems and chatbots in the academic field and their impact on research and education from an ethical perspective. Through a qualitative methodology, the researcher performs exploratory research and data collection based on expert analysis and interpretation. The researcher conducted a comprehensive review of the main potential challenges associated with the use of chatbots in education and research to identify current practices, challenges, and opportunities. The primary aim of this study is to develop a Python-based chatbot specifically tailored for university settings. This chatbot will address the challenges of swiftly retrieving information regarding university teachers' contact numbers, office cabin locations, and addressing various other queries related to university operations. The chatbot will enhance user convenience and provide a modernized, user-friendly interface for accessing essential information. The results of this study are of great significance to the educational community. The chatbot's ability to efficiently provide information on teachers' contact details, office locations, and other university-related inquiries can enhance the overall university experience for students, faculty, and staff. It not only saves time but also promotes seamless communication within the university ecosystem.*

Keywords—*artificial intelligence; chatbots; education; research; ethics; sustainability; ChatGPT*

I. INTRODUCTION

In general, bot is the computer system that can perform automated task and Chatbot refers to the

normal messaging application which the receiver is a robot [1]. In an easy word, the situation is like when human is chatting with the robot (computer). According to [2] Chatbot is the computer system that can communicate with human in the form of messaging app. They can understand multiple question requested by human. They also have the ability to differentiate between uniqueness of word including emoticons.

The conversation could happen through voice commands, text chats, graphical interfaces or graphical widgets

Recently, Chatbots has been used in various industries to deliver information or perform tasks, such as telling the weather, for education [3], making flight reservations, or purchasing products. These technologies also are used by various famous application such as Telegram, Cortana, Slack, WeChat, Facebook Messenger, Google Assistant and Siri. In business for instance, since Chatbots can provide real-time customer support 24/7, therefore it has been used widely in customer service for marketing purpose. The use of Chatbots are meant to help and deliver immediate actions where humans cannot reach due to timing or budget. Chatbots will capture the user's questions and give feedback fast rather than manually searching for enormous list of FAQs .

Artificial intelligence[4] (AI) and chatbots have been rapidly advancing in recent years and are becoming increasingly prevalent in various fields, including the academic field. With the rise of big data and the need for efficient and fast data processing, AI systems and chatbots are being seen as a valuable tool for researchers and academics.

Chatbot is a computer program that humans will interact with in natural spoken language and including artificial intelligence techniques such as NLP (Natural language processing)[5] that makes the chatbot more interactive and more reliable. Based on the recent epidemiological situation, the increasing demand and reliance on electronic education has become very difficult to access to the university due to the curfew imposed, and this has led to limited access to information for academics at the university. This project aims to build a chatbot for Admission and Registration to answer every person who asks about the university, colleges, majors and admission policy.

II. BACKGROUND

Chatbots are machine agents that engage a communication with human using natural language. From the early stages, when chatbots were mainly experimented to fool people into thinking that they were humans and to entertain them (the most famous examples are ELIZA [6] or A.L.I.C.E. [7]), nowadays they are used into a wide range of fields for more practical purposes, like information retrieval, e-commerce, education, etc. Over the time the main focus in chatbot design moved from the perfect imitation of human to the development of helpful tools able to support the users in their tasks with a more natural interaction achieved through the use of natural language [8]. The communication with a chatbot can take place by writing text or with a speech-recognition system, and machine learning methods can be used to train the chatbot to understand the inputs provided by the users. From here the split between two different kind of inputs and outputs, closely linked to the context of use. Voice-driven voicebots, based on speech recognition technology (digital assistants like Apple's Siri, Amazon's Alexa, etc.) that could be consulted everytime, also while the user is driving a car, but it may have trouble recognizing words if not pronounced correctly[9]. Text-based chatbots, real time chats, implemented on the website or provided by social media platforms. There are also virtual assistant that can use both technologies. Kuligowska et al. proposed an interesting framework evaluation method to identify different aspects of chatbots functioning, which includes Visual Look, Knowledge Base (general and specialized information because a conversational agent should be able to answer to a set of general knowledge questions, not only about the topic in which it is specialized, an aspect close to the personality traits of the chatbot), Conversational Abilities, Language Skills and Context Sensitiveness (a good chatbot should be able to bear a coherent dialogue, understand the context, giving feedback and repairing the dialogue if necessary, to minimize user frustration during the interaction), Personality Traits (a successful chatbot should have a unique personality, including personality aspects, biography and emotions), Emergency Responses in Unexpected Situations (the chatbot should be able to overcome user's misspellings or other mistakes and diplomatically answers to rude or sexual provocations), Possibility of Rating Chatbot (ask directly to the users to rate the conversation is an important added value to estimate the appreciation of the virtual agent) [10].

