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Development of ESUT Chatbot Communication Channel on Telegram

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Abstract

ESUT Questions and answers AI communication Channel (ESUQAICC) is a GenAI Chatot that runs on the Telegram platform. It a refined-digitalized channels of communication that solved problems experienced from other existing channels of communication such as memo, WhatsApp group, monthly bulleting, bill board, fliers, websites, notice board, etc in ESUT community. ESUQAICC generally enhanced communication as the Chatbot ensured round the clock availability of information, addressing common questions instantly and reducing response delays. The deployment ensured Reduction of staff workload by Automating Routine Communication answering frequently asked questions and inquiries in admission and ICT units, Enhanced Engagement by Retrieving Past information without discrimination or denials, Increase Accessibility and Portability of Information by digitalizing and reducing energy requires by manual searching or file localizations, Increase safety and security by reducing the risk of travelling just to ask questions, Increase Availability of information by removing human intervention and sentiments, and Decreasing Cost of communicating in printing memo as GenAI Chatbot requires minimal maintenance thereby increasing administrative efficiency in effective seamless communication. It was showed in PivotChart that the Chatbot can have steady conversation up to 18 interactions in 11 minutes or more interactions in a session like in natural language flow proving instant faster communication. The analytic history of interactions of the agent between 3-7/10/2026 showed range of response between 11-100% which indicate the rate of understanding and unfamiliarity of queries from natural language users and it gives fallback response to keep the conversation continuous thereby enhancing communication in the university community.

Keywords: *AI, Channel, Communication, Chatbot, Dataset, Telegram, Google DialogFlow, Intents,Query*

1. INTRODUCTION

In today's digital age, effective communication is paramount for the smooth functioning of any institution. The Enugu State University of Science and Technology (ESUT) can greatly enhance its communication framework by leveraging GenAI Chabot technology integrated into Telegram. This innovative approach aims to reform the way students, staff, and stakeholders interact in the university community, ensuring faster, more efficient, and user-friendly communication channels. AI deals with the development of intelligent systems that can think and act as humans in various tasks such as learning, planning, and speech recognition (Zojan Memon et alm 2021). Conversational artificial intelligence is the technology that enables automatic messaging and conversation between computers and humans (Cem Dilmegani, 2021). Developments in speech

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recognition and natural language processing allow businesses to adopt conversational chatbots in multimodal conversational experiences, including voice, keypad, gesture, and image. Today, there is a chatbot solution for almost every industry, including marketing, real estate, finance, education, and healthcare. According to a Salesforce survey, 86% of customers would rather get answers from a chatbot than fill out a website form (Alamira Jouman Hajjar, 2021).

Balasubramanian. S. and Tamilselvan. Balasubramanian and Tamilselvan (2023) concluded that AI has great potential to enhance library services by improving efficiency, personalizing services, and providing better access to library resources in schools and universities. According to Cornell Bowel University research (2021), AI as a mediator gives 'smart' replies that can help humans communicate. Artificial intelligence chatbots have the potential to reduce the quantity of human labor needed for certain tasks while increasing productivity in other areas of a business (Anwer Basha. H, 2023). The literature review revealed that the University of Birmingham implemented an IT desk service support chatbot to enhance users' experience with ICT services (Simeon Kostadinov, 2016). The University of Technology Sydney (UTS) explored chatbots as an emerging technology to innovate, improve, and support library services (Indra Ayu et al, 2019). In Yusuf Maitama Sule University, Kano State Nigeria. Hausa Intelligence Chat was implemented to communicate with users in the Hausa Language only, tell some funny stories and learn new simple Hausa words from users(Usman .H., et al, 2020).

The Tho University of Technology worked on a Chatbot for University Admission Services to optimize community interaction (Nghia D.T and Nguyen T. P(2020). The MIT World Peace University, Pune designed and implemented a Chatbot to help students know the admission processes of the institute from anywhere using an internet connection(Kshitija Shingte et al, 2021). Lehman College's Leonard Lief Library implemented Ivy, a proprietary educational software Chatbot to help users seek information in the university library (Michelle E. and DeLooper J., 2022). Today in academia, ChatGPT can write introductions and abstract sections of scientific articles (Bushard, Brian, 2023). The sustainability, possibility, and opportunity space for the project-ESUTQAICC lays on: AI Technology is fast growing and applicable in many communication sector, Mobile Phone is the hand everyone and no new device is needed in the deployment, Cloud storage is scalable on data storage. No worry or purchase of extra device on data storage, and Social media platform-Telegram is an open source, easy to integrate, popular and futuristic.

However, in the Supporting theories. Oracle predicted that 80% businesses will use AI in 2025. IBM Company declared that chatbot reduces cost of productivity by 30%, and Salesforce affirmed that approximately 60% consumers on communication prefer text messaging to voice calls.

2. METHOD

The materials involved in the implementation of the project were categorized as hardware and software materials. The hardware components used were personal computers and mobile phones, whereas the software were Microsoft Windows 10 operating system, MTN data subscription, Google Dialog Flow, Telegram Bot, and internet connection.

