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INTERACTIVE CHATBOTS: A WAY FOR THE DEVELOPMENT OF THE EDUCATIONAL SECTOR.

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Abstract— **In this day and age, Chatbots are becoming vital for many organizations and consortiums to negotiate with their customers. They are also being developed for educational Institutes to provide students of Institutes with services and support very quickly and efficiently. This paper provides the recapitulation of Chatbot usage and its primary aim of being designed for accessing information about an educational institute and assisting professors, students, and all other members who are in need of information and requires a speedy response from any corner of the world without being present in the Institute's premises. Educational chatbots ameliorate profitability and correlation, and confine ambiguity from communications. It builds a between the Institute's official site and its users. The Educational Chatbot has the potential to reply to any student's, teacher's, or other member's queries, which can be related to any information such as the Institute's academics and admission process, assignments, research, administration, important events, etc. Chatbots guarantee that all the data will be made accessible to any individual day in and day out.**

Keywords— **Chatbots, Artificial Intelligence, Education, Correlation, Response, Academic Activity, Research, Improvement in the Educational sector, Advising.**

I. INTRODUCTION

During the period of 1950s and 1960s, the concept of artificial intelligence and computer-based conversations emerged. Alan Turing, the Researcher explored the new idea of machines that would have the ability to mimic human conversation. ELIZA was one of the earliest chatbots which was developed by Joseph Weizenbaum at MIT in 1966 to match the pattern and process simple language techniques to simulate conversation with users. It used pattern matching and simple language processing techniques to simulate conversation with users. ELIZA aimed to impersonate a Rogerian psychotherapist and responded based on the available keywords and templates. Later, tech giants like Google and Amazon introduced voice-activated chatbots. These chatbots utilize natural language processing, and voice recognition, and get integrated with various services to provide users with a wide range of functions and information. There's a significant advancement in chatbot technology, because of the integration of machine learning, deep learning, and neural networks. Modern chatbots provide more sophisticated and context-aware conversations.

The implementation of chatbots into the educational sector has obtained remarkable attention for the development of various institutes. Chatbots are typically used for several means in dialog systems for different practical purposes which include information accession and customer assistance. For the usage of a chatbot, a user can ask a question or can give a command, and then the chatbot will respond to or perform the requested actions. The chatbots with different purposes have various distinctive queries, which are uniquely acknowledged by the chatbots and are relevant to their purpose of answering the questions. The students inside or outside the college or university can acquire various kinds of information about their schedules and activities. Before the development of chatbots in educational sectors, students had to reach out to their respective universities or colleges to acquire such particulars. This resulted in slow down of access to get the information and work gets extended on the establishment's side. To avoid the overall problem of educational sectors chatbots are an effective answer and the only way to solve every problem.

The goal of this paper is to analyze the potential utilization of chatbots in the academic sector and their influence on education and research from an ethical point of view. It will also explore how chatbots could impact the academic sector, and their impact on the integrity of assessments. It will also investigate whether the chatbots are going to alter the variety of academics. Comprehensively, this analysis will scrutinize the advantages of chatbots, also their responsibility in reinforcing judgment and human expertise. The study will utilize an analytical research approach, with a subjective research methodology, to collect data. The research will

discover and put forward the possible evolution, insights, and future perspectives, and related to the use of chatbots in academic and research sectors.

II. OBJECTIVE

The main objective of this paper is to demonstrate the use of chatbots for academics, their implementation, applications, and how effectively these can put up to take up an important part of development in many sub-areas of academics and research so that the students, professors, and all the University or college departments can get the particular information in a very less time or efforts and the overall queries of the individual will get resolved. The developed chatbot enhances student satisfaction, streamlines processes, improve communication, and provide personalized support, ultimately contributing to a positive and productive experience.

