Enhancing Student Success: Developing and Evaluating an Effective Advice and Guidance Consultation System

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Abstract:

The objective of this study was to create and evaluate an advice and guidance consultation system for a learning institution in Nueva Ecija, Philippines. The study employed a developmental research design and involved IT experts and end-users from various senior high school tracks as respondents, who were selected using purposive sampling. The system was developed based on the software development life cycle model, and its technical aspects and quality were evaluated using ISO 25010 software standards. The results indicated that the system was well-received by end-users and met their needs and expectations. The study recommends following the SDLC model, conducting regular assessments, and continuing to improve the system. The study highlights the importance of a systematic approach to system development and the significance of assessing the technical aspects and quality of use of the system. The findings can serve as a foundation for future studies on the development and evaluation of comparable systems.

Keywords: *advice and guidance, consultation system, development, evaluation, student success.*

Introduction

The past few years have seen significant changes in people's lives, including adjustments to their lifestyles and the educational system, due to the COVID-19 pandemic (Gadi et al., 2022; Mbabazi et al., 2022). The government introduced various learning modalities (Hernando-Malipot, 2020), which require students to have access to the internet, mobile phones, and computers to adapt to the new normal. Unfortunately, financial instability has caused many students to struggle, resulting in discontinuing their studies, while others continue or resume them despite the obstacles they face. This study aims to assist students in

receiving help from their advisers or teachers to deal with problems and obstacles in school. Amidst the pandemic, scholars have directed their attention towards the challenges, anxiety, and psychological well-being of students (Iftikhar et al., 2022). For example, MacPhee (2020) stated that the pandemic could cause stress in adults as well as children and students. The sudden campus closures forced young people to go home or find a place to stay quickly, leading to a need to adjust quickly to the technology and environments of distance learning, which may exacerbate youth mental health issues. Due to the cessation of classroom instruction, students must have to rely on online education, which offers an alternative to

minimizing or eliminating student-to-student and student-to-teacher contact. However, due to the economic and digital divide or "gap," many students lack the resources or technology necessary to enrol in online classes, negatively affecting their academic performance. Filipino teachers also deal with anxiety through information gathering, preventative measures, and other coping mechanisms during the quarantine period (Talidong & Toquero, 2020). Based on the results conducted by Talidong and Toquero (2020), teachers cope with anxiety by participating in virtual learning, engaging with the professional community, following quarantine protocols, and engaging in meaningful activities.

The pandemic-related suspension of national school-related activities in the Philippines caused senior high school students to have difficulty accomplishing their prerequisites and academic activities due to a lack of internet connectivity, mobile devices, and other online school necessities. As a result of their lack of resources, they suffered from high level of stress. Most senior high school students failed to adjust to the new learning modality during the pandemic, leading some sort of isolation. The rapid replacement of face-to-face schooling with virtual schooling is causing concern for most students and parents. (Aucensillo, 2021). The pandemic has caused stress levels to increase since it has increased students' workload, and they do not know when the semester will end or what they must study. The "new normal" has led to more problems for students, including having to make their own decisions about their lives and schoolwork and adjusting to the academic demands of an unstructured learning environment.

The COVID-19 pandemic severely impacted education globally, with over 102 countries ordering the closure of all public schools, and 11 countries enforcing localized school closures, affecting over 800 million children worldwide. The pandemic has had a significant impact on the mental health of most children, especially because they are required to study independently without assistance from friends, classmates, or teachers. This research aims to help students who need assistance with academic concerns or problems become more active and perform better in class. It also aims to assist students in resolving their problems, regardless of their academic activity, and seeks answers to the issues that arose before and after the pandemic, regardless of how well pupils performed in school.

Statement of the Problem

In general, this study aimed at designing and evaluating an advice and guidance consultation system. Specifically, it sought to describe the following:

1. How may the design and development of the system be described in terms of System Development Lifecycle model (SDLC)

1.1. Requirements Analysis;
1.2. Design;
1.3. Development;
1.4. Testing;
1.5. Deployment and
1.6. Maintenance?
2. How may the IT experts assess the system based on ISO 25010 standards in terms of

2.1. Functional Suitability;
2.2. Performance Efficiency;
2.3. Compatibility;
2.4. Usability;
2.5. Reliability;
2.6. Security;
2.7. Maintainability and
2.8. Portability?
3. How may the end-users assess the system based on quality of use in terms of

3.1. Functional Suitability;
3.2. Reliability; and
3.3. Usability?

Materials and Methods

The researchers utilized a developmental research design, which involves the systematic study of designing, developing, and evaluating educational programs, techniques, and outputs

that must meet internal consistency and effectiveness criteria, as contrasted to merely instructional development (Richey, 1994). This approach is particularly important in the field of educational technology and in software development.