Identification, Collection and Characterization of data

The first technique employed to implement the system was identifying the areas of activities in the university community were information for building Chatbot queries

could be obtained. The identified concerned areas were collected as described in Table no 1.

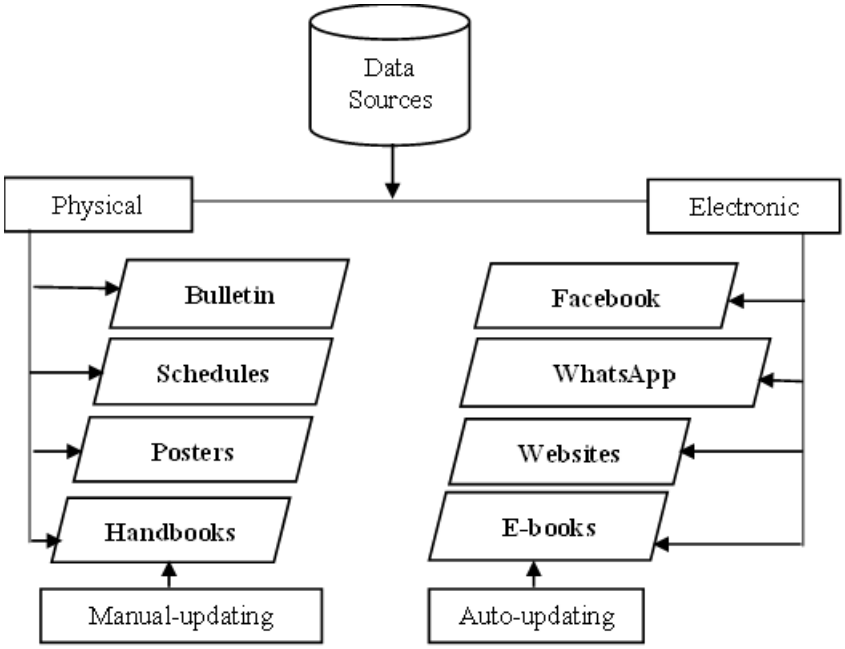


Fig.1. Data Sources for Intents

Fig.1 shows a diagram of the data sources: electronics and manual. The primary data sources were monthly Bulletin, ESUT Mirror Facebook page, where memos are regularly pasted, transcript and certificate schedules, website directories, convocation brochure, advert fliers/posters/banners, and faculty and departmental handbooks. The collected data were stored as text data.

Table 1: Identification and collection of data for ESUT Activities and Services

S/n	Activities/services	Brief Description
1)	Academic Calendar	Knowing and retrieving information on the current and past academic calendar
2)	Admission Services	Deriving replies on how to apply, qualification, and cut-off mark, of school admission.
3)	Certificate collection status	This service enable applicants to know if their certificate have been processed with dates
4)	Code of Conducts	The contents of just released 2026 staff code of conducts are viewed from the services
5)	Condition of Services	The contents of the 2023 revised edition can be viewed from the services
6)	Faculties and Departments	Information on the available faculties ad departments in the university are made available
7)	Hostel Management	location, allocation, resources, rooms, rules and regulations, etc
8)	ICT Services and Solutions	Invoice generation, validation, fees payment, course registration,
9)	Inaugural Lectures	Who, when, content. Knowing the past
10)	Locations Navigation	Community by asking question from a location locating places in ESUT

S/n	Activities/services	Brief Description
11)	Official Memos	This gives information on the past memos collected from different sources
12)	Personality Profiles	The information on personal profile such as position or portifolio
13)	Quality Assurance policy	The reply gotten here tells you standards of certain operations done in the school.
15)	Security Alertness	Rules and regulations. Security awareness.
16)	SIWES affairs	Information on how student to manage the
17)	Student Union Corners	The student union leaders and their activities
18)	Transcript collection status	This service enable applicants to know if their transcript have been processed with dates
19)	University Farm Products	It bears advertisement, and general information needed by the public on the farm products

Table 1 bears the tabulated list of identified and collected 19 activities and services that are currently feasible as areas that people are constantly asking as well as seeking for information on those activities which the proposed system has the capacity to provide expected answers to those queries. The categorization of the identified and collected data is presented in Table 2.

Table 2: Characterization of ESUT Activities Services in Categorized Intents

S/n	**Activities & Services**	**Parent Intents contents**	**Child/Follow-up Intents contents**
0)	Default welcome messages	1. Welcome greeting 2. Welcome users privilege 3. Welcome users name 4. Welcome service request 5. Goodbye message 6. Fallback Message	Reply welcome message Users identify - staff, student, parents, guardians, and others Service Interest – Yes Service Interest – Yes
1)	Academic Calendar	7. Calendar session 8. Calendar months 9. Calendar weeks 10. Calendar dates by day 11. Calendar activities	i.2024,2025.2026 ii.Jan, Feb,.., Dec. iii.Mon, Tues … Thurs, Friday iv.1, 2,4,5,6..30,31 v.Resumption, examination, etc
2)	Admission Services	12. Application for PTUME 13. Application for JUPEB 14. Application for PG School Programme 15. Application for ICS 16. Application for Sandwich 17. Checking of Post UTME Result	vi.Applicant number identification vii.Start date and end of each program