III. LITERATURE REVIEW

There are several types of chatbots functioning at every level as per the requirement. [1] This provides overall information on the types of chatbots currently present and is providing efficiency to the users at regular intervals. The chatbots such as:

i. Menu-based chatbots: These types of chatbots consist of two options such as yes or no. They will consist of pre-defined questionaries and the next question asked by the bot will be linked with the present-stage answers. These bots will be pre-fed with the list of questionnaires with their answer path for two options also. The answer chosen by the user will determine the next set of questions. **ii. ML Chatbots:** These are properly trained bots. These types of chatbots are trained for the intent entity selection and quick response-giving methodologies. **iii. Voice Bots:** The voice chatbots make the work of users easier and it reduces the possibilities of entering wrong data. The additional feature of text-to-speech and speech-to-text is provided. This type will take the input by voice and respond with voice outputs. Some of the more functionalities like sending voice messages and e-mail can be also made possible using these bots. **iv. Linguistic Chatbots:** A wide range of social media applications have linguistic chatbots and they are based on this type of chatbots. These bots help the users to understand the information provided by the chatbots in their languages as many users may not be aware of the English language. Adding linguistic chatbots attracts customers for a business and allows them to get the details of the products in their native languages. **v. Keyword Recognition-based Chatbots:** These chatbots work on a keyword pattern and provide specific requirements that are asked by the user. It works as per the collection of the keywords that are defined from the queries and then fulfills the inquiry of the user. The incorporation of artificial intelligence (AI) and chatbots into education and research can prove more prevalent for academics. Chatbots are conversational agents that are automated and use natural language processing and various machine learning algorithms to interconnect with end users in a human-like manner. It also raises ethical challenges in the field of the educational sector which needs to be addressed [3]. Ref.[2] provides an overview of the contemporaneous state of AI and chatbots in education, its prospective benefits, increased accessibility, incorporating personalized learning, and improved efficiency. Some more ethical challenges are also discussed associated with the adoption of AI in education. A comprehensive review of chatbots in education and their potential advantages has been made by Zhang and Aslan [4]which includes improved student motivation and engagement, reinforced assessment and feedback, cost-effectiveness, and increased efficiency. Pedro et al. [5] highlighted the advantages of the integration of AI and chatbots in the educational field were highlighted by Pedro et al. The researchers admitted that AI can automate repetitive tasks, the workforce can be upskilled and more complex questionaries can be resolved.

The challenges and policy implementation of chatbots into education and making students ready for AI-powered circumstances have also been discussed by Pedro et al. [5]. The challenges it includes are of enlarging comprehensive public policies for sustainable development, making certain inclusion and equity, evolving data systems, preparing educators for AI-powered education, developing the quality of data systems, providing research on AI in the educational field, and directing ethical concerns of collection of data and its distribution. Tlili et al. [6] carried out an investigative study to determine the use of conversational means, as an implementation for strengthening the learning experiences. They realized that students can complete their learning activities more quickly, by gaining engaging and interactive learning experiences.

Kuhail et al. [7] described that the students get instant support and response, also personalized learning experiences using Chatbots. Chatbots have the ability to increase student engagement and motivation in learning. Araujo [8] introduces the study of the Conversational Agent Research Toolkit (CART). This toolkit is formed to aid the researchers in developing the conversational agents for deriving the experimental learnings. An overview of a tool is provided by the paper and it has also explained a gradual process for implementing an experiment with the chatbot.

A rapid and appropriate approach to particulars is provided to chatbots, they also present several ethical concerns. The recent research [26] The evolution and application of a chatbot were designed to develop the interaction between students and teachers. The integration of the chatbot was done in an online platform and it's used for choosing a particular university course and to provide assistance for the students. The outcomes of the result show the positive usage response that was assessed by a large number of the students. It concludes that chatbots enhance a student–teacher interaction and improve the overall learning experience. Chatbots have as a promising educational tool, which the chatbots help students

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to have developed the potential to enhance their learning experience by getting personalized and immediate feedback.

IV. HOW EDUCATIONAL SECTORS CAN BE IMPROVED?

The application of chatbots in the educational sector: According to recent studies the usage of chatbot have been rapidly increasing. They can be used in a number of ways which include management, assessment, teaching and learning process, and research and development.