Table 1. Distribution of Respondents

Type of Respondents	Frequency	Percentage
IT Experts	10	22.22%
GAS End-Users	9	20.00%
ABM End-Users	9	20.00%
STEM End-Users	9	20.00%
HUMSS End-Users	8	17.78%
Total	45	100.00%

In this research, the researchers used the software development life cycle (SDLC) and the International Organization for Standardization (ISO) software quality assurance criteria to develop an advice and guidance consultation system. The researchers deemed the developmental design appropriate because it had an impact on the actual development process they undertook. The researchers conducted the study at a learning institution in Nueva Ecija, Philippines. They conducted it in the Senior High School Department. Using purposive sampling technique (Vijayamohan, 2023), the respondents were identified. Two sets of respondents participated in this study: IT experts and end-users. The end-users comprised students from the GAS, STEM, ABM, and HUMMS tracks in the senior high school. The researchers purposely selected the respondents for the study's purpose. Table 1 presents the frequency and percentage distribution of the respondents.

The researchers adapted two sets of instruments from existing available instruments to assess the technical features and quality of the system. However, they modified the instruments to suit the context of this study. In the data gathering, the researchers sought informed consent from the respondents and explained all the necessary information regarding the project. Subsequently, they administered the instrument through Google Forms. The collected data received utmost care, confidentiality, and anonymity, and were only used for the purpose of this study. To address the identified research problems, the researchers employed several data analysis techniques. They described the activities undertaken following the stages of SDLC to design and develop the system as stated in the first statement of the problem. The IT experts assessed the technical aspect of the system by computing the mean rating of their evaluation. The researchers conducted the same activities to treat the data to address the third research problem. They used the scoring guide presented in Table 2a and 2b.

Table 2a. Scoring Range and Verbal Interpretation

Range	Functional Suitability	Performance Efficiency	Compatibility	Usability
3.26 – 4.00	Very Functional	Very Efficient	Very Compatible	Very Usable
2.56 – 3.25	Functional	Efficient	Compatible	Usable
1.76 – 2.50	Needs Improvement	Needs Improvement	Needs Improvement	Needs Improvement
1.00 – 1.75	Poor	Poor	Poor	Poor

Table 2b. Scoring Range and Verbal Interpretation

Range	Reliability	Security	Maintainability	Portability	Acceptability
3.26 – 4.00	Very Reliable	Very Secured	Very Maintainable	Very Portable	Very Acceptable
2.56 – 3.25	Reliable	Secured	Maintainable	Portable	Acceptable

| 1.76 – 2.50 | Needs Improvement | Needs Improvement | Needs Improvement | Needs Improvement | Slightly Acceptable |
| 1.00 – 1.75 | Poor | Poor | Poor | Poor | Not Acceptable |

Results and Discussion

The Design and Development of the System Based on the Stages of the SDLC

1. Requirements Analysis

In this phase, the researchers aimed to create a solid plan for constructing the developed system (Software Testing Help, 2023). They identified the system's development process, scope, and functionality through a series of observations and interviews. The researchers emphasized how the developed system could adapt to the processes being carried out and address the issues encountered by the senior high school students at a particular high school. To guide them in constructing the developed system, they created a Gantt chart of the SDLC activities. Before conducting the study, the researchers shared a list of possible studies with each other.
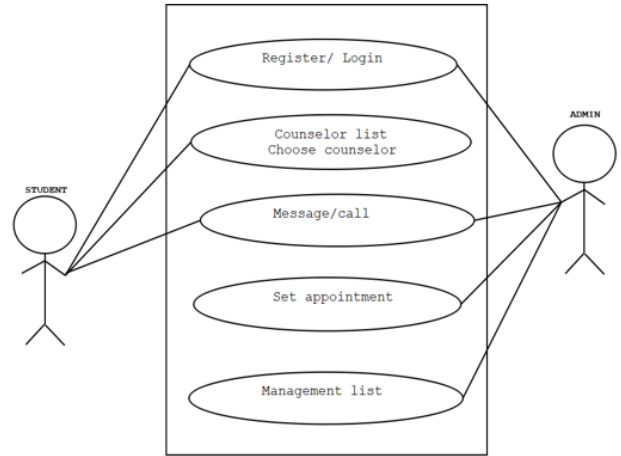
Figure 1. Use-Case Diagram