S/n	**Activities & Services**	**Parent Intents contents**	**Child/Follow-up Intents contents**
		18. Application for ESUT Business School 19. Checking of PUTME Admission Status 20. Checking for PG admission Status 21. Checking ICS Admission Status 22. Checking for Sandwich Admission Status	registration viii. Registration or admission Procedure ix. Admission notification x. Application fees
3)	Certificate Collection Status	23. Date of readiness 24. Name of student 25. Student department	i. Date ii. Name iii. Schedule
4)	Code of Conducts	26. Purpose of the Code of Conduct 27. Scope of Code of Conduct 28. Definitions of Terms 29. Core Workplace Expectations 30. General Expectation for All Staff 31. Specific Codes for Academic Staff 32. Specific Codes for Non-Teaching Staff 33. Relationship among Staff Of The University 34. Relationship between Staff and Students of the University 35. Procedure for Enforcement 36. Disciplinary Measures 37. Forms of Disciplinary Measures 38. Misconducts 39. Dishonesty, Fraud, and Misrepresentation 40. Harassment, Discrimination, Victimisation, and Retaliation 41. Alcohol, Drugs, Smoking, and Substance Abuse 42. Violence, Threats, Discourtesy, and Disorderly Conduct 43. Breach of Law, Regulations, or Confidentiality 44. Insubordination, Neglect of Duty, and Poor Performance of Official Responsibilities 45. Sexual Misconduct 46. Abuse of Office and Conflict of Interest 47. Improper Legal Action Against Fellow Staff 48. Forgery and Falsification 49. Impersonation 50. Academic and Research Misconduct 51. Financial Misconduct 52. Misuse of Information and	i. University, units, University Assets, University property, staff, students, bullying ii. Verbal or Written Warning iii. Reprimand or Rebuke iv. Restitution, Recovery, or Surcharge v. Withholding of Salary vi. Deferment of Annual Increment vii. Withholding of Increment viii. Suspension ix. Interdiction x. Withholding or Deferment of Promotion xi. Demotion xii. Transfer or Reassignment xiii. Termination of Appointment or Employment xiv. Dismissal from Service

S/n	**Activities & Services**	**Parent Intents contents**	**Child/Follow-up Intents contents**
		Communication Technology 53. Conduct Prejudicial to the University 54. Fraud, Dishonesty, and Financial Impropriety 55. Academic and Research Misconduct 56. Consequences of Gross Misconduct	
5)	Condition of Services	57. Introduction: 58. Appointments 59. Staff duties and Responsibilities 60. Committees 61. Promotions 62. Outside Commitments 63. Salaries and Allowances 64. Leave 65. Passages and Transport 66. Medical Care 67. Accommodation 68. Advances 69. Retirement Benefits 70. Personal Accident Cover 71. Discipline 72. Miscellaneous 73. Code of conduct for university staff 74. Scheme of service	xv. Citation, definition, interpretation, applications, appointments xvi. xvii. Authority, Categories, procedures, eligibility, tenure, probation, and confirmation of appointments viii. Posting, multiple responsibilities, outside engagement and uniform xix. Retirement, resignation, withdrawal, dismissal, termination of appointment xx. Redeployment, transfer of service, secondment, xxi. Assumption of duty xxii. Petitions xiii. Appointment of headship position procedures
6)	Faculties and Departments	75. Faculty name 76. Departmental names 77. Areas of specialization	Name of 9 faculties Name of 48 departments

S/n	**Activities & Services**	**Parent Intents contents**	**Child/Follow-up Intents contents**
			Specialized careers
7)	Hostel Management	78. location, allocation, resources, rooms, rules and regulations, etc	
8)	ICT Services and Solutions	79. Invoice Generation 80. Payment of Fees 81. Invoice Validation 82. Fees Registration 83. Course Registration 84. Result Checking 85. Fee Report Printing (e-ledger) 86. Filling of Online Application 87. O' Level Verification 88. Course Uploading 89. Course Assigning 90. Internet connection 91. Network Connection	Expired invoice Resetting invoice Arrears fee Sessions of fee Fees reference number Session course Course uploaded-Yes Course uploaded-No Course assigned-Yes Course assigned –No Empty e-ledger No-internet, Yes-Internet No-connection, Yes-connection
9)	Inaugural Lectures	92. Inaugural date 93. Inaugural month 94. Inaugural session 95. Inaugural person 96. Inaugural topic 97. Inaugural abstract	Serial Numbers Inaugural lecturers
10)	Locations Navigation	98. Navigate Main road 99. Navigate Track road 100. Navigate Faculty building 101. Navigate Department office 102. Navigate Office building 103. Navigate Junctions 104. Navigate bus stops 105. Navigate business centers 106. Navigate school of PG 107. Navigate ODL 108. Navigate front gate 109. Navigate back gate 110. Navigate hostel 111. Navigate parks	(i) Location Geoinformation (ii) Kilometer distance (iii) Drive distance (iv) Law,Agric, environmental, etc (v) VC, registrar, records, ITU, etc (vi) FANS Pharm, junction, , etc

