**CHAPTER IV RESULTS AND DISCUSSION**

This chapter presents the project description and structure, capabilities, limitations, and project evaluation.

**Project Description and Structure**

The Understanding and Accepting ASD: An Autism Spectrum Disorder Learning and Guide App is a system designed to provide in-depth insights into Autism Spectrum Disorder (ASD). This system has audio narration, informative videos, test, and immediate test results and recommendation. The primary goal of the app is to promote awareness and understanding of ASD, allowing users to learn more and gain familiarity with the details, challenges, and effective techniques for support.

This system was prepared to provide knowledge and awareness in the context of ASD, It is organized with five main sections, namely, What is Autism Spectrum Disorder, Laws and Guidelines for ASD, Basic Speech Therapy Tutorial, Treatments and Intervention for ASD, and Autism Symptom Checker. The ‘What is Autism Spectrum Disorder’ section shows the essential information about ASD, The Lessons component delves into diverse topics surrounding ASD, like laws and guidelines, treatment and interventions and video links making for a thorough learning experience of the user. The system's standout feature is the test, which allows users to assess their child for potential ASD and get instant reports and suggestions.

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Figure 5 shows the loading page and the short overview of the Autism Spectrum Disorder Guide App. This page will give the overall idea of what the user will learn in the application.

**Project Capabilities and Limitations**

The Autism Spectrum Disorder Learning and Guide App has the following capabilities:

* 1. Shows the crucial information about Autism Spectrum Disorder.
  2. The system can run offline.
  3. Runs on different Android versions and screen resolution.

The following are the limitations of the project:

* + 1. The system exclusively operates on the Android operating system.
    2. The contents of the Autism Spectrum Disorder Learning and Guide App are specific and fixed as stated in the system.

The findings as shown in Table 2 shows the test result of the system based on the smartphone components. It was tested in different Android OS to know if the developed system is applicable in different versions of Android Operating System.

Table 2. Test results of Autism Spectrum Disorder Learning and Guide App.

|  |  |
| --- | --- |
| **Smartphone Components** | **Findings** |
| **Android Version** |  |
| Android version 4.4: KitKat | Passed, the system successfully operated on Android version 4.4: KitKat. |
| Android versions 5.0 and 5.1: Lollipop | Passed, the system successfully operated on Android versions 5.0 and 5.1: Lollipop. |
| Android version 6.0: Marshmallow | Passed, the system successfully operated on Android version 6.0: Marshmallow. |
| Android versions 7.0 and 7.1: Nougat | Passed, the system successfully operated on Android versions 7.0 and 7.1: Nougat. |
| Android version 8.0 and 8.1: Oreo | Passed, the system successfully operated on Android version 8.0 and 8.1: Oreo. |
| Android version 9: Pie | Passed, the system successfully operated on Android version 9