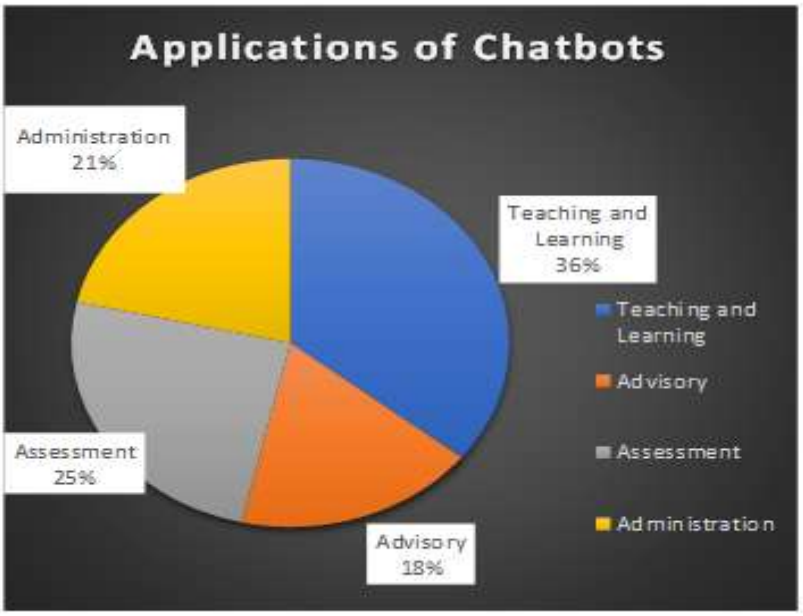

Fig. 1. Key application of Educational Chatbots

Teaching and Learning According to the studies it has been observed that Chatbots can give out various course contents to students through an online platform and can act as a conversational agent capable of providing accurate content to users. Through the chatbots, students can get their questions answered quickly. The introduction of chatbots in learning has made all the study materials accessible to students of the institutes anytime and anywhere. Chatbots help to improve student's learning interest, acquisition of cognitive skills, and achievement.

Administration: Chatbots can be best used to provide administrative tasks in educational institutions. The Chatbot system accordingly answers the student's questions related to the administration of the institutes. The Chatbot will play a role in reducing labor expenses, improving contemporary services, generating new plans, and providing digital aid. This will enable students to have easy access to all the important details or information such as the amount to be paid tuition fees, scholarships that are available, and overall admission processes.

Advisory: The next important characteristic of a Chatbot where it can be applied to provide guidance or solve the problems of the students about academics and admissions by providing vital opinions for academic activities or programs. It will also explain the course that should be chosen and more educated decisions about the career option that they should choose.

Research and Development: By providing the appropriate response to the conversation about academic research-related issues the chatbots can prove helpful for providing and developing research assistance. The information can be retrieved using a Chatbot by supporting the training from various areas of knowledge so that students can gain practical knowledge of their course.

Integration of Contents: The chatbot will be integrated with the information of content which includes regular updates of the Institute's upcoming academic events, the examination timetables, new assignments, syllabus as well as names of covered topics. The students can get updated about all events such as seminars, workshops, sports, school events such as sports, workshops, and other activities that may be of interest to them.

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V. SIGNIFICANCE OF UNIVERSITY CHATBOT

University chatbots offer many advantages which contribute to improved efficiency, enhanced user experience, and streamlined administrative processes. Here are some key advantages of university chatbots:

24/7 Availability: Chatbots can provide support and information to users around the clock, eliminating the constraints of traditional office hours. Students, faculty, and staff can access assistance whenever they need it, even during weekends and holidays.

Instantaneous Responses: Chatbots can provide immediate responses to inquiries, eliminating the need for users to wait for human assistance. This saves time and reduces frustration, especially for routine and commonly asked questions.

Scalability: Chatbots can handle multiple inquiries simultaneously without any decrease in response time. They can handle a high volume of user interactions, ensuring scalability as the user base grows without requiring additional staff resources.

Personalized Experience: Through the use of natural language processing and machine learning algorithms, chatbots can provide personalized responses and recommendations based on the user's individual needs, references, and history. This tailored experience enhances user satisfaction and engagement.

Automation of Routine Tasks: Chatbots can automate repetitive and routine tasks such as providing general information, answering frequently asked questions, assisting with registration processes, and guiding users through administrative procedures. By automating these tasks, university staff can focus on more complex and value-added responsibilities.

Improved Efficiency: By handling routine inquiries and administrative processes, chatbots free up staff time and resources, allowing them to concentrate on more critical tasks. This improves overall operational efficiency within the university.

Access to Information and Resources: University chatbots can integrate with various systems and databases, providing users with instant access to information, resources, and services. This includes course schedules, campus maps, library catalogs, academic resources, and more, making it easier for users to find what they need.

Data Collection and Insights: Chatbots generate valuable data on user interactions, allowing institutions to gather insights into user preferences, common issues, and areas for improvement. This data can inform decision-making, service enhancements, and personalized offerings.

Cost Savings: Implementing chatbots can lead to cost savings for universities. By automating routine tasks and reducing the need for additional human resources, institutions can optimize their operational costs over time.

