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CHATBOT IN EDUCATION: A CRITICAL EXAMINATION OF ETHICAL IMPLICATIONS AMONG TEACHERS WITH SPECIAL REFERENCE TO COIMBATORE CITY

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Abstract: The use of chatbots in education has gained significant traction, offering innovative solutions for personalized learning, administrative support, and student engagement. However, their integration into educational systems raises various ethical concerns, particularly among teachers. This study critically examines the ethical implications of chatbot usage in education, with a specific focus on teachers in Coimbatore city.The research explores key ethical issues such as data privacy, teacher autonomy, and the potential for reduced human interaction in classrooms. It seeks to understand how teachers perceive the use of AI-driven tools, including concerns over job security, accuracy of responses, and the quality of educational experiences provided by chatbots. The study also delves into the socio-cultural factors that shape teachers' acceptance and resistance toward chatbots. Using a mixed-methods approach, the study gathers quantitative data through surveys distributed among teachers in Coimbatore, complemented by qualitative interviews to gain deeper insights into their attitudes and concerns. The findings aim to highlight the ethical dilemmas faced by educators and offer recommendations for policymakers and educational institutions to create a balanced, ethical framework for integrating chatbots in the teaching process. This examination emphasizes the need for responsible AI implementation in education, ensuring that technological advancements enhance rather than diminish the role of teachers, and that the ethical challenges are addressed to safeguard both educators and students.

Keywords: Chatbots in education, ethical implications, teacher autonomy, data privacy, AI in education, Coimbatore teachers, educational technology.

I. INTRODUCTION

Chatbots in education represent a groundbreaking frontier, promising transformative advancements in the way teachers learn, educators teach, and institutions operate. These intelligent virtual agents, programmed to engage in natural language conversations, hold immense potential for providing personalized learning experiences, immediate feedback, and round-the-clock support. Chatbots, by their very nature, often require access to sensitive student information, from academic performance data to personal details. The ethical responsibility of educational institutions and developers is to establish robust safeguards to protect this information from unauthorized access and misuse. Striking a delicate balance between data-driven insights and preserving individual privacy becomes imperative to maintain the trust of teachers and educators in these educational technologies. Accountability extends beyond transparency and encompasses the responsibility of educational institutions and developers to rectify errors, address complaints, and continuously improve chatbot functionality. As these virtual agents play a pivotal role in shaping the educational experience, establishing clear lines of accountability becomes essential for

maintaining the quality of education and the well-being of the learning community. Bias in algorithmic decision-making poses a complex ethical challenge, with far-reaching consequences in education. Chatbots, driven by algorithms, may inadvertently perpetuate and amplify existing biases present in training data. If not addressed, these biases can lead to discriminatory outcomes, reinforcing societal inequities. A critical examination of the ethical implications demands a proactive approach to identify and rectify biases within the algorithms, fostering fairness and equal opportunity for all teachers. Teachers and educators must be informed and consent to the collection and use of their data by these virtual assistants. Establishing clear guidelines for obtaining consent and ensuring that users have control over their data contributes to ethical practices and respects individuals' autonomy. The ethical discourse surrounding chatbots in educational so encompasses concerns about the impact on student well-being. Excessive reliance on virtual assistants may in advertently contribute to a sense of isolation or detachment among teachers. Balancing the convenience of instant support with the need for authentic human connections is crucial for promoting a positive and nurturing learning environment. Additionally, the ethical implications of chatbots extend to considerations of accessibility and inclusivity in education. Ensuring that chatbot interfaces and functionalities are designed with diverse users in mind, including those with disabilities, is an ethical imperative. This requires a commitment to universal design principles to guarantee that educational technology benefits all teachers, regardless of their individual needs and abilities. The integration of chatbots in education necessitates a meticulous and multidimensional examination of the ethical implications surrounding their deployment. Privacy, transparency, accountability, the role of human interaction, bias in algorithms, consent, student well-being, accessibility, and on going monitoring are key facets of this critical examination. As educational institutions and developers navigate the uncharted territory of intelligent virtual agents, a commitment to ethical practices is in dispensable for fostering a learning environment that is not only technologically advanced but also ethically sound. Balancing innovation with responsibility is the key to unlocking the full potential of chatbots in education while upholding the values and ethical principles that underpin the pursuit of knowledge.