S/n	**Activities & Services**	**Parent Intents contents**	**Child/Follow-up Intents contents**
11)	Official Memos	112. Memo by date 113. Memo by office 114. Memo by title 115. Memo by officer	Date Office Tittle Officer
12)	Personality Profiles	116. Personnel portfolio 117. Personnel name 118. Personnel responsibilities	Qualifications
13)	Quality Assurance policy	119. Research standards 120. Plagiarism	Standards Regulations
14)	Security Alertness	121. Security rules and regulations, 122. security information 123. emergency contact	Security contacts
15)	SIWES affairs	124. Student application guideline 125. Student report writing guideline 126. SIWES Funding	SIWES objectives Log book filling ETF form filling
16)	Student Union Corners	127. Leaders by session 128. Electoral process 129. Tenure contributions cum achievements	Electoral result Leaders name Session governed Project done
17)	School Programs	130. Qualifications and requirement for BSc 131. Qualifications and requirement for BEng 132. Qualifications and requirement for MBBS 133. Qualifications and requirements for BLaw 134. Qualifications and requirements PGD 135. Qualifications and requirements MSC 136. Qualifications and requirements MED 137. Qualifications and requirements MENG 138. Qualifications and requirements MPHIL 139. Qualifications and requirements MLIB 140. Qualifications and requirements LLAW 141. Qualifications and requirements PHD	O'Level Grades JAMB Subjects JAMB Scores FGPA Credit level PGD result Masters Result
18)	Transcript Collection Status	142. Date of readiness 143. Date Emailed 144. Date DHLed 145. Name of student 146. Student department	Date Name Schedule
19)	University Farm Products	147. Available farm product 148. Procedure for purchasing 149. Advertisement for available careers 150. Advertisement for partnership	Crops Livestock Prizes Availability

Table 2 described in a list the parents ad child intents of the classified ad categorized intents derived from the available activities and services of the universities. More

possible intents can be narrowed and developed from the current table as the Chatbot trainings expands due to amplified queries from the users.

Subscriptions to Google Cloud Service

The subscription of Google Cloud service through the Gmail address provided access to the Google Dialogflow Essential Console (ES), which serves as a natural language understanding platform for development and integration of a conversional interface for mobile and web applications. Fig. 2 shows the workspace of the Google Dialogflow ES Console. The workspace is created after subscription.

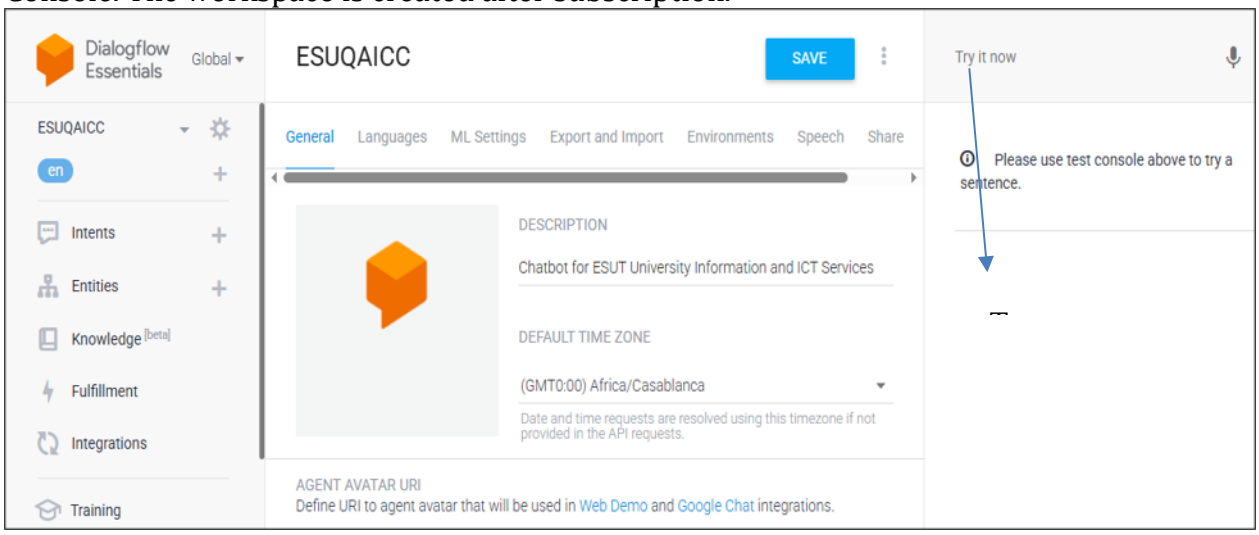


Fig.2: The Screenshot of Google DialogFlow ES Console

Developing and Training of Chatbot using Google DialogFlow

The workspace, as shown in Fig.2, is a space where tools for developing agents, intents, entities, and training and deploying chatbots are available. Fig.2 shows the name of the agent as ESUQAICC on top and tabs for setting the agent. The left panes of the diagram indicate the modules for adding intents and entities to the created agent. The following steps were followed to develop and train the chatbot in the Google DialogFlow ES Console.