They then planned a session to sketch out the strategy they would follow, ensuring a clear understanding of their next steps.
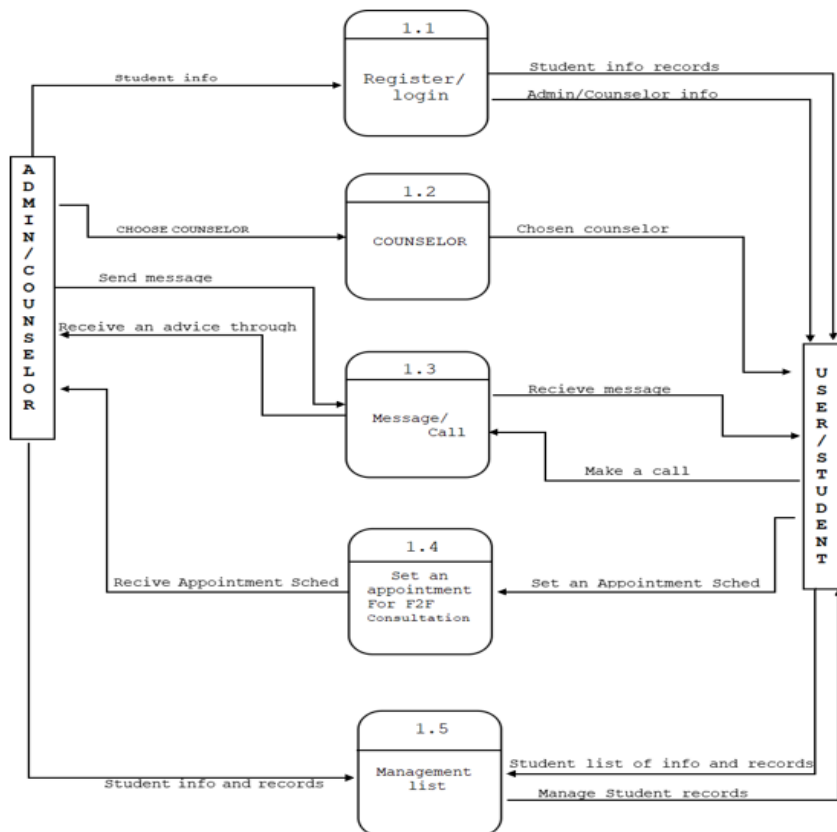
Figure 2. Data Flow Diagram – Level 1

2) Design

During the analysis phase of the SDLC, the researchers collected, comprehended, and documented the business needs, aiming to obtain the business requirements necessary to develop the system. They created use-case diagrams to illustrate the major functional requirements of the system as shown in Figure 1. The researchers also used data flow diagrams (DFD) as shown in Figure 2 to illustrate the information flow between external entities and the system's operations and data stores, while the use case scenario diagram depicted the activities and their relationships with each external object.

3) Development

In the development phase, the researchers developed the system based from the diagrams created as a result of the analysis performed during the design stage.

Figure 3. Programming Languages and IDE

Using integrated development environments, the researchers were able to develop the system. As shown in Figure 3, the IDE and programming languages used were presented.
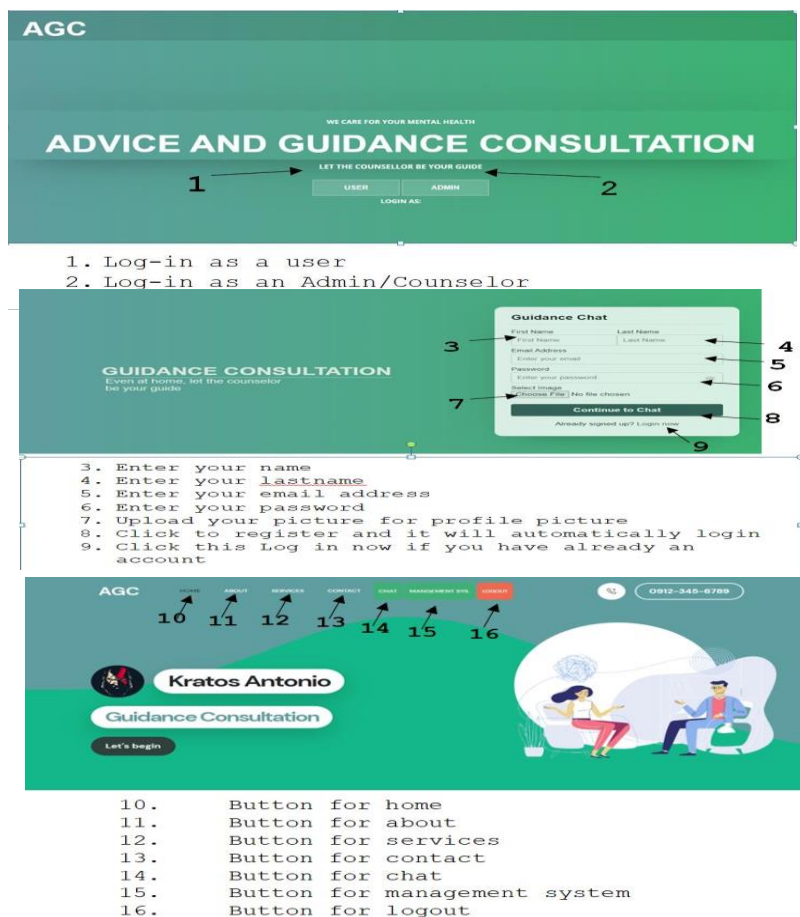

