AEROCHAT: A Chat Application with Data Analytics for The Institute of Computer Studies in The Philippine State College of Aeronautics

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Abstract: - Online communication tools represent an efficient method of supporting remote education using web-based tools as the basic source of information. Several researchers (Ogega, 2018; Razali et al. 2021), highlight the usage of social media platforms such as Facebook, WhatsApp, WeChat, and Twitter as a platform for faculty-student communication. Nevertheless, despite the supportive role of the aforementioned applications, it poses a significant risk and challenge to their users (Ogega, 2018; Pang & Woo, 2020; Razali et al., 2021; Almaiah et al. 2020; Viju, 2021; Adedoyin & Soycan, 2020, p.4). AeroChat was developed and intended as a resolution for the Institute of Computer Studies to enable safe and secure semantic communication for SY 2020-2021. This study examines the relevance and effectiveness of distant learning communication in the global network that continues to dominate the usage of Information and Communication Technologies (ICT). The study has applied ISO 25010 (System/Software Quality Requirements and Evaluation), with the standard factors namely; Functional Suitability, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Moreover, AeroChat was developed with an Agile-based methodology that can provide a sustainable and high-quality software development life cycle. A qualitative approach, purposive sampling technique, mean, and Likert scale (four points) were employed with a total sample size of 46 responded users, composed of 43.48 percent Bachelor of Science in Aviation Information Technology students, 43.48 percent Bachelor of Science in Aviation Information System students, 10.87 percent Faculty, and 2.17 percent Information Technology experts. This study gathered positive feedback and affirmation claiming that the AeroChat - a web-based learning context decreases the possibility of unauthorized access while providing a safe learning environment through profanity avoidance, user role and ban management settings, group chat management (password protected, secret/hidden), message character limit and flood control, log-in attempt limitation, and data analytics that shows the engagement rate, session summary, browser used, and active users. Thus, this study points out substantial and hopeful possibilities for the future of online education and upgrades of online communication tools.

Key Words: ***Distance Education, Web-Based Chat Application, Information Communication and Technology (ICT).***

I. INTRODUCTION

Online communication tools represent an efficient method of supporting remote education using web-based tools as the basic source of information.

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Several researchers (Ogega, 2018; Razali et al. 2021), highlight the usage of social media platforms such as Facebook, WhatsApp, WeChat, and Twitter as a platform for faculty-student communication. Nevertheless, despite the supportive role of the aforementioned applications, it poses a significant risk and challenge to their users (Ogega, 2018; Pang & Woo, 2020; Razali et al., 2021; Almaiah et al. 2020; Viju, 2021; Adedoyin & Soycan, 2020, p.4). AeroChat was developed and intended as a resolution for the Institute of Computer Studies to enable safe and secure semantic communication for SY 2020-2021. This study examines the relevance and effectiveness of distant learning communication in the global network that continues to dominate the usage of Information and

Communication Technologies (ICT). The study has applied ISO 25010 (System/Software Quality Requirements and Evaluation), with the standard factors namely; Functional Suitability, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Moreover, AeroChat was developed with an Agile-based methodology that can provide a sustainable and high-quality software development life cycle. A qualitative approach, purposive sampling technique, mean, and Likert scale (four points) were employed with a total sample size of 46 responded users, composed of 43.48 percent Bachelor of Science in Aviation Information Technology students, 43.48 percent Bachelor of Science in Aviation Information System students, 10.87 percent Faculty, and 2.17 percent Information Technology experts.

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II. Literature Review

2.1 Information and Communication Technology

In the article by Melody and Skinner (2015), communications evolved from the telegraph in 1837, the telephone in 1876 to the invention of mobile communications in the 1970s. The advancement of communication technology has led to mobile communication devices being the core technological foundations of the Internet and the World Wide Web. Since the beginning of the 1970s, the Internet and mobile communications have evolved significantly, and mobile Internet access has become the dominant and fastest-growing mode of communication of the century. The fundamental goal of information and communication technology (ICT) innovation in the 21st century is to increase the capabilities and capacity of the services and machines used to connect over communication networks. Throughout the 1990s and 2000s, the term technological convergence came to signify how new ICT combined previously distinct communication media — such as voice telephone, radio, television, newspaper articles, and computer data — into a single medium, the Internet, delivered over enhanced, high-capacity broadband telecommunication networks.

According to the study by Viju (2021) it is a fact that ICT has become an essential part of everyday life, and knowledge of the environment has become a requirement for ICT literacy for approximately all competencies. Environments for online education foster extra learning reviews that allow learners to share information, work collaboratively, and have beneficial ownership in their very own learning at their very own pace and moment. As a result, ICT-enhanced classes no longer provide a dynamic and productive learning environment for students, but it also encourages self-directed learning.

According to the research of Chowdhury, Arefin, and Rahaman (2018), students do not feel safe commenting on the teacher's work or course material, and the teacher does not allow students to raise questions in the classroom. Furthermore, there was no group-sharing area or interactive setting for students to communicate with one another. Instructors also did not maintain a successful Q&A forum on the online conversation to enable students to communicate with each other. The result of the study showed that teachers must possess a positive attitude toward ICT integration to overcome lacking technical skills.