II. Review of Literature

Aysha Khan, Sakshi Ranka, Chaitali Khakare, Subodh Karve (2019), In this study a Chatbot is a program that mimics human-like intelligent conversations through text chats and voice commands. It is fast and less confusing which makes it easy to install as there is no need to have installation packages. As the name suggests, NEEV means foundation & so, this intelligent Chatbot for career counseling and obtaining suggestions, will help user in choosing the right career by giving an appropriate response to user's query. In future this Chatbot can be expanded by adding several features like multilingual capability. By adding this feature, the Chatbot will be more user friendly. **Dr. K S Wagh (2020)**, The purpose of this paper is to develop an automated system which gives a reply to a user query on behalf of a human for the education system. The development of the information technology and communication has made artificial intelligent systems more complex. Existing chatbots such as Facebook chatbot, We Chat, Natasha from Hike, Operator ,etc. we're giving reply from its local database. There are various techniques such as machine learning, NLP, pattern matching, data processing algorithms are used in this paper to enhance the performance of the system. **Galymzhan Momonov and Lela Mirtskhulava (2021)**,This paper reviews empirical literature on artificially intelligent chatbots for higher education published in 2000-2021 in peer reviewed journals. The review shows that chatbots are mainly used for teaching assistance and for non-academic support purposes.The published studies un animously report positive effects of chatbots on the outcomes of interest. Overall, based on the reviewed studies, one can conclude that chatbots positively affect academic and non-academic outcomes of teachers in higher education. Chatbots assist teachers in improving their English language skills and other skills like writing. **Gwo-Jen Hwang & Ching-Yi Chang (2021)**,This study explores the trends of chatbots in education studies by conducting a literature review to analyze relevant papers published in the Social Science Citation Index (SSCI) journals by searching the Web of Science (WoS) database. From the analysis results, the greatest proportion of studies adopted guided learning, followed by no learning activities. It was determined that the studies related to chatbots in education are still in an early stage since there are few empirical studies investigating the use of effective learning designs or learning strategies with chatbots. **Chinedu Wilfred Okonkwo, Abejide Ade-Ibijola (2021)**, The use of Artificial Intelligence (AI)in education is rapidly expanding. One of the most popular AI technologies used to support teaching and learning activities is the Chatbot system. Chatbots are being considered as a useful technology to facilitate learning within the educational context. The review results provide a comprehensive understanding of prior research related to the use of Chatbots in education, including information on existing studies, benefits, and challenges, as