VI. SYSTEM ARCHITECTURE

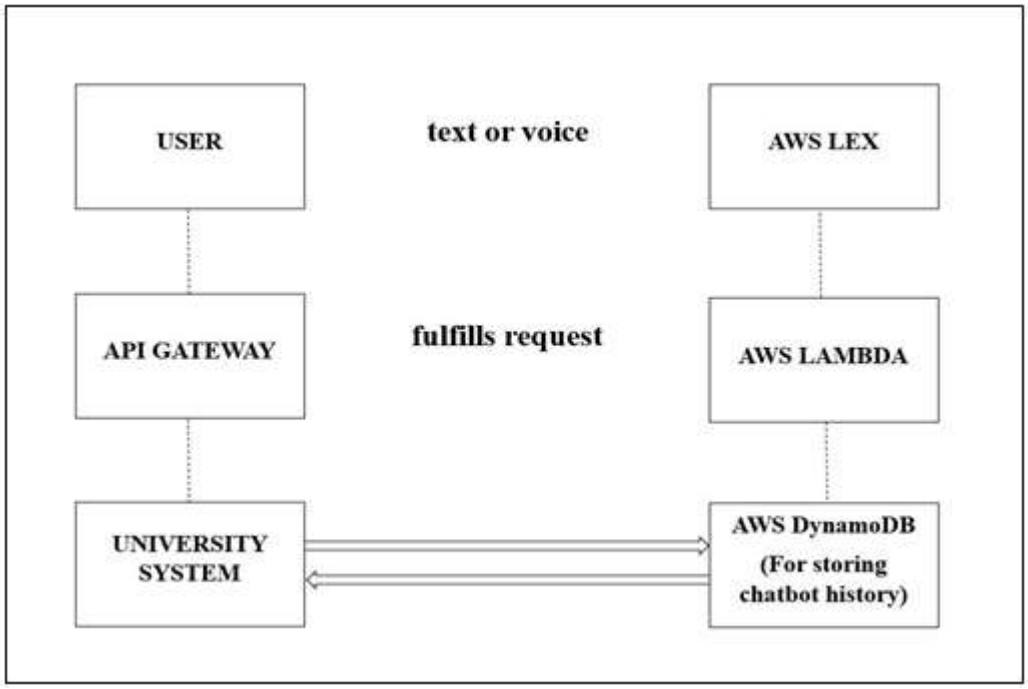

Fig. 2. Architecture Diagram of University Chatbot

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The architecture diagram of the University Chatbot describes that the user interacts with the chatbot through text or voice input, which is received by AWS Lex. AWS Lex uses natural language processing to understand the user's intent and extract relevant information from their input. Once AWS Lex has processed the user's input, it sends a request to AWS Lambda, which is responsible for fulfilling the request. AWS Lambda executes code that interacts with the University system to provide the user with information about academics, admission, student section, incubation center, and research. AWS lambda can also store the chatbot history in AWS DynamoDB, which allows the University to analyze chatbot interactions and improve the chatbot's performance over time. Finally, the chatbot's responses are sent back to the user through the API gateway.

VII. RESULTS

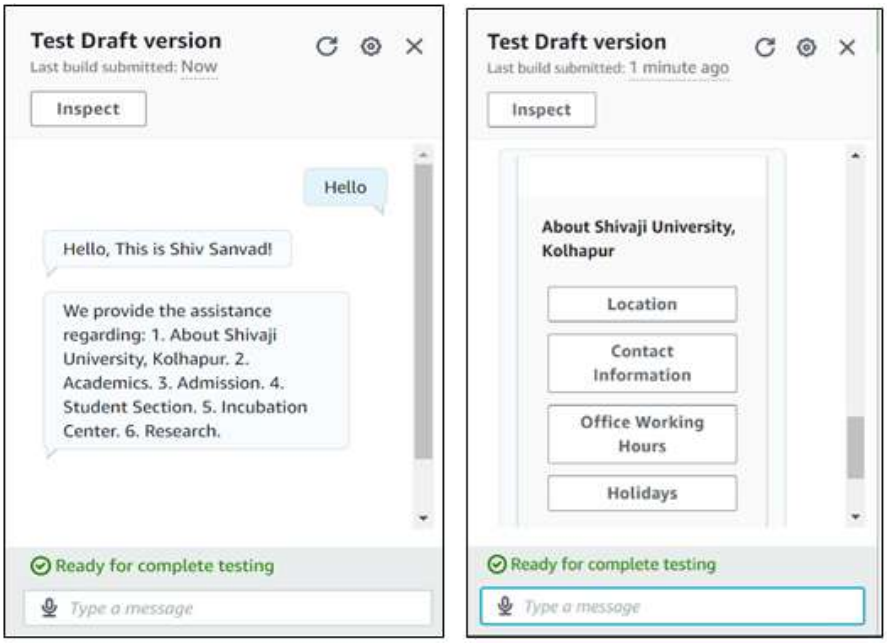

Fig. 3. About Page representing the information of University

Fig. 3. Describes the About page of the University in which the information of the University is provided.