According to Das (2019), the potential of ICT has been defined to convert it as a powerful tool for the expansion of educational opportunities. ICT possesses the potential to increase access to education while also improving its relevance and quality. The impact of ICT in the teaching and learning process has become relevant because it facilitates the teaching and learning process, creates a conducive learning environment, and assists learners in developing creative thinking and self-confidence. However, ICT poses new challenges to the quality of education.

2.2 Online Learning

Over the last few decades, a digital revolution fueled by advances in new technology has fundamentally altered the style and accessibility of learning and teaching (Mkrttchian et al., 2021). In the research of Dhawan (2020), Corona Virus, commonly known as Covid-19, is a fatal and contagious illness that had a significant impact on the worldwide economy. The education industry is expected to rebound across the global education system which has placed the majority of the globe under quarantine due mainly to the severe break out of the worldwide pandemic Covid-19, making every institution leave no choice but to shift from face-to-face lectures to online classes. Viju (2021) supported this study by stating that extensive national activities that use technology to enhance

remote learning are developing from a distance and online learning during the Covid-19 pandemic. The Global Education Alliance, a UNESCO agreement, is one of the examples that established distance learning alternatives to follow the rapid response from governments and partners throughout the world to promote the continuation of education. Following the findings, there is a need to build a resilient education system for qualified and sustainable development and a change in education and learning that promotes increased consultation and communication systems while finding new ways to solve the learning crisis.

According to new research, it was evident that the epidemic is altering the way we live, study, and work. Alternative modes of education delivery, such as online and remote learning, are becoming the new standard (Khalili, 2020; LeBlanc, 2020). Online education is available and has been accompanying higher education because of information technology (Khalili, 2020; Adedoyin & Soykan, 2020). In the Philippines, on May 1, 2020, an online learning system was implemented to deal with the challenges brought about by the pandemic Covid-19 stated by the Commission on Higher Education (CHED) chairperson Prospero de Vera III. He also added that even before this devastating event occurred, many higher educational institutions, such as Mapua University, Ateneo De Manila University, the University of Santo Tomas, and the Universitas del Sur, were already implementing online and flexible learning (Montemayor, 2020).

2.3 Applications for Online Learning

Ogega (2018) cited Bosch (2009) carried out qualitative research at the University of Cape Town on how South African college students utilize social networking sites in teaching and education in general, predominantly in the establishment and growth of academic organizations. Most current educators use ICT in teaching and learning approaches.

The research of O'Keefe, Rafferty, Gunder, and Vignare (2020) discussed that number of the instructional techniques employed in person might also apply online, like group discourse, writing exercises, and project-based learning, and these are perhaps the most feasible possibilities for Emergency Distance Teaching for they are relatively simple to adapt to the virtual community. Learning Management System (LMS) becomes the principal environment for an online course, for example, Canvas, Blackboard, D2L, or Moodle.

Teachers' ideal amount of social presence is critical in obtaining participation, and cooperation, and encouraging the cohesiveness of learning during online activities, as stated by (Komninou 2017; Satar & Akcan 2018).

2.4 Demand in Application Development

O'Keefe, Rafferty, Gunder, and Vignare (2020) explain that it is critical to developing an online course's instructional presence by allowing students to connect with the teacher. It is crucial to ensure that students communicate with their instructors, especially in emergencies, to ensure stability and a less destructive experience.

In the study of Treethong, Gulthawatvichai, and Chatpunyakul (2021), they cited that Hsieh and Tseng (2017) found that mobile instant messaging and emojis expand information richness, which contributes to the perception of mobile instant messaging as amusing. As a result, consumers' perceived playfulness increased their social connectivity. It implies that team members' social connections can improve by using mobile instant messaging.

Sheer and Rice (2017) have stated in their study that the use of mobile instant messaging and affordances is favorably associated with employee outcomes such as job performance, job satisfaction, and relational satisfaction with online bridging and bonding social capital, according to their survey. It may aid in improving an organization's overall performance. Users stated that a social media platform may be used to facilitate social interaction among team members. It helps build mutually beneficial relationships between members of the organization.

2.5 ISO 25010 Model

ISO 25010 is an international standard for evaluating the quality of software and systems. This standard has been updated three times since 2007, 2011, and 2017 (Peters & Aggrey, 2019). It is also referred to as the SQuaRE (Systems and Software Quality Requirements and Evaluation) model. ISO 25010 was developed as an update to the ISO 9126 model, according to Peters and Aggrey (2019). They assert that the preceding model (ISO 9126) contains six (6) factors and twenty-one (21) sub-factors. In a straightforward comparison of the two models, "security" and "compatibility" were the only two factors introduced into the ISO 25010, along with their sub-factors. The new model comprises eight factors which include functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. Numerous researchers have adopted the ISO 25010 standard in their studies to propose new quality models (Franca & Suares, 2015; Haoues et al., 2017; Iqbal & Babar, 2016). This study

adopted ISO 25010 and redefines its subfactor in order to suit the AeroChat system evaluations.