III. LITERATURE SURVEY

The integration of artificial intelligence (AI) and chatbots into education and research has become more prevalent in recent years, especially as of the end of 2022. Chatbots are automated conversational agents that use natural language processing and machine learning algorithms to interact with users in a human-like manner. However, the increasing use of AI and chatbots in these fields also raises ethical challenges that need to be addressed [11]. This literature review aims to explore the ethical challenges of using AI and

chatbots in education and research, with a focus on the major observed issues.

Ref. [12] provided an overview of the current state of AI in education and its potential benefits, including personalized learning, increased accessibility, and improved efficiency. The authors also discussed some ethical challenges associated with the adoption of AI in education. Zhang and Aslan [13] made a comprehensive review of AI in education and its potential benefits, including improved student engagement and motivation, enhanced assessment and feedback, and increased efficiency and cost-effectiveness. Pedro et al. [14] highlighted the advantages of the integration of AI in the educational field. The researchers admitted that AI in education can automate[15] repetitive tasks, free up more time for complex cases, and upskill the workforce to become AI-ready.

Pedro et al. [16] also discussed the challenges and policy implications of introducing AI into education and preparing students for an AI-powered context. The challenges include developing comprehensive public policies for sustainable development, ensuring inclusion and equity, preparing teachers for AI-powered education, developing quality and inclusive data systems, making research on AI in education significant, and addressing ethical concerns related to data collection, use, and dissemination. These challenges require international and national partnerships and public discussions on ethics, accountability, transparency, and security. The authors also addressed some of the ethical and technical challenges associated with the adoption of AI in education. The authors mentioned the sixth challenge of introducing AI in education. Pedro et al. [17] admitted that the concerns surrounding AI and its impact on education include access to educational systems through machine learning algorithms, potential discrimination, inadequate recommendations for certain groups of students, personal data concentration, liability, and the impact of AI automation on teacher jobs. The challenge lies in protecting personally identifiable information and privacy preferences, particularly for young learners who cannot provide express consent. Pedro et al. [18] consequently mentioned the need to address the ethical concerns related to data collection, use, and dissemination.

An exploratory study conducted by Tlili et al. [19] investigated the use of conversational agents, including ChatGPT, as a tool for enhancing online learning experiences. They found that students preferred using conversational agents for learning activities, as they provided a more engaging and interactive experience. Further, Kuhail et al. [20] found that chatbots can provide students with instant feedback and support, as well as personalized learning experiences. The authors also found that chatbots have the potential to increase student engagement and motivation in learning. Similarly, another study [21] explored the potential use of chatbots in higher education. The research showed that the use of chatbots in the first year of the university studies eases the transition of students into their first year of university, and increases their study engagement. The findings showed a positive correlation between the use of chatbots, study engagement and engagement with peers. Students reported that the chatbot helped them obtain support and connect with their program leader.

A recent newspaper article [22] admitted that some school districts and a college in Hamilton (Canada) and its neighboring areas are being vigilant against any attempts made by students to cheat using ChatGPT. The article also confirmed that students use ChatGPT to produce essays or answer assessments.

IV. RELATED WORKS

A. Chatbot Development

There are several techniques that can be used in developing a Chatbot system. Most chatbots search for patterns, keywords, phrases, and examples that have been customized into their databases, yet some use more propelled strategies [23]. A review of several chatbots system such as Chat.io, Collect. Chat and Cleverbot is also provided to explain the different way how each chatbot works [24]. In this paper, Chatbot is implemented to meet the academic needs of the visitors who wants to know about university's faculty information offered. Artificial intelligence, a chatbot, is designed to connect with people by sounding just like real people. Chatbots can be as simple as responding to a few words or as complicated as having entire conversations that are impossible to distinguish from those of actual people. In order for chatbots to comprehend the nuances of the English language, determine the true meaning of a text, and develop through interactions with people, natural language processing and machine learning are used in their development. The two simple actions required to use a chatbot.