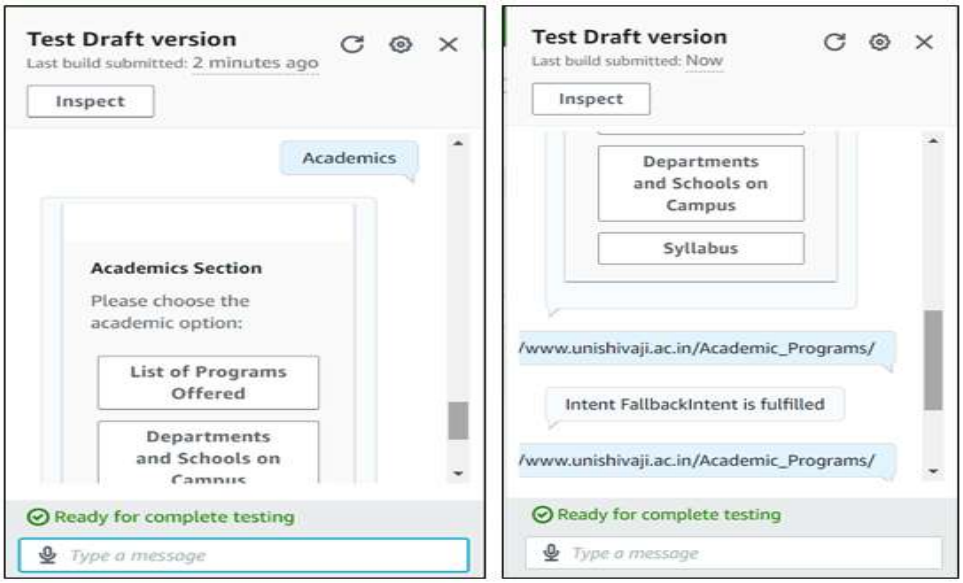

Fig. 4. Academics Section

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Fig. 4. describes the Academics section in which all the details such as the List of Programs Offered, Departments and schools on campus, and syllabus information are provided.