2.6 Faculty-Student Communication Channel

The research of Kim and Ko (2021) has discussed that faculty-student contact refers to the intellectual and social interactions that college students have with their teachers while in school. Students benefit from the educator's relationship to gain specific information about their majors and the appropriate attitudes and actions through talks with professors that are commonly considered the heart of higher education activities (Beckett et al., 2016).

Meishar-Tal and Pieterse (2019) have said that in the past, informal contact between students and lecturers took place primarily in academic institution halls and through face-to-face discussions. Due to technological advancements, social media has become more popular among students and lecturers; these platforms began to act as an extra venue for lecturer-student contact.

According to the study by Sparks and Selig (2020), the number of students that submit student evaluations of teaching (SETs) has a significant impact on their accuracy. A positive connection between educators and students often called responsiveness, appear to increase the student's willingness to participate in the SET process. Therefore, student evaluations of teaching (SETs) are critical in higher education for both teachers and administrators. It has been acknowledged as a suggested strategy for improving education, understanding learner demands, and investigating how educators might meet (Kim & Ko, 2021). With the emergence of social media, academic institutions began offering online SETs, which learners could do at their leisure and faculty embeds different approaches like giving additional points as an incentive to withhold final grades or limiting course access to assure the recommended SET has been met.

2.7 Social media as Communication Channel

According to Worldometers, around 5.1 billion people worldwide now use the Internet, which is anticipated to continue. The number of social media channels is growing proportionally. Interactions between peers and educators were influential in promoting cooperation and partnerships, but they were insufficient to assure the formation of a social presence (Mumford & Dikilitaş 2020).

The increased amount of time spent on social media, and interactions with web friends and followers, has radically altered how users perceive social connections. Consequently, according to Yamagishi, Saito, and Ikeda (2016), networking sites have a crucial function in extending social ties and in influencing users' decisions. Users' travel, leisure, and purchasing interests are influenced by social media, creating a desire for them to participate in events sponsored by their online friends or individuals they follow.

According to Dwityas and Briandana (2017), before an activity, social media material such as photographs, videos, or text impacts the user by establishing the demand to participate in a shared activity. More recent research, such as that of Varghese and Jana (2019), has focused on the potential of information and communication technology (ICT) to increase access to opportunities. The data revealed differences in household socioeconomic characteristics, individual personal characteristics, ICT use patterns, activity participation patterns, and time allocation patterns, allowing researchers to conclude the interrelationships between ICT, social disadvantage, and activity participation.

2.8 Social Media Dilemma and Solutions

In research from Almaiah, Al-Khasawneh, and Althunibat (2020), they have found that some of the critical challenges that E-learning systems face today are the “E-learning system technical issue,” where addresses the probable barriers in terms of accessibility, availability, and usefulness of the system (Viju, 2021; Adedoyin & Soykan, 2020, p. 4) and the “Financial support issues” where the budget deficit is the main highlight and according to the researchers, the way to mitigate the budget deficit is through the help of the government funding, as for the technical issues, making the system user-friendly and having useful services makes it mitigate the said problem.

In the research of Sabah, Kadhimand, and Dhannoon (2017), they stated that in a test done by the Electronic Frontier Foundation, most of the popular messaging apps failed to meet most security standards. These applications may use the talks as data for various purposes. Furthermore, reading private discussions is unacceptably intrusive in terms of privacy. Most applications just used Transport Layer Security (TLS) to secure the channel; the service provider has full access to every message exchanged across their infrastructure.

According to a 2018 German study, "concerns about the alleged detrimental effects of social networking sites on academic achievement are unfounded." Additionally, those who "intensely use social media to discuss school-related subjects are likely to earn slightly higher grades." However, the study's authors discovered that individuals who spend a significant amount of time on Instagram while studying or completing

homework "tend to score somewhat lower than other students." Taken together, these and other research indicate that students who use social media for educational purposes may benefit academically, but those who use it as a diversion may suffer.

According to Buschek, Hassib, and Alt (2018), when compared to face-to-face contact, a message is one of the most significant communication channels today, yet it suffers from a lack of expressiveness, context, and emotional awareness. This issue was overcome by including information about users and contexts in text messaging. Share and reflect on the lessons learned from three field studies in which augmentation concepts were implemented in the form of prototype chat apps in the users' daily lives. Users were learning (1) subtly conveying context via dynamic font personalization (TapScript), (2) integrating and sharing physiological data – namely heart rate – implicitly or explicitly (HeartChat), and (3) automatic annotation of various context cues: music, distance, weather and activities (ContextChat). Based on their studies, it discussed chat augmentation concerning privacy issues, understandability, connectedness, inferring context, and methodological lessons learned.