Chatbots can cut down on customer service costs, average handling times, and call volume [25]. A chatbot's principal role is to analyze user requests [26]. They first determine the question's intent and gather all user information that would be needed to provide an answer. They then provide a suitable response to the query.

B. Technology Used for Chatbot Development

There are many ways to develop the Chatbot System. The process of developing Chatbot System may be different depending on the purpose of the development. Like we are making the chatbot for the university help so we are using the tools and technology according to it. These are the tools used in the development of HELPY bot system:

MongoDB: MongoDB is a source-available, cross-platform, document-oriented database program. Classified as a NoSQL database product, MongoDB utilizes JSON-like documents with optional schemas.

PyCharm

PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a range of essential tools for Python developers, tightly integrated to create a convenient environment for productive Python and data science development. Python has become a well-liked programming language[27] for application development. The reason for its popularity lies in its simplicity in designing codes. For writing simple and efficient

Python codes, we need an Integrated Development Environment (IDE). We use PyCharm as an IDE[28] for developing Python-based applications.

C. System Requirements

● Functional Requirements:

1. The system must provide clear information about Admission policy.
2. The system must provide clear and fully detailed information about university colleges.
3. The system must provide clear and fully detailed information about colleges' programs.
4. The system must provide clear and fully detailed information about colleges' majors.
5. The system should clarify information about the permitted secondary school branch for each major.
6. The system should clarify the minimum GPA in high school for each major.
7. The system should clarify the duration of study for each major.
8. The system should clarify the parallel study policy for each major.
9. The system should provide the graduation plans for each major.
10. The system should provide information about placement tests.
11. The system should provide information about first installment costs for each major and the credit hour price.

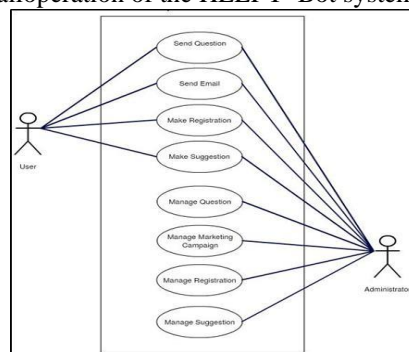
● Non-Functional :

1. The system shall handle multiple users inputs, If two or more students are chatting with the bot, none of the students has to wait too long to be answered by the system.
2. The bot should have a delay in response, to let the student feel like he/she is talking to a human instead of a bot. A little late response from the chatbot makes the student feel as though he is talking to a human.
3. The system should have the appropriate data set. The correct data set is the basis for the chatbot, when the data set is correct and tuned, the chatbot will be trained on it to give the best possible result.
4. The system should have Data Training. Data training mainly depends on the content targeted at Admission and Registration deanship.
5. The system should prevent abusive language.

V.DESIGN OF CHATBOT SYSTEM

A. Use Case Diagram

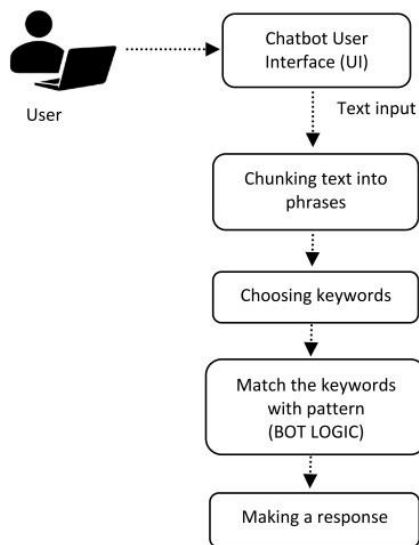
The following Fig. depicts the use case diagram of detailoperation of the HELPY Bot system.



B. How Chatbot Works

Firstly, user must have computer in order to access the chatbot user interface (UI). A text console will appear on the chatbot UI where user can pass text input through the console.