1. Click on create dropdown arrow ad type the name of the agent- ESUQAICC
2. Go to the general tab of the agent creation window and write the agent description- Chatbot for ESUT Community Communication Channel ad time zone- (GMT0:00) Africa/Casablanca
3. Use the Language Tab to select English Language, ML Setting Tab for threshold score, spelling, and other settings for the algorithm in Machine Learning.
4. Click on the Save button to save all the settings.
5. Click on the intent + sign to add the intents as listed in Table 2 one after the other. See Fig. 3 for examples of implemented intents. Each intent has training phrases and respective response(s).
6. The unit testing of each intent after adding follows using the test console at the right panes, as labeled in Fig.3. The test is performed by simply typing different queries and examining the corresponding reply.
7. The next stage is training each intent by clicking on the training modules. Under the training module, all conversations done with the bot are displayed. Choose the date range for training. Modify the training phrases as the case may be. Automatic training is also available as the bot uses the algorithm setup in the ML environment.
8. Validate other responses from users that are not included in your training phrases

but are necessary for the training of the bot under the validation module.

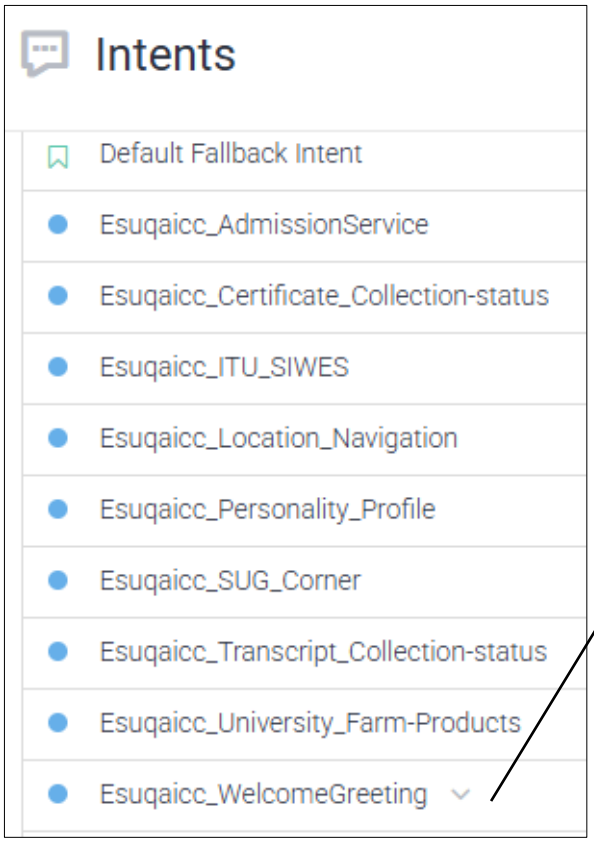


Fig.3a. Parents Intents



Fig 3b. Welcome Child/Follow-up Intents

Deployment of the Chatbot to Telegram and Installation Telegram on Smart Phones.

The deployment of the Chatbot is done under Integration module as shown in See Fig 2 dialogflow window left pane. The Telegram platform is a text-based platform for Chatbot integration in the dialogflow, as shown in Fig.4.

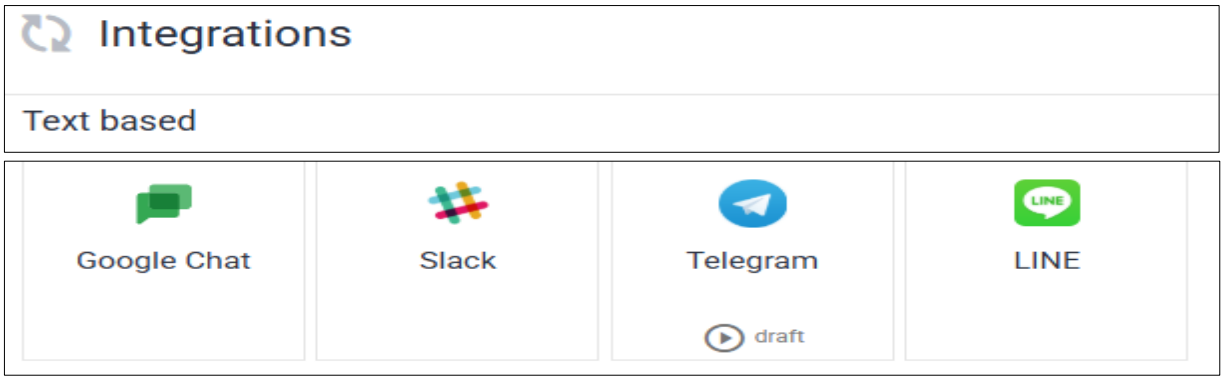


Fig.4. Screenshot of Telegram App Integration

The integration is performed by selecting the Telegram icon in Fig.4, followed by obtaining a Telegram BotFather(BotAPI) access token from an installed Telegram account on a device. The BotFather(BotAPI) access token is keyed into the Telegram Token Field of the Dialogflow integration window. Finally, the START button on the window is clicked to initialize and establish the connection between the developing

platform (Dialogflow) and Telegram account.