well as future research a reason the implementation of Chatbot technology in the field of education. **JeyaAmanthaKumar(2021)**, Educational chatbots(ECs) are chatbots designed for pedagogical purposes and a reviewed as an Internet of Things(IoT) interface that could revolutionize teaching and learning. These chatbots are strategized to provide personalized learning through the concept of a virtual assistant that replicates humanized conversation. The present study investigates how integrating ECs to facilitate team-based projects for a design course could influence learning outcomes.This study aims to add to the current body of knowledge on the design and development of EC by introducing a new collective design strategy and its pedagogical and practical implications. **Vijaya Lakshmi, Y and Ishfaq majid (2022)**, The aim of use of chatbots in education is not to replace the teacher but to reduce the burden of repetitive and low cognitive level tasks carried out by the teacher and thus increase her/his efficiency. In field of education the use of chatbots can be divided into those used with educational intention and those without educational intention. Chatbots could be involved in performing various tasks like design textbooks, deliver course content, develop test questions and evaluate the answers, monitor online discussions, and tutor teachers. **MohammadAminKuhail,NazikAlturki,SalwaAlramlawi,KholoodAlhejori(2022)**, Chatbots hold the promise of revolutionizing education by engaging learners, personalizing learning activities, supporting educators, and developing deep insight into learners' behavior. This study presents a systematic review of 36 papers to understand, compare, and reflect on recent attempt stoutilize chatbots in education usings even dimensions: educational field, platform, design principles, the role of chatbots, interaction styles, evidence, and limitations. The results show that the chatbots were mainly designed on a web platform to teach computer science, language, general education, and a few other fields such as engineering and mathematics. **Patchara Vanichvasin (2022)**, There are many ways to learn how to be entrepreneurs and one of the powerful ways is to learn from successful entrepreneurs. However, it is difficult to reach and interview those entrepreneurs about their best practices in doing business in real lives. Chatbot technology can come into play in mimicking conversation of successful entrepreneurs and providing pre-programmed responses of their best practices drawn from interviews published in newspapers, books and articles. This study indicated that chatbot technology positively impacted student learning and satisfaction. It can be implemented as a powerful tool to teach entrepreneurship in entrepreneurship education programme in higher education context.

III. OBJECTIVE

This study is being conducted with the following objectives:

- To identify the Accessibility and Inclusivity.
- To examine the ethical implications of chatbot in education.
- To suggest the possible solution for making the chatbot better in education.

IV. METHODOLOGY:

4.1 SAMPLING DESIGN

The sample was collected among the teachers on a convenient random sampling method.

4.2 SAMPLING SIZE

Data was collected from 90 respondents from teachers.

4.3 SOURCE OF DATA

- **Primary data**

  The data collected for this study was based on primary data which was collected by framing the structured questionnaire given to the teachers.

- **Secondary data**

  The secondary data was collected from various journals, books, website.

V. ANALYSIS

5.1 Simple Percentage Analysis:

Based on the Simple Percentage Analysis we have the following findings:

Table 1.1
TABLE SHOWING THE PRIMARY PURPOSE OF USING CHATBOT IN EDUCATION

S.NO	PARTICULARS	NO.OF. RESPONDENTS	PERCENTAGE (%)
1.	Personalized learning support	22	24.44
2.	Automatically administrative tasks	31	34.44
3.	Enhancing student engagement	31	34.44
4.	Instant response	6	6.67
TOTAL		**90**	**100**

(Source: Primary Data)

The table 1.1 shows that out of 90 respondents, 24.44% of the respondents are using for Personalized learning support, 34.44% of the respondents are using for Automatically administrative tasks, 34.44% of the respondents are using for Enhancing student engagement and 6.67% of the respondents are using for Instant response of chatbot in education. Majority 34.44% of the respondents are using for both Automatically administrative tasks and for Enhancing student engagement.

Table No 1.2
TABLE SHOWING THE RESPONSIBLE FOR ADDRESSING ETHICAL CONCERN RELATED TO CHATBOT IN EDUCATION

S.NO	PARTICULARS	NO.OF. RESPONDENTS	PERCENTAGE (%)
1.	Teachers	29	32.22
2.	Educational Institutions	34	37.78
3.	Developers	23	25.56
4.	Regulatory Bodies	4	4.44
TOTAL		**90**	**100**

(Source: Primary Data)

The table 1.2 shows that out of 90 respondents, 32.22% of the respondents are Teachers, 37.78% of the respondents are Educational Institutions, 25.56% of the respondents are Developers and 4.44% of the respondents are Regulatory Bodies are responsible for addressing ethical concern related to chatbot in education. Majority 37.78% of the respondents are that Educational Institutions are responsible for addressing ethical concern related to chatbot in education.