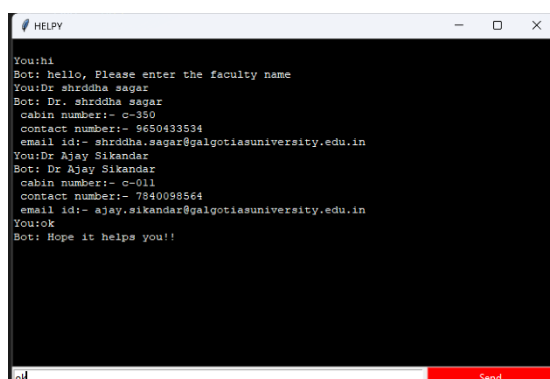
Secondly, the text input which entered by user in a sentence will then be chunk. Chunking here means the process of splitting text into separate words for tagging. The output from the chunking process is several meaningful phrases which are going to be used later in the matching process. This phrase will act as keyword in the matching process



Finally, the keywords resulted from the chunking process are then matched with the pattern in the chatbot system. The process of matching the keywords with patterns is called BOT LOGIC. The output from the chatbot system is the programmed response, which will be, for instance, any other

C. User Interface (UI) Design

The following shows the HELPY Bot system interface:



User interface represent the interface to make easy contact with user. This system will look for keywords

that match with user's input. If the keyword was found, then the corresponding response will be displayed. For the keywords that is not being registered in the UNISEL Bot database, the corresponding response is enabled to continue the conversation with the user.

Consider the following case to see how this would function.

User: aaabbbccc?

At this point HELPY Bot could not recognize keyword results for "aaabbbxxx?" but will continue with the next conversation.

HELPHY: Sorry, I didn't get it.

HELPHY Bot cannot respond as intended but will be supported by a feedback form which allow users to add new keyword to the system. HELPHY Bot will give standard answers if the keyword is not found.

The *IF-ELSE* statement is used in HELPHY Bot system to follow a set of specific instructions based on results. This concept is the same as in real life when you want to decide based on certain circumstances.

"In case of rain, you will use an umbrella; otherwise you will not."

In this statement, you will decide to use an umbrella based on the rainy state. In HELPHY Bot system, these results and conditions are explicitly stated to provide feedback based on certain keyword. The condition in the bracket of the *IF* statement is assessed. If the test results are correct, the instructions in the *IF* body are executed. If the outcome of the situation is wrong, then the statement is overlooked. The following Fig. are an example of program fragment using *IF* statement in HELPHY Bot system.

```
client=pymongo.MongoClient("mongodb://localhost:27017")
print(client)
from tkinter import *
root = Tk()
def send():
    send = "You: "+ e.get()
    text.insert(END,"\\n" + send)
    if(e.get()=="hi"):
        text.insert(END, "\\n" + "Bot: hello, Please enter the faculty name ")
    elif(e.get()=="hello"):
        text.insert(END, "\\n" + "Bot: hi, Please enter the faculty name")
    elif(e.get()=="Dr shrdha sagar"):
        text.insert(END, "\\n" + "Bot: Dr. shrdha sagar \\n cabin number:- c-350 \\n contact number:- 9650433534")
    elif(e.get()=="Dr Ajay Sikandar"):
        text.insert(END, "\\n" + "Bot: Dr Ajay Sikandar \\n cabin number:- c-011 \\n contact number:- 7840098564")
    elif(e.get()=="ok"):
        text.insert(END, "\\n" + "Bot: Hope it helps you!!")
    else:
        text.insert(END, "\\n" + "Bot: Sorry I didnt get it.")
text = Text(root,bg="black", fg="white")
text.grid(row=0,column=0,columnspan=2)
e = Entry(root,width=80)
send = Button(root,text='Send',bg='red', fg='white', width=20,command=send).grid(row=1,column=1)
e.grid(row=1,column=0)
root.title('HELPY')
root.mainloop()
```

VI. RESULTS AND ANALYSIS

As a development in AI, the concept of chatbots can be traced back to the early days of computing, with early computer programs being capable of performing simple, repetitive tasks. However, it was not until the advent of artificial intelligence (AI) and natural language processing (NLP) technologies that chatbots became more advanced and capable of human-like interactions.

In the 1990s, researchers began developing conversational agents, or chatbots, that could understand and respond to human inputs in natural language. These

early chatbots were limited in their capabilities, but they laid the foundation for the development of more sophisticated chatbots in the following decades.