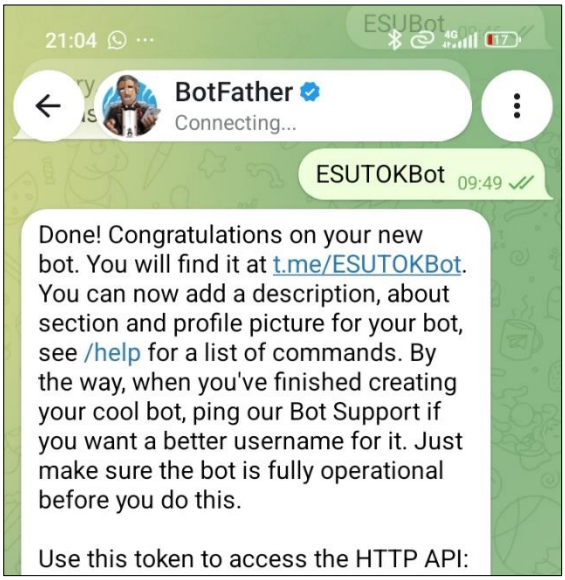


Fig. 5a. Screenshot of Telegram Bot API description

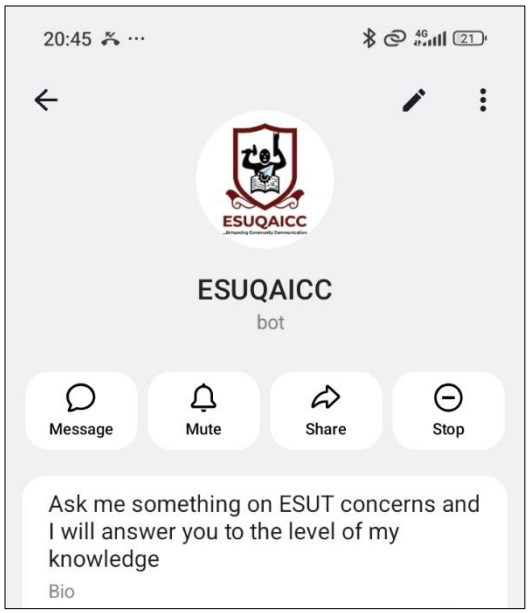


Fig. 5b. Screenshot of Chatbot Icon and

The Telegram app is installed by downloading it from the Play Store and adding users' phone number, after verification of phone number and agreeing on their terms and conditions, the app will be installed on the designated device. To URL below is used to join and connect to the ESUQAIC telegram platform. https://t.me/ESUTOKot.

3. RESULTS AND DISCUSSION

indirect the outcomes of the implemented system are displayed using Fig.4,5,6,7, and Table 3. The figures indicate that the conversational flow with the Chatbot following the trained datasets was successful. The human users, staff, students, parents, and guardians among others, receive replies to text queries on a choice issue(s) via a Telegram platform.

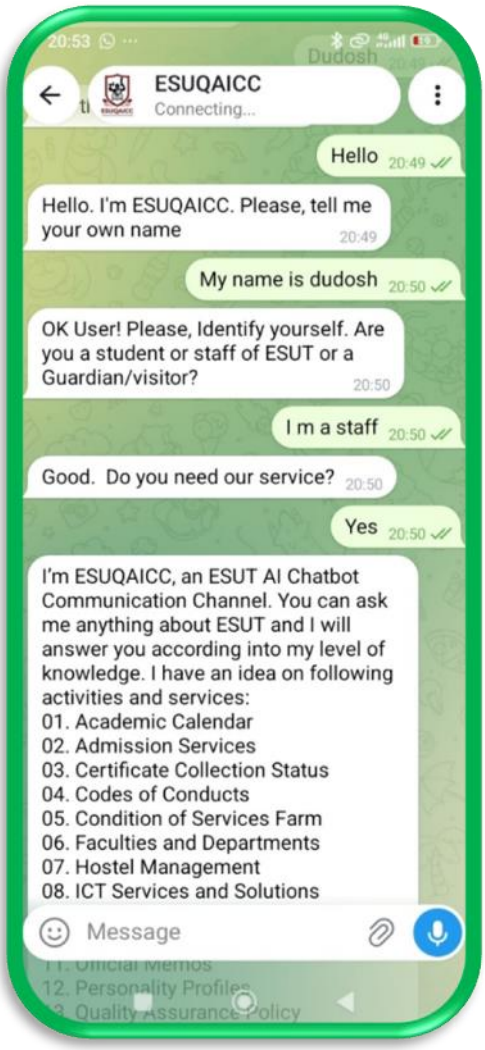


Fig.6a. Screenshot of Welcome service on Mobile Telegram



Fig.6b. Screenshot list of admission services on Desktop Telegram

Fig.5 shows screenshots of the outcome of the communications in both the mobile and desktop Telegram interfaces. fig.6a and b show that communication can be done through the Telegram bot when a user connects to the ESUQAIC. Comparing Fig 6a and b with Table 2, it was proved that the categorized intents were developed, trained, and functional corresponding to the trained dataset (service, query, and response). It addressed common questions and provided instant replies, there by reducing response delays.