According to Ogega (2018, pp. 4-63), a study was done at the University of Cape Town, South Africa, examining students' use of social media. The study reveals a good association between social media use in teaching and the overall educational process, mainly during the establishment and growth of academic groups. However, the favorable impact of social media usage led the researcher to conclude that it is addicting and can have a strong influence on teaching and learning activities because both educators and students spend too much of their time on social media rather than facilitating and learning.

In the research conducted by Razali, Jusoh, Salleh Omar, and Azizan (2021), they stated that social media applications like Facebook, WhatsApp, WeChat, and Twitter had imposed a significant threat to expose someone to receive inappropriate content such as curses, bad photos, and other sensitive files in their accounts. Now, the mentioned social media platforms cannot filter out such content or mitigate it from appearing. That is why the researchers implemented anti-profanity words in mobile application platforms to filter content before transmitting them to the recipient and remove any malicious content.

Simko, Grogan, Nickel, and Elliot (2019) proposed two innovations to improve faculty-student communication: 1) an Online Forum/ Q&A, which aims to engage students in an online forum to provide feedback on poor performance; and 2) Course Specific Advising Group, which will provide students with guided questions to facilitate their feedback on the course as a whole. This innovation creates a more dependable communication channel, assuring that feedback is directed directly to academics or personnel.

2.9 Data Analytics

Guha (2021) implies that data analytics uncovers how learners engage with training information, learning activities, and one another. Seeking information on such encounters allows instructors to create a more accurate knowledge of the needs of their students. Trainers benefit from learning analytics to raise the effectiveness and influence of their courses by allowing them to track and evaluate accomplishments across various modalities of instruction.

In research from Srivastava, Yang, and Jain (2019), data analytics uses metadata that is becoming more freely available as part of an "open data" and "smart city" revolution to create predictive methods that extract insights about a property's performance and, as a result, allow targeted energy-efficiency policies and interventions.

Agasisti and Bowers (2017) cited that according to Chen et al. (2012, p.1174) "Data analytics refers to the BI&A (Business Intelligence & Analytics) technologies that are grounded mostly in data mining and statistical analysis. As mentioned previously, most of these techniques rely on mature commercial technologies (Vanthienen & Witte, 2017)."

Maseleno, et al. (2018) stated that analytics with high performance in the process of massive data accumulated to see the relevant data which can go further to be the outstanding opportunity to decide any field is assumed that collectively the process looks separately integrated; however, it would be highly integrated performance analytics. As supported by Martin and Thawabieh (2017), the main principles for employing analytics are accountability, openness, permission, privacy, validity, access, limiting negative consequences, and so on.

2.10 Data Analytics Usage in Learning Process

Agasisti and Bowers (2017) stated that their research focuses on disseminating analytics usage in the educational field, one example being "Learning Analytics." Learning analytics is concerned with measuring, collecting, analyzing, and displaying data on learners and their surroundings to comprehend and maximize learning and external environments (Hussein & Mohamed, 2019).

According to Maseleno et al. (2018), extending the variety, velocity, and volume of data sets from transmitting and sharing data, extracting big data that is included to become the value in supporting the learning process offers access to reliable data sources to enable users' engagement and interaction. The assistive function of data analytics helps users gain a better understanding of information by recognizing massive amounts of data performed using specific software. It allows them to run a variety of purposes such as business, education, and many others. As a result of getting a deeper understanding, the subsequent analysis with the extensive data technique is essentially an insightful attempt with knowledge derived through data analysis. After analyzing a large amount of data, the apps are finally merged with specialist software tools for predictive analytics, forecasting, text and data mining, and data optimization.

Several opportunities to improve the learning process have emerged due to the usage of data analytics. 1) Using data analytics, it is possible to improve students learning processes by delivering real-time feedback or increasing the learning experience, 2) Data analytics may assist the educator or instructor. The teacher can effectively analyze the student's academic process and take specific steps to increase the students' cognitive development thanks to data analytics, and 3) There is potential in applying data analytics to assess educators' performance. Now it is possible to compare and evaluate the performance of instructors thanks to data analytics (Vanthienen & Witte, 2017; Rogge, Agasisti, & De Witte, 2017).

2.11 Data Privacy and Security

According to Koruco and Gurkez's (2019) research, most individuals know that their personal data was gathered and spread on the Internet without their knowledge, and have no control over this information. On the other hand, users regard this as a necessity; an unavoidable aspect of contemporary life in order to obtain some services as wanted. In the nineteenth century, Warren and Brandies (1890) articulated the right to privacy as the right to be left alone. Because of the extensive use of the Internet and social media accounts in society, the public's sense of privacy has shifted. As a result, today's scientific research focuses on Internet privacy, and in the majority of research, privacy is dealt with through the lens of concern for the breach of an individual's complete privacy. The condition of allowing or refusing access to information is governed by privacy control (Green & Baumal, 2019).

In research from Chang (2021), publicly sharing information is becoming increasingly vital. However, it is equally crucial to respect and safeguards learners' privacy, especially in an online learning environment. When privacy considerations are more complex and subtler than in a physical learning setting. Privacy issues vary depending on the situation and may shift over time among various communities. New privacy problems must be discovered, and specific privacy contracts may need to be amended and customized to a new portion of the community or a new setting. In order to strike a balance between the need for privacy and the benefits of publicly sharing knowledge, students can be taught about the various methods they can readily adjust and control their private identifying information. There should be "an urgent attempt to educate online habits at all school levels, as well as professional training."