Table No 1.3
TABLE SHOWING CHATBOT ETHICALLY AND RESPONSIBLY IN EDUCATION SETTING

S.NO	PARTICULARS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Regularly evaluating their impact on students	34	37.78
2	Incorporating ethical considerations into chatbot design	28	31.11
3	Providing clear guidelines for chatbot use	27	30
4	Depersonalization of learning	1	1.11
TOTAL		**90**	**100**

(Source: Primary Data)

The table1.3 shows that out of 90 respondents, 37.78% of the respondents are regularly evaluating their impact on students, 31.11% of the respondents are in corporating ethical considerations into chatbot design, 30% of the respondents are providing clear guidelines for chatbot use and 1.11% of the respondents are Depersonalization of learning. Majority 37.78% of the respondents are regularly evaluating their impact on students.

Table No 1.4
TABLE SHOWING THE ETHICAL CONCERN ASSOCIATE WITH THE USE OF CHATBOT IN EDUCATION

S.NO	PARTICULARS	NO.OF. RESPONDENTS	PERCENTAGE (%)
1	Data privacy concern	29	32.22
2	Bias and fairness	15	16.67
3	Depersonalisation of learning	27	30.00
4	Dependency issues	12	13.33
5	Transparency and informed consent	5	5.56
6	Equity and Access	2	2.22
TOTAL		**90**	**100**

(Source: Primary Data)

The table 1.4 shows that out of 90 respondents, 32.22% of the respondents are Data privacy concern, 16.67% of the respondents are Bias and fairness, 30% of the respondents are

Depersonalization of learning, 13.33% of the respondents are Dependency issues, 5.56% of the respondents are Transparency and informed consent and 2.22% of the respondents are Equity and access. Majority 32.22% of the respondents are Data privacy concern is mostly associate with the chatbot in education.

5.2 Likert Scale Analysis

- 5= Fully Aware
- 4= Aware
- 3= Neither Aware nor Not Aware
- 2= Not Aware
- 1= Fully Not Aware
- 5= Strongly Agree
- 4= Agree
- 3= Neither agree nor disagree
- 2= Disagree
- 1= Strongly Disagree

Formula:

$$\text{Likert Scale} = \frac{\Sigma f(x)}{\text{Total Number of Respondents}}$$

While,
f = Number of respondents
x = Likert scale value
Σf(x) = Total score

Mid Value:
Mid value indicates the middle most value of Likert scale.
Based on the Likert Scale Analysis we have the following findings:

Table No 2.1
TABLE SHOWING THE SATISFICATION LEVEL OF TEACHERS ABOUT ACCESSIBILITY AND AVAILABILITY OF CHATBOT

S.NO	FACTORS	NO.OF. RESPONDENTS	LIKERT SCALE VALUE	TOTAL SCALE
1.	Very satisfied	50	4	200
2.	Satisfied	36	3	108
3.	Neutral	4	2	8
4.	Dissatisfied	0	1	0
TOTAL		**90**		**316**

(Source: Primary Data)

Likert Scale value 3.51is higher than the middle value(2.5), so the teachers are very satisfied on accessibility and availability of chatbot.

Table No 2.2
TABLE SHOWING THE SATISFICATION LEVEL OF TEACHERS ABOUT COST EFFECTIVENESS OF CHATBOT

S.NO	FACTORS	NO.OF. RESPONDENTS	LIKERT SCALE VALUE	TOTAL SCALE
1.	Very satisfied	13	4	52
2.	Satisfied	66	3	198
3.	Neutral	11	2	22
4.	Dissatisfied	0	1	0
TOTAL		**90**		**272**

(Source: Primary Data)

Likert Scale value 3.02 is higher than the middle value(2.5),so the teachers are Satisfied on cost effectiveness of chatbot.

Table No 2.3
TABLE SHOWING THE SATISFICATION LEVEL OF TEACHERS ABOUT PERSONALIZATION AND CUSTOMIZATION OF CHATBOT

S.NO	FACTORS	NO.OF. RESPONDENTS	LIKERT SCALE VALUE	TOTAL SCALE
1.	Very satisfied	35	4	140
2.	Satisfied	34	3	102
3.	Neutral	14	2	28
4.	Dissatisfied	7	1	7
TOTAL		**90**		**277**

(Source: Primary Data)

Likert Scale value 3.07 is higher than the middle value (2.5), so the teachers are Satisfied on personalization and customization of chatbot.