The PivotChart in Fig.7 was used to interpret the sample conversions derived from the conversation history of the Dialogflow. Fig.7 shows the five starting queries used by the five users in their interactions, the date of the conversations, and the sum total of 41 interactions between 3/10/2026 and 6/10/2026.

Row Labels	Sum of Total Interactions
admission	2
4/10/2026	2
Application for PUTME	3
5/10/2026	3
Hello	25
3/10/2026	7
4/10/2026	18
How to buy PG form	4
6/10/2026	4
My name is Dudosh	7
4/10/2026	7
Grand Total	41

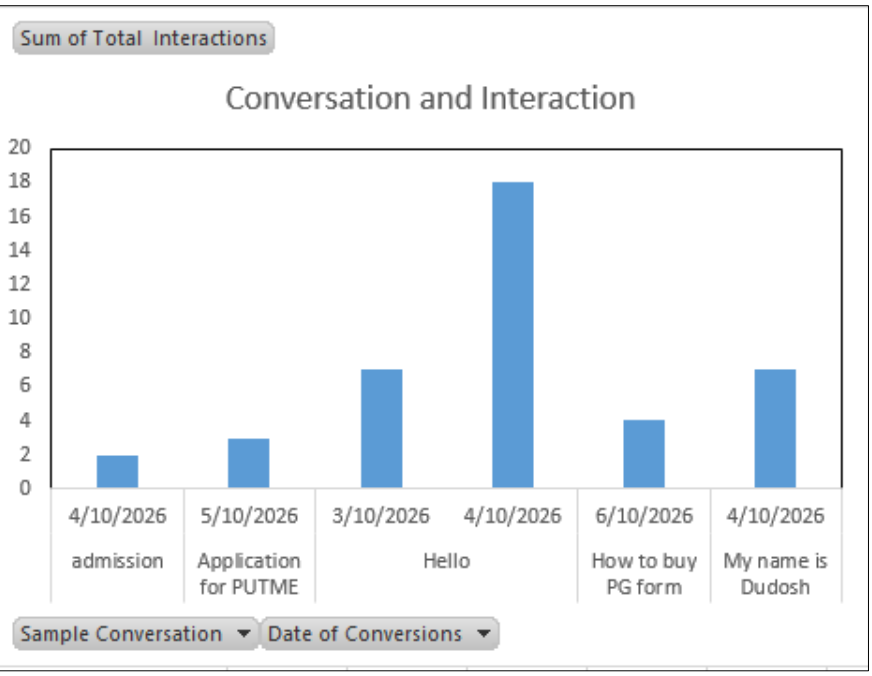


Fig.7. Frequency Sample Conversations and Interactions

In Fig.7. In Fig. 7, the frequency of interactions increased as demonstrated with five queries that generated 41 interactions by a user. Fig. 7 shows that a user can ask as many questions as they can without hinges with the Chatbot. This means that the system can increase the availability of information by removing human intrusions to information flow and decreasing the cost of communicating in printing media. The deployment has also ensured a reduction in staff workload because the routine conversations are automated.

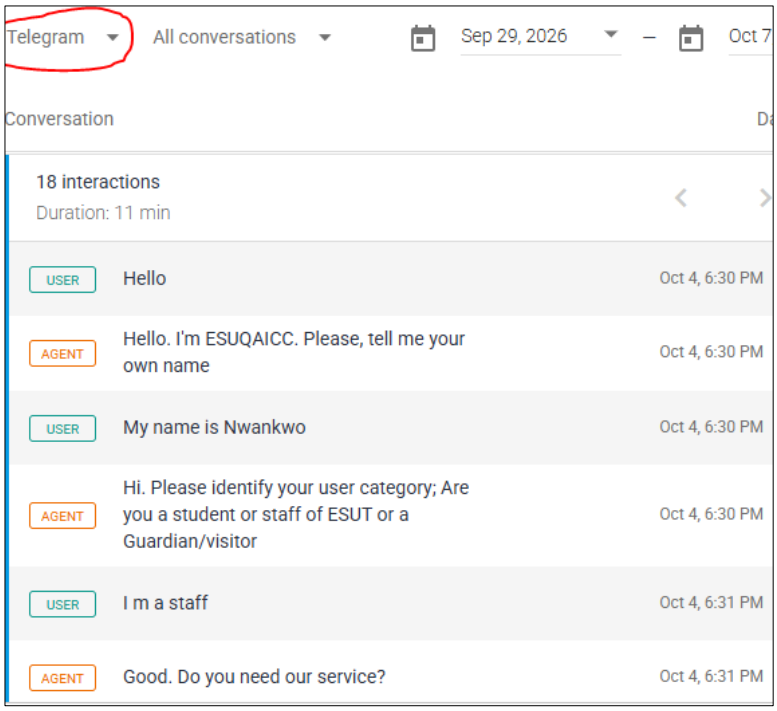


Fig. 8. Time of Query and Reply between Agent and Users.