III. METHODOLOGY

The researchers of the study utilized a descriptive method and developmental design in conducting the study. The descriptive method research design explains the elements that will be necessary for the study to be effective**.** In terms of system development, researchers used the Software Development Life Cycle Model (SDLC), specifically the Agile Model as a guide during the application's development and implementation. Each element of the software development life cycle was followed meticulously to ensure that the development of the application meets the ISO requirements while also establishing a precise and high-quality result. The Agile model has been proven in both research and industry to be a successful software development paradigm that results in well-designed and robust system development. An online questionnaire with radio buttons was used as an instrument. Respondents are the IT expert, faculty, staff, and students of both programs (BSAIS and BSAIT) from the Institute of Computer Studies. The assessment of the respondents was based on International Standardization Organization (ISO) 25010 or the System/Software Quality Requirement and Evaluation.

3.1 Software Development Life Cycle

System Development Life Cycle is a procedure followed inside a software organization. It is a thorough strategy that describes how to build, maintain, replace, and alter or enhance specific software. The life cycle outlines a technique for enhancing software quality and the development process as a whole.

- *Development* - Commonly referred to as dev, this is where developers build the code.
- *Integration* - The new code is combined and validated to work with the existing code.

- *Test*- It is where functional and non-functional tests are conducted on the merged code to confirm it meets organization and customer requirements.
- *Staging* - This environment is used to test the software using real data to validate that it is ready for use.
- *Production* - Commonly referred to as prod, this is where the software is made available to users.

The Software Development Life Cycle is divided into stages, including planning, design, building, testing, and deployment. The waterfall, spiral, and agile models are all popular Software Development Life Cycle models.

Using the Software Development Life Cycle achieves these seemingly divergent aims by adhering to a strategy that eliminates the common hazards of software development projects. The plan begins with an assessment of current systems for flaws. Then it outlines the new system's needs. The following process goes through design, development, testing, and deployment to generate the software. The SDLC technique is the procedure used in the system's analysis and design, as depicted in Figure 8, that researchers used in their application development.

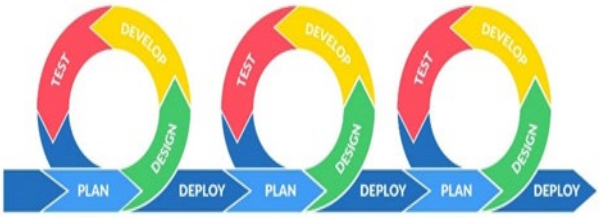

Fig.1. Agile Model

The Agile Software Development Life Cycle model was utilized for the development of this capstone project because it is a combination of iterative and incremental process models focusing on process adaptability and customer satisfaction through the rapid delivery of working software products.

This software development approach is one of the simplest models for the life cycle models. Agile is quick, flexible, and simple to react to changes; it is based on principles and values and does not make decisions for oneself; instead, it provides a framework for teams to make decisions for better software development.

IV. RESULTS AND DISCUSSION

A test result is a type of validation that progressively takes down the right path toward achieving a strong software application. The test result completes the software test life cycle, allowing us to examine the facts and statistics and gradually prepare for the next steps.

TEST CASE ID	TEST CASE	ACTION	EXPECTED OUTPUT	ACTUAL OUTPUT	REMARK
TC_1	Test for user if able to create account in chat application	Creating account	Able to create an account	Able to create an account	PASS
TC_2	Test for user if able to log-in in chat application	Log in account	Able to log in	Able to log in	PASS
TC_3	Test for users to be able to send requests to other users for chat	Adding another user	Can add another user	Can add another user	PASS
TC_4	Test for users if able to send messages to another offline user.	Messaging offline	Can message offline	Can't message offline	FAIL
TC_5	Test for users if able to see the time of reply in Chat.	Message with time information/ response	Able to see time of reply	Able to see time of reply	PASS
TC_6	Test for ability to create a chat group.	Creates a group chat	Able to create group chat	Able to create group chat	PASS
TC_7	Test for user if able to share image, and documents.	Sending files to another user	Can send image and documents	Can send image and documents	PASS
TC_8	Test for profanity filter has been used in Chat application.	Sending inappropriate words	Can't send inappropriate words	Can't send inappropriate words	PASS
TC_9	Test for embedded link to play	Playing an embedded link	Can play the embedded link	Can play the embedded link	PASS
TC_10	Test for admin to change role of a user	Role manager as administrator	Admin can change roles of a user	Admin can change roles of a user	PASS

The table shows the test result and the majority of the test has the remark pass which means that the application is working properly. This involves identifying and then correcting bugs/errors that the researcher encounters. The test for the application is to find out defects or prove that the application functionality is complete that fulfills all of the stated tasks and user objectives.