1. Log-in as a user
2. Log-in as an Admin/Counselor

3. Enter your name
4. Enter your lastname
5. Enter your email address
6. Enter your password
7. Upload your picture for profile picture
8. Click to register and it will automatically login
9. Click this Log in now if you have already an account

10. Button for home
11. Button for about
12. Button for services
13. Button for contact
14. Button for chat
15. Button for management system
16. Button for logout

Figure 4. Sample User Interfaces of the Developed System

4) Testing

During the testing phase, the researchers verified whether the system worked and met all the requirements defined in the analysis phase. Simultaneously, it was important to carry out the coding and testing phases to identify possible errors and solve them immediately. The system was tested with different test conditions in a step-by-step manner to ensure that every module of the system worked and was error-free. Detailed test conditions were used by the researchers to solve possible problems that might occur. After completing the primary transactional components in the system, the researchers tested it and learned a lot from their experiences. These experiences helped them identify both minor and significant flaws in the system and provided more insight into how to improve it. A few weeks later, they successfully launched the system. The researchers used functional testing strategies to confirm that each system function conformed to the specified requirements and that all system functionality was in place. Additionally, non-functional testing methods were employed by the researchers to evaluate efficiency, usability, security, and reliability.

5) Deployment

In the SDLC, the researchers were able to present the developed system to potential users of the school by implementing the software in a live setting to evaluate its functionality. The researchers made the program available to end-users after it was implemented, and they also taught actual users about the system's advantages. During this phase, the researchers had the opportunity to talk to students about the Advice and Guidance Consultation System and inform them about every aspect of it.

6) Maintenance

During the maintenance phase, the researchers aim to support and maintain the software to ensure its proper functioning. The main objective of this phase was to address any difficulties, flaws, or problems that the client or consumers might have experienced when using the product. This was the final stage of the SDLC, wherein modifications, revisions, and changes were made based on the end-users' feedback to improve the Advice and Guidance Consultation System. The researchers planned to conduct various maintenance activities, such as corrective software maintenance, adaptive software maintenance, perfective software maintenance, and preventive software maintenance. Software maintenance was necessary because it identified and fixed the software system's faults and errors, enhanced the software's capabilities to make it more suitable for the most recent marketing and business environments, and removed any software features that were out of date and hurting the product's performance. This made the software run better.

The Assessment on the Technical Features of the System by the IT Experts

In this section, the assessment on the technical features of the system was discussed, which was conducted by IT experts. This assessment was considered a crucial step in the development of the software system as it involved the evaluation of the technical aspects of the system to ensure its functionality and efficiency. The IT experts were responsible for reviewing and testing the system's technical features based from the ISO 25010 software standards. The primary goal of this assessment was to provide valuable feedback to the development team, enabling them to improve the system's overall performance and reliability. Further discussion was conducted on the process of assessing the technical features of the system and the significant role of IT experts in this process. Table 3 presents the result of the assessment made.

Table 3. Assessment on the Technical Features of the System by the IT Experts

Software Criteria	Mean	Verbal Interpretation
Functional Suitability	3.50	Very Functional

Software Criteria	Mean	Verbal Interpretation
Performance Efficiency	3.46	Very Efficient
Compatibility	3.35	Very Compatible
Usability	3.40	Very Usable
Reliability	3.32	Very Reliable
Security	3.56	Very Secured
Maintainability	3.44	Very Maintainable
Portability	3.43	Very Portable
Total	**3.43**	**Very Acceptable**

Table 3 presents the results of the assessment on the technical features of the system conducted by IT experts. The table displays the mean scores for each software criterion assessed, along with a verbal interpretation of the score. The software criteria evaluated were functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. The total mean score for all criteria was also calculated to determine the overall acceptability of the system.