With the growth of AI and NLP technologies, chatbots have evolved significantly, becoming more capable of handling complex tasks and undertaking more human-like interactions. Today, chatbots are used in a wide range of industries, including customer service, healthcare, finance, and education, among others. Overall, the development of chatbots is a result of advancements in AI and NLP technologies, and the increasing demand for more efficient and convenient ways to interact with technology. One of these NLP technologies that is frequently used in the education sector is ChatGPT. As a variant of the GPT (Generative Pretrained Transformer), it constitutes a language model developed by OpenAI. It was trained on a massive amount of text data, allowing it to generate human-like text and answer questions.

One of the main dangers of chatbots is the potential for cheating during assessments, exams, and projects. Chatbots can provide students with immediate answers to questions, which can lead to academic dishonesty and a lack of learning. In addition, the use of chatbots can create an uneven playing field, as some rich students may have access to better or more advanced chatbots than others. So, it is essential that students put in the necessary effort and time to learn the course material and acquire the necessary knowledge and skills through legitimate means. Additionally, it is important to uphold academic honesty and ethics in all learning environments.

Furthermore, in the future, we could observe raised concerns about the impact of chatbots on the education levels of future generations. We could argue that the use of chatbots could lead to a decrease in critical thinking skills and a lack of independent problem-solving abilities. This could result in a generation of students who are overly reliant on technology and unable to think critically or creatively. Future longitudinal qualitative and quantitative research needs to better explore these aspects.

The use of AI by students in education can raise ethical concerns on several aspects. AI technology has the potential to be used by students to cheat on assessments and exams, which undermines the integrity of the education system and devalues the efforts of other students who have earned their grades honestly. AI systems can also be used to generate essays or other written assignments, which can lead to instances of plagiarism and devalue the learning experience for all students. Additionally, when students rely on AI to complete their work, they may not fully understand the material and may lack a sense of ownership over their learning. This can reduce the effectiveness of education and limit their ability to apply their knowledge in the future. Such situations can also provide some students with an unfair advantage over others, particularly if not all students have access to the technology or if it is used in an unequal manner. To prevent the potential negative effects of AI system misuse in education, professors need to assess students' skills. They also

need to discourage the use of AI systems, such as chatbots, by incorporating a variety of innovative assessments.

In this new era of chatbots, educational institutions need to incorporate assessments that require students to think critically, be creative, and apply their knowledge in novel and unpredictable ways that can be difficult for AI systems to replicate. Incorporating open-ended questions in assessments could encourage creativity as students are required to provide in-depth and original responses, which can be difficult for AI systems to replicate. Assessments need also to focus on problem-solving tasks. Assessments containing complex, real-world problems can help demonstrate a student's ability to think critically and apply their knowledge in new and innovative ways. Educators are also encouraged to evaluate their students through projects that require original solutions or prototypes that can help demonstrate their creativity and problem-solving abilities. Requiring students to give presentations on a topic of their choice, in which they must incorporate original ideas and perspectives, can help demonstrate their creativity and ability to communicate effectively. Encouraging the use of interactive quizzes is also effective as these require students to actively engage with the material and respond to questions in real-time, rather than just passively reading or watching a lecture.

VII.CONCLUSIONS

The HELPY Bot is expected to give a new breath to help university's marke to promote HELPY with new approach. The implementation of multiple widget function works seamlessly and the data is successfully transferred and stored into the database.

In the future, many improvements can be made to the HELPY Bot to make the system more knowledgeable and user-friendly. Artificial Intelligent and machine learning can be implemented in the HELPY Bot to make the system more intelligent and can mimic as human chatting behaviour.

The voice recognition also can be implemented in the HELPY Bot to make the system able to decode the human voice without having to use a keyboard. This is because the system is intended to publicly use for the inside and outside HELPY, so it need such as advance technology to attract user for marketing purpose of HELPY.

This study admits that the potential benefits of AI systems and chatbots in the academic field are substantial, and their use is likely to increase in the coming years. However, to fully realize the potential use of AI in research and education, it is important for researchers and educators to critically evaluate the ethical and technical implications of AI systems and ensure that they are used in a responsible and transparent manner. The actual study provides a solid foundation for exploring the potential use of AI systems and chatbots in the academic field and their impact on research and education. It supports the arguments that AI has the potential to improve efficiency and accuracy in research, personalize learning experiences, and make education more accessible and inclusive. However, it also highlights the need to critically evaluate the ethical and technical implications

of AI and ensure that it is used in a responsible and transparent manner.