4.1 Implementation Result

The researcher believes that the software's ranking was based on the evaluation of the participants/respondents. This assessment is carried out by completing a survey questionnaire, of which are based on the ISO standard 25010 for assessing software quality.

The tables below represent the respondents' evaluations based on the actual user acceptability testing performed during the survey.

Evaluation of AEROCHAT: A chat Application with Data Analytics for the Institute of Computer Studies in the Philippine State College of Aeronautics.

FUNCTIONAL SUITABILITY	STUDENTS		FACULTIES		IT PROFESSIONAL	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
FUNCTIONAL COMPLETENESS. The AeroChat works completely and effectively.	3.70	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
FUNCTIONAL CORRECTNESS. The application produces the desired outcome and performs smooth and has no errors.	3.60	Strongly Agree	3.60	Strongly Agree	3.00	Agree
FUNCTIONAL APPROPRIATENESS. The application's features were appropriate to use by the user.	3.60	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
Average Weighted Mean	3.63		3.60		3.67	
Verbal Interpretation	Strongly Agree		Strongly Agree		Strongly Agree	
General Weighted Mean	3.63					
Verbal Interpretation	Strongly Agree					

Table 1 shows the overall result of the mean distribution on the evaluation of the AeroChat application in terms of functional stability. As indicated, the functional stability of the AeroChat is mainly categorized according to its functional completeness, correctness and appropriateness with mean scores and interpretations.

As for Functional Completeness, students, faculties and an IT professional attained the mean scores of 3.70, 3.60 and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that the AeroChat application works completely and effectively.

On the Functional Correctness result, both students and faculty members scored the same average of 3.60, indicating that these groups of respondents have a high level of agreement about the functional correctness service of the application wherein the AeroChat produces the desired output and performs without error. On the other hand, the IT specialist gained the mean score of 3.00 suggesting that there is a significant agreement when it comes to Functional Correctness.

Furthermore, the data on the Functional Appropriateness are primarily focusing on the usability of AeroChat application in an academic institution where it would describe whether the application is appropriate to use as a safe and secured learning environment communication tool using the defined features such as the profanity avoidance communication methodology; user role manager and ban management; group chat management; message character limit and flood control; and others. As shown above, the respondents garnered the mean scores of 3.60, 3.60, and 4.00 accordingly which resulted to the same interpretation. This merely indicates that the application satisfies the requirements of the ISO 25010 standard and is found to be usefully appropriate by the target audience.

Generally, the complete data of the functional stability categories have gained the average weighted mean scores of 3.63 for students, 3.60 for faculty members, and 3.67 for the IT professional. As a result, the general weighted mean score is 3.63 which interpreted unanimously as 'strongly agree'. This implies the participant have 'strongly agreed' on the high stability functions of the AeroChat application that strongly corresponds with ISO standards.

Mean Distribution on Compatibility Evaluation of Aero-chat

COMPATIBILITY	STUDENTS		FACULTY		IT PROFESSIONAL	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
COEXISTENCE. The application can perform its required functions efficiently.	3.60	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
INTEROPERABILITY. The application can exchange and make use of information.	3.65	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
Average Weighted Mean	3.63		3.60		4.00	
Verbal Interpretation	Strongly Agree		Strongly Agree		Strongly Agree	
General Weighted Mean	3.74					
Verbal Interpretation	Strongly Agree					

Table 2 shows the overall result of the mean distribution on the evaluation of the AeroChat application in terms of compatibility. As indicated, the compatibility of the AeroChat is mainly categorized according to its coexistence and interoperability with mean scores and interpretations.

As for Coexistence, students, faculties and an IT professional attained the mean scores of 3.60, 3.60 and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that the AeroChat application performs the required functions efficiently.

Furthermore, the data on the Interoperability are primarily focusing on the exchange and make use of AeroChat's information in an academic conversation. As shown above, the respondents garnered the mean scores of 3.65, 3.60, and 4.00 accordingly which resulted to the same interpretation. This merely indicates that the application satisfies the requirements of the ISO 25010 standard and is found to be usefully appropriate by the target audience.

Generally, the complete data of the compatibility categories have gained the average weighted mean scores of 3.63 for students, 3.60 for faculty members, and 4.00 for the IT professional. As a result, the general weighted mean score is 3.74 which interpreted unanimously as 'strongly agree'. This implies the participant have 'strongly agreed' on the high compatibility functions of the AeroChat application that strongly corresponds with ISO standards.