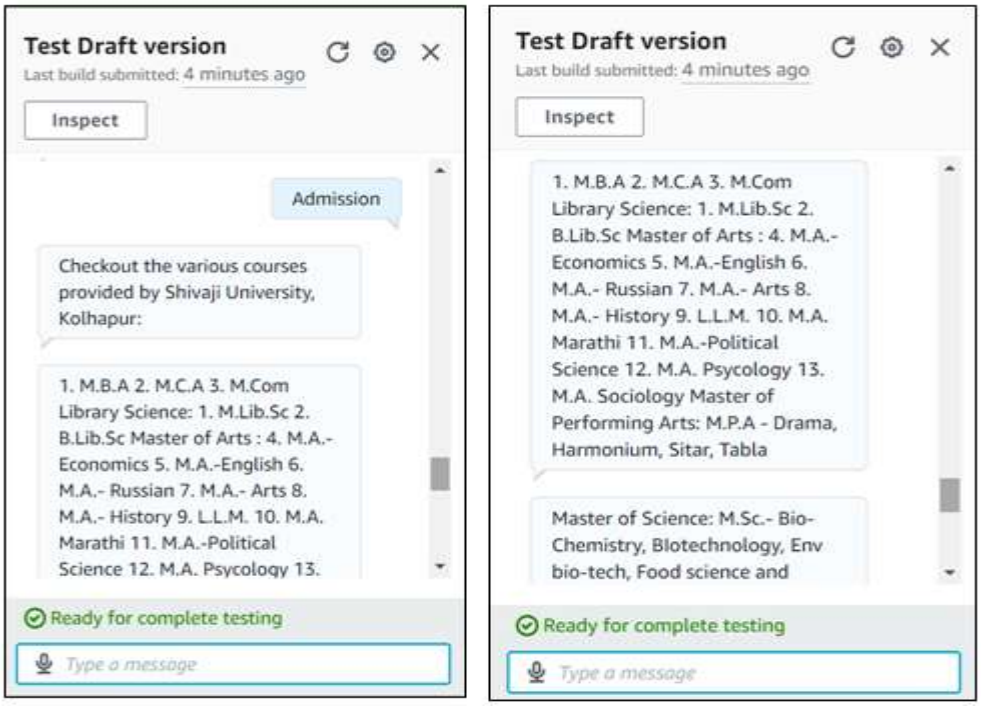

Fig. 5. Admission Section

The admission section deals with providing information on courses to the end user so that the user may understand the subjects available all the time for the University.

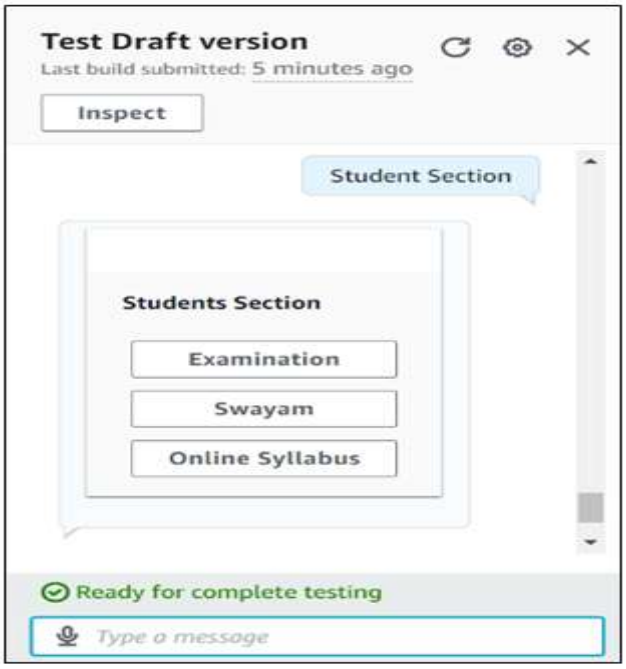

Fig. 6. Student Section

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The Student section allows to get access to information on examinations, online courses link, and online syllabi. The Incubation Center section allows an individual to get information and updates

Fig. 7. Research Section

The Research section provides information on research journals, research project corner, Intellectual Property Rights Cell, and publications.

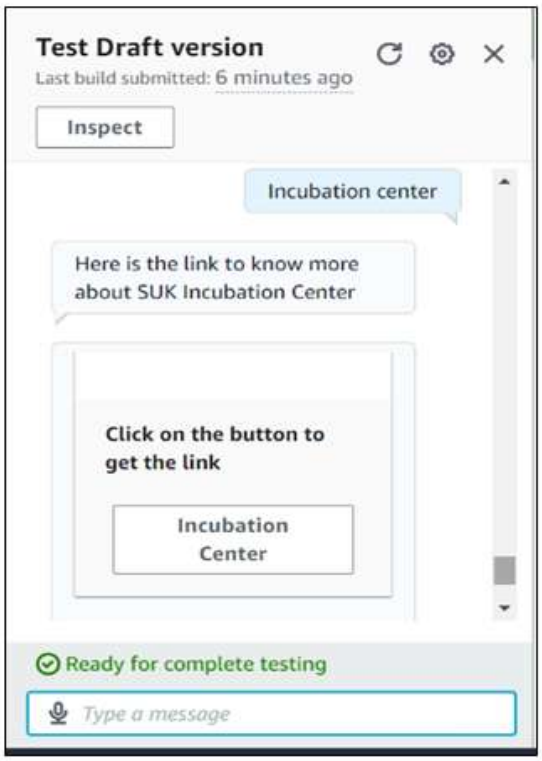

Fig. 8. Incubation Center Section

VIII.CONCLUSION

In the educational sector, this technology of chatbots can prove more beneficial as it can offer a variation in solutions for institutions. An effectual implementation of Chatbots can provide a way of communicating by standardizing every process of delivering information about the university or college's educational support and even assisting the students or any other individual in their regular queries of any important events, research, or academic updates. This escalating technology is a boon for the upcoming era and it can solve many queries of users and give them an appropriate solution in a very short period. This paper wholly explores the chatbot and its benefits to the students and teachers simultaneously which commits to a proficient educational system.

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