VIII. REFERENCES

- 1) J. Masche and N. Le, "A Review of Technologies for Conversational Systems," *Adv. Intell. Syst. Comput.*, vol. 629, pp. 212–225, 2018.
- 2) L. Ciechanowski, A. Przegalinska, M. Magnuski, and P. Gloor, "In the shades of the uncanny valley: An experimental study of human-chatbot interaction," *Futur. Gener. Comput. Syst.*, vol. 92, no. January, pp. 539–548, 2019.
- 3) S. A. and D. John, "Survey on Chatbot Design Techniques in Speech Conversation Systems," *Int. J. Adv. Comput. Sci. Appl.*, vol. 6, no. 7, pp. 72–80, 2015.
- 4) Heller, M. Procter, and D. Mah, "Freudbot: An investigation of chatbot technology in distance education," *Proc. World Conf. Educ. Multimedia, Hypermedia Telecommun.*, no. March 2016, pp. 3913–3918, 2005.
- 5) B. R. Ranoliya, N. Raghuwanshi, and S. Singh, "Chatbot for university related FAQs," 2017 *Int. Conf. Adv. Comput. Commun. Informatics, ICACCI 2017*, vol. 2017–Janua, pp. 1525–1530, 2017.
- 6) S. Reshmi and K. Balakrishnan, "Implementation of an inquisitive chatbot for database supported knowledge bases," *Sadhana - Acad. Proc. Eng. Sci.*, vol. 41, no. 10, pp. 1173–1178, 2016.
- 7) N. Akma, M. Hafiz, A. Zainal, M. Fairuz, and Z. Adnan, "Review of Chatbots Design Techniques," *Int. J. Comput. Appl.*, vol. 181, no. 8, pp. 7–10, 2018.
- 8) Tapalova, O.; Zhiyenbayeva, N. Artificial Intelligence in Education: AIED for Personalised Learning Pathways. *Electron. J. e-Learn.* **2022**, *20*, 639–653. [[Google Scholar](#)] [[CrossRef](#)]
- 9) González-Calatayud, V.; Prendes-Espinosa, P.; Roig-Vila, R. Artificial Intelligence for Student Assessment: A Systematic Review. *Appl. Sci.* **2021**, *11*, 5467. [[Google Scholar](#)] [[CrossRef](#)]
- 10) Pelletier, K.; McCormack, M.; Reeves, J.; Robert, J.; Arbino, N.; Dickson-Deane, C.; Stine, J. 2022 *EDUCAUSE Horizon Report Teaching and Learning Edition*; EDUC22: Boulder, CO, USA, 2022; 58p. [[Google Scholar](#)]
- 11) Murtaza, M.; Ahmed, Y.; Shamsi, J.A.; Sherwani, F.; Usman, M. AI-Based Personalized E-Learning Systems: Issues, Challenges, and Solutions. *IEEE Access* **2022**, *10*, 81323–81342. [[Google Scholar](#)] [[CrossRef](#)]
- 12) Brown, T.; Mann, B.; Ryder, N.; Subbiah, M.; Kaplan, J.D.; Dhariwal, P.; Amodei, D. Language models are few-shot learners. *Adv. Neural Inf. Process. Syst.* **2020**, *33*, 1877–1901. [[Google Scholar](#)]
- 13) OpenAI. (n.d.). OpenAI GPT-3. Available online: <https://openai.com/gpt-3/> (accessed on 5 February 2023).
- 14) Chen, X.; Xie, H.; Zou, D.; Hwang, G.-J. Application and theory gaps during the rise of Artificial Intelligence in Education. *Comput. Educ. Artif. Intell.* **2020**, *1*, 100002. [[Google Scholar](#)] [[CrossRef](#)]
- 15) Akgun, S.; Greenhow, C. Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI Ethic.* **2021**, *2*, 431–440. [[Google Scholar](#)] [[CrossRef](#)] [[PubMed](#)]
- 16) Okonkwo, C.W.; Ade-Ibijola, A. Evaluating the ethical implications of using chatbot systems in higher education. *digiTAL* **2021**, *2021*, 68. [[Google Scholar](#)]