Mean Distribution on Usability Evaluation of Aerochat

USABILITY	STUDENTS		FACULTY		IT PROFESSIONAL	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
APPROPRIATENESS RECOGNIZABILITY. The application was appropriate to use specially the stated features of the AeroChat.	3.68	Strongly Agree	3.60	Strongly Agree	3.00	Agree
LEARNABILITY. The effectiveness of the application in providing information's.	3.78	Strongly Agree	3.60	Strongly Agree	3.00	Agree
OPERABILITY. The application includes features that make it simple to use and control.	3.75	Strongly Agree	3.60	Strongly Agree	3.00	Agree
USER ERROR PROTECTION. The application prevents users from making mistake.	3.68	Strongly Agree	3.40	Strongly Agree	3.00	Agree
USER INTERFACE AESTHETICS. The application user interface allows for pleasant and rewarding interaction.	3.60	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
ACCESSIBILITY. The AeroChat can access easily.	3.68	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
Average Weighted Mean	3.70		3.57		3.33	
Verbal Interpretation	Strongly Agree		Strongly Agree		Strongly Agree	
General Weighted Mean	**3.53**					
Verbal Interpretation	Strongly Agree					

Table 3 shows the overall result of the mean distribution on the evaluation of the AeroChat application in terms of usability. As indicated, the usability of the AeroChat is mainly categorized according to its appropriateness recognizability, learnability, operability, user error protection, user interface aesthetics, and accessibility with mean scores and interpretations.

As for Appropriateness Recognizability, students, faculties and an IT professional attained the mean scores of 3.68, 3.60 and 3.00 respectively which revealed a parallel interpretation of two (2) 'strongly agree' and one (1) 'agree'. This simply implies that the AeroChat application was appropriate for usage and recognized as an ICT. On the Learnability result, students scored an average of 3.78 while the faculty members scored 3.60, indicating that these groups of respondents have a high level of agreement about the effectiveness of the AeroChat application in providing information to its user. On the other hand, the IT specialist gained the mean score of 3.00 suggesting that there is a significant agreement when it comes to Learnability. Data demonstrates that according to the result in Operability, students, faculties and an IT professional attained the mean scores of 3.75, 3.60 and 3.00 respectively which revealed a parallel interpretation of two (2) 'strongly agree' and one (1) 'agree'. This simply implies that the AeroChat application includes features that make it simple to utilize and operate. Furthermore, the data on the User Error Protection are primarily focusing on the protecting the users of AeroChat application and mitigates them from causing mistake upon usage. As shown above, the respondents garnered the mean scores of 3.60, 3.60, and 4.00 accordingly which resulted to the same interpretation. This merely indicates that the application satisfies the requirements of the ISO 25010 standard and is found to be usefully appropriate by the target audience. As for User Interface Aesthetics, students, faculties and an IT professional attained the mean scores of 3.60, 3.60 and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that the AeroChat application encourages its users to have a pleasant and active interaction online. On the Accessibility result, students scored an average of 3.68, the faculty members scored 3.60, and the IT expert scored 4.00, indicating that these groups of respondents have a high level of agreement about the accessibility of the AeroChat application.

Generally, the complete data of the usability categories have gained the average weighted mean scores of 3.70 for students, 3.57 for faculty members, and 3.33 for the IT professional. As a result, the general weighted mean score is 3.63 which interpreted unanimously as 'strongly agree'. This implies the participant have 'strongly agreed' on the high usability functions of the AeroChat application that strongly corresponds with ISO standards.

Mean Distribution on Reliability Evaluation of AeroChat

RELIABILITY	STUDENTS		FACULTY		IT PROFESSIONAL	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
MATURITY. The application meets the needs for reliability under normal operation	3.63	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
AVAILABILITY. The application is functional and available when needed.	3.56	Strongly Agree	3.60	Strongly Agree	3.00	Agree
FAULT TOLERANCE. The application performs as expected despite of hardware and software faults.	3.63	Strongly Agree	3.40	Strongly Agree	3.00	Agree
RECOVERABILITY. The application can recover the damaged data immediately and restore the system to its desired condition.	3.63	Strongly Agree	3.40	Strongly Agree	3.00	Agree
Average Weighted Mean	3.61		3.50		3.25	
Verbal Interpretation	Strongly Agree		Strongly Agree		Agree	
General Weighted Mean	**3.45**					
Verbal Interpretation	Strongly Agree					

Table 4 shows the overall result of the mean distribution on the evaluation of the AeroChat application in terms of reliability. As indicated, the reliability of the AeroChat is mainly categorized according to its maturity, availability, fault tolerance, and recoverability with mean scores and interpretations.

As for Maturity, students, faculties and an IT professional attained the mean scores of 3.63, 3.60 and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that the AeroChat application met the needs for reliability under normal operation basis.

On the Availability result, students scored an average of 3.56 while the faculty members scored 3.60, indicating that these

groups of respondents have a high level of agreement about the availability of the AeroChat to its user. On the other hand, the IT specialist gained the mean score of 3.00 suggesting that there is a significant agreement when it comes to Availability.

Data demonstrates that according to the result in Fault Tolerance, students, faculties and an IT professional attained the mean scores of 3.63, 3.40 and 3.00 respectively which revealed a parallel interpretation of two (2) 'strongly agree' and one (1) 'agree'. This simply implies that despite of the hardware and software fault, the AeroChat application still perform and working.