Insights drawn from the table reveal that the system's technical features received positive evaluations from the IT experts. The software criteria with the highest mean scores were security with a score of 3.56, followed by functional suitability with a score of 3.50, and performance efficiency with a score of 3.46. These high scores indicate that the system's technical features were highly functional, efficient, and secured. The software criteria with the lowest mean scores were reliability with a score of 3.32 and compatibility with a score of 3.35. Although these scores are still in the "very acceptable" range, there may be some areas that require improvement.

The results from the assessment on the technical features of the system show that the system was highly functional, efficient, compatible, usable, reliable, secured, maintainable, and portable. This suggests that the development team has done an excellent job in designing and implementing the system's technical features. Furthermore, the system's overall mean score of 3.43 indicates that the IT experts found the system to be very acceptable. However, the lower scores in reliability and compatibility suggest that the development team may need to

make some improvements in these areas to enhance the system's overall performance and reliability. Overall, the insights drawn from the table suggest that the system's technical features have been well-received by the IT experts, indicating that the system is well-designed and functional.

The Assessment on the Quality of Using the System by the End-Users

This section was focused on assessing the quality of the system by the end-users, as it was crucial to evaluate its performance and functionality. The assessment provided valuable insights into how the system was being used, identified any areas for improvement, and ensured that the system met the needs and expectations of the users. The methods used to assess the quality of the system by the end-users included surveys, interviews, and usability testing. Feedback from the end-users was vital to enhance the system's overall performance and effectiveness, and it was important to gather it regularly. By doing so, researchers could improve the system ensuring that it remained relevant and useful over time.

Table 4. Assessment on the Quality of Using the System by the End-Users

Software Criteria	Mean	Verbal Interpretation
Functional Suitability	3.38	Very Functional
Reliability	3.18	Reliable
Usability	3.30	Very Usable
Total	**3.29**	**Very Acceptable**

In Table 4, the assessment on the quality of using the system by the end-users is presented. The table shows the mean values for each of the software criteria, including functional suitability, reliability, and usability. The total mean value for all criteria is also provided.

The results of the assessment show that the system was rated as "very functional" in terms of its functional suitability, with a mean value of 3.38. This indicates that the system was able to provide the necessary functions that were required by the end-users. The system was also

rated as "reliable," with a mean value of 3.18, suggesting that the system was dependable and was able to perform as expected without any major issues. Additionally, the system was rated as "very usable," with a mean value of 3.30, indicating that the end-users found the system easy to use and navigate. The total mean value for all criteria was rated as "very acceptable," with a mean value of 3.29. This suggests that the overall quality of the system was rated positively by the end-users.

Based on the results of the assessment, it can be concluded that the system met the expectations and needs of the end-users. The high ratings for functional suitability, reliability, and usability indicate that the system was able to perform the necessary functions and was reliable and easy to use. These positive ratings can have several implications, including increased user satisfaction, improved system usage, and potential for further development and expansion of the system to meet the evolving needs of the end-users. Overall, the results of the assessment suggest that the system was successful in meeting the requirements of the end-users and can be considered as an effective and valuable tool for its intended purpose.

Conclusion and Recommendations

Based on the findings, it was concluded that the System Development Life Cycle was used to develop the Advice and Guidance Consultation System. The model comprises several steps, including requirements analysis, design, development, testing, deployment, and maintenance. These steps were followed to ensure that the system was developed efficiently and effectively.

Furthermore, the system underwent assessments on the technical qualities of the software made by IT professionals and the quality of use made by senior high school students. Based on the assessment results, it was determined that the system passed both technical and usability tests, indicating that it was reliable and usable by its intended end-users. The developed system was found to benefit senior high school students, as

it provided platform for giving advice and guidance on various academic and career-related matters.

Based on the conclusions drawn from the findings, the following recommendations can be made:

Follow the SDLC Model: The use of the SDLC model was found to be effective in developing the system. It is recommended that this model be followed in the development of future systems to ensure that they are developed efficiently and effectively.

Conduct Regular Assessments: Regular assessments of the system's technical qualities and quality of use should be conducted to ensure that the system meets the needs and expectations of its end-users. This will help identify any issues or areas for improvement and allow for adjustments to be made to enhance the system's effectiveness.

Continue to improve the system: The system was found to be effective and beneficial for the senior high school students. It is recommended that efforts be made to further improve the system to enhance its functionality and usability. This could include adding new features, improving user interface, or incorporating feedback from end-users to make the system more tailored to their needs.

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Conflict of interests

The researchers declare no conflict of interest.

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