Table No 2.4
TABLE SHOWING THE TEACHERS RATE OF ACCESSIBILITY LEVEL ABOUT IMPROVED EFFICIENCY OF CHATBOT IN EDUCATION

S.NO	FACTORS	NO.OF. RESPONDENTS	LIKERT SCALE VALUE	TOTAL SCALE
1.	Excellent	25	4	100
2.	Good	40	3	120
3.	Fair	22	2	44
4.	Poor	3	1	3
TOTAL		**90**		**267**

(Source: Primary Data)

Likert Scale value 2.96 is higher than the middle value (2.5), so the teachers are Good on improved efficiency of chatbot in education.

Table No 2.5
TABLE SHOWING THE TEACHERS RATE OF ACCESSIBILITY LEVEL ABOUT MULTICHANNEL INTEGRATION OF CHATBOTIN EDUCATION

S.NO	FACTORS	NO.OF. RESPONDENTS	LIKERT SCALE VALUE	TOTAL SCALE
1.	Excellent	31	4	124
2.	Good	34	3	102
3.	Fair	17	2	34
4.	Poor	8	1	8
TOTAL		**90**		**268**

(Source: Primary Data)

Likert Scale value 2.97 is higher than the middle value (2.5), so the teachers are Good on multichannel integration of chatbot in education.

VI. FINDINGS

6.1 Percentage Analysis

- Majority 34.44% of the respondents are using for both Automatically administrative tasks and for Enhancing student engagement.
- Majority 37.78% of the respondents are that Educational Institutions are responsible for addressing ethical concern related to chatbot in education.
- Majority 37.78% of the respondents are regularly evaluating their impact on students.
- Majority 32.22% of the respondents are Data privacy concern is mostly associate with the chatbot in education.

6.2 Likert Scale Analysis

(A) LEVEL OF SATISFICATION LEVEL ABOUT CHATBOT IN EDUCATION

- Likert Scale value 3.51 is higher than the middle value (2.5), so the teachers are very satisfied on accessibility and availability of chatbot.
- Likert Scale value 3.02 is higher than the middle value (2.5), so the teachers are Satisfied on cost effectiveness of chatbot.
- Likert Scale value 3.07 is higher than the middle value (2.5), so the teachers are Satisfied on personalization and customization of chatbot.

(B)RATEOFACCESSIBILITYLEVELABOUTCHATBOTINEDUCATION

- Likert Scale value 2.96 is higher than the middle value (2.5), so the teachers are Good on improved efficiency of chatbot in education.
- Likert Scale value 2.97 is higher than the middle value (2.5), so the teachers are Good on multichannel integration of chatbot in education.

VII. SUGGESTION

- The study suggested that educational institutions and Teachers are responsible for ethical implication of chatbot in education and also responsible for regularly evaluating their impact on students.
- The teachers are expected to transform the way of delivering the education, so the infrastructure facilities of chatbot will be improve.
- This study suggests to frame ethical guidelines and anonymous support to encourage teachers about ethical concern without fear of judgement.

VIII. CONCLUSION

The development of a chatbot tailored to address the critical examination of ethical implications among teachers presents a promising opportunity to enhance professional development and ethical awareness within the education sector. By incorporating interactive scenarios, ethical guidelines integration, and anonymous support features, the chatbot can serve as a valuable resource for teachers navigating complex ethical dilemmas in their daily practice. Collaboration with ethics experts, prioritization of data privacy, and cultural sensitivity considerations are essential to ensure the chatbot's effectiveness and relevance across diverse educational contexts. Ultimately, the implementation of such a chatbot stands to promote a culture of ethical reflection, decision-making, and continuous improvement with in the teaching profession, ultimately benefiting students and educators.

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