Fig. 8 detailed the time of asking question by the user and reply by the agent using the highest recorded interaction in Fig.7 to interpret the ability of the ESUQAICC in steady

response, non-discrimination reply and off-official hours availability. The 18 interactions in 11 minutes (6:30-6:41pm) in Fig. 8 proved how fastest the Telegram bot in communication compare to human staff who can sluggishly reply query due to other factors like sentiments, fatigue and busyness. The time gaps between the users asking and the agent replying are in seconds thereby providing very fast conversations via telegram platform. The agent also reply to any query unlike a human staff that can choose what or whom to reply or not.

The analytic results derived from the Dialogflow dashboard, as shown in Fig.9 and Table 3, demonstrated the sessions, interactions, and intent communication paths. Fig.9 shows a graph of the number of query scores on the vertical axis and the corresponding time of the interactions round the clock. The peak of the interaction is also indicated from 3:00 pm to 6:00 pm and low during the night.

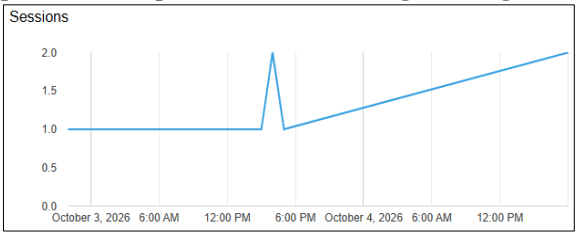


Fig. 9a. Conversion Session and Time

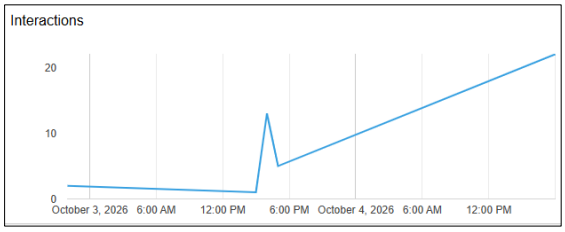


Fig. 9b. Conversion Session and Time

Fig.9a and Fig.9b indicate that communication with the chatbot can take place at anytime and anywhere round the clock. There were approximately 18 interactions between 3:00 pm and 6:00 pm in Fig.9 on 3/10/2026, and the interaction went through 6:00 am till 6:00 am next day 4/10/2026, making 24 hours of steady conversations. It was deduced that successful conversations made by the Chatbot had a recorded session with the number of interactions, queries, and their corresponding replies.

The intent path of conversation in the analytic dashboard of Dialogflow is like a network of nodes in continuous transmission of messages from one intent to another. The intent-nodes communicate with each other, forming continuous links. The chatbot communicates like human beings who talk and receive feedback and continue to engage in dialogues. The rate of understanding of messages from one intent-node to another is measured in percentage. The percentage agent responses to user queries are tabulated in Table 3.

Table 3 shows the percentage properties of the communication intents. The queries column is derived from Fig. 7. The table shows that “hello (18)” that has more interactions started with a greeting query, which the chatbot is very familiar with, and that grantee smooth flow of communication. Understanding the communicating language brings successful communication between the user and the agent, which is measured in percentage. 100% in Table 3 indicates low misunderstanding of the starting words from the user to the agent. 10% show higher understanding. However, the agent still communicates to unfamiliar queries using default fallback based on the training algorithm, with time learn and makes the dialogue continuous.

Table3: Conversion Path of Agent Response Percentage

User Queries	Conversation Path		Agent Response (%)	Agent Understanding Level to Users' Queries
	From Intent	To Intent		
Admission(2)	Available Program Default Fallback	Default Fallback Available Program	100 50	Very Low understading Meduim understading
Application for the PUTME(4)	Available program Default Fallback ...	PUTME Admission Service ...	100 11.11 ...	Very Low understading High understading ...
Hello(18)	Greeting Getname Getname Getname Getcategory AvailableService Getservice-Yes Greeting	Getname Getname Getcategory Availableservice Gerservice-Yes Getservice-Yes Default Fallback Greeting	10 20 70 10 14.29 85.1 50.33 33.39	High understading High understading Low understading High understading High understading Low understading Meduim understading High understading ... ...
How to Buy PG form(4)	PG Application Default Fallback Available Courses ...	Invoice Validation Available Courses Available Courses ...	50 100 100	Meduim understading Very Low understading Very Low understading ...
My name is Dudosh(7)	PG application Default Feedback Uplevel Certificate Certificate ...	Default Fallback Uplevel Getcertificate Default Fallback Getcertificate ...	100 100 100 33.33 66.67 ...	Very low understading Very low understading Very low understading High understading Low understanding ...

4. CONCLUSIONS AND SUGGESTIONS

The GenAI Chatbot Communication Channel(ESUQAICC) developed in this study has proven the ability of people to communicate using text answers to questions/queries asked using the Telegram Platform either on a mobile phone or desktop device. The text-mode responses from the system are relevant and similar to responses received from other available communication channels in ESUT but in electronic form in instant questions and answer platforms, available round the clock without boundaries of official hours, office locations, sentiments, discriminations by workforce, and response delays. Users of the ESUQAICC communication channel can inquire about 19 ESUT activities and services, such as the admission process, ICT services, code of conduct, conditions of service, personality profile, and location navigation. The implemented chatbot template can serve as a communication channel model for similar educational institution communities.

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