Furthermore, the data on the Recoverability are primarily focusing on the recovery state of the AeroChat application after a damaged data have been introduced to the system and restores to its desired condition. As shown above, the respondents garnered the mean scores of 3.63, 3.40, and 3.00 accordingly which resulted to the interpretation of two (2) 'strongly agree' and one (1) 'agree'. This merely indicates that the application satisfies the requirements of the ISO 25010 standard and is found to be usefully appropriate by the target audience.

Generally, the complete data of the reliability categories have gained the average weighted mean scores of 3.61 for students, 3.50 for faculty members, and 3.25 for the IT professional. As a result, the general weighted mean score is 3.45 which interpreted unanimously as 'strongly agree'. This implies the participant have 'strongly agreed' on the high reliability functions of the AeroChat application that strongly corresponds with ISO standards.

Mean Distribution on Security Evaluation of AeroChat

SECURITY	STUDENTS		FACULTY		IT PROFESSIONAL	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
CONFIDENTIALITY. The application ensures that data is only available to those who have been granted access.	3.53	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
INTEGRITY. The application protects data from unauthorized access.	3.60	Strongly Agree	3.60	Strongly Agree	3.00	Agree
ACCOUNTABILITY. The application is successful in execution of service from the beginning to the end.	3.70	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
AUTHENTICITY. The applications data and information are authentic.	3.65	Strongly Agree	3.60	Strongly Agree	4.00	Strongly Agree
Average Weighted Mean	3.62		3.60		3.75	
Verbal Interpretation	Strongly Agree		Strongly Agree		Strongly Agree	
General Weighted Mean	**3.66**					
Verbal Interpretation	Strongly Agree					

Table 5 shows the overall result of the mean distribution on the evaluation of the AeroChat application in terms of security. As indicated, the security of AeroChat is mainly categorized according to its confidentiality, integrity, accountability, and authenticity with mean scores and interpretations.

As for Confidentiality, students, faculties, and IT professionals attained mean scores of 3.53, 3.60, and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that the AeroChat application ensures its users that data is protected meticulously.

On the Integrity result, both students and faculty members scored the same average of 3.60, while the IT expert scored 4.00, indicating that these groups of respondents have a high level of agreement about the integral service of the application wherein the AeroChat mitigates any unauthorized access on the user's data.

Data demonstrates that according to the result in Accountability, students, faculties, and an IT professional attained mean scores of 3.70, 3.60, and 4.00 respectively which revealed a parallel interpretation of 'strongly agree'. This simply implies that AeroChat successfully executes services from start to end.

Furthermore, the data on Authenticity is primarily focusing on providing users with genuine information. As shown above, the respondents garnered the mean scores of 3.65, 3.60, and 4.00 accordingly which resulted in the interpretation of 'strongly agree'. This merely indicates that the application satisfies the requirements of the ISO 25010 standard and is found to be usefully appropriate by the target audience giving assurance that the information shared was authentic.

Generally, the complete data of the security categories have gained the average weighted mean scores of 3.62 for students, 3.60 for faculty members, and 3.75 for IT professionals. As a result, the general weighted mean score is 3.66, interpreted unanimously as 'strongly agree'. This implies the participant has 'strongly agreed' on the high-security functions of the AeroChat application that strongly corresponds with ISO standards.

V. CONCLUSION

The necessity of developing chat applications in a learning environment is vital since there is a need in boosting the assurance that chat applications have supplied safe and protected learning settings. Online learning has become the new normal as the pandemic continues to hold face-to-face education and cause every institution across the world to close. Chat applications have become the bridge in linking instructors' and students' academic concerns.

On contrary, despite the assistive function of well-known chat applications (such as Facebook Messenger, WhatsApp, WeChat, Twitter, etc.), it still poses a significant threat precisely in these factors: accessibility, availability, and usefulness (Viju, 2021; Adedoyin & Soycan, 2020, p.4);

security (Sabah, et al.,2017; Razali, et al.,2021); and influence (Ogega, 2018).

As a resolution, researchers have developed the AeroChat application to become the communication platform where users may enjoy online interaction without compromising the safety and security of the user. With AeroChat's profanity avoidance methodology, user role and ban management, group chat management (password protected, secret/hidden, public groups), message character limit, and flood control services, users are assured that their identity and privacy are protected. According to the findings, the AeroChat application not only exceeded the ISO standards, but it also had a positive response from its participants, indicating that they are impressed with how AeroChat performs and provides its features and services. Combating the problems encountered online that affects the teaching and learning process is obligatory for the reciprocal of this action is the diminish of educational quality that is why more research and innovation are needed to maintain to continue providing quality education even in the virtual environment and this has been also one of the researchers' main purposes why AeroChat exist.

RECOMMENDATION:

Based on the conclusion and findings of the researcher's study, the following items should be considered as recommendations:

- Once the person has been identified and assigned a role, neither their identity nor their role should be modifiable.
- It must adopt the institute's color theme as part of the logo's identity.
- Admin of the system will have the access to see all online users.
- Limit some features granted to the admin and its users.
- For future researchers, due to the advancement of the technology, the system must adopt an andriod-based application to support most of android users.
- For future development, a higher level of subscription for the local network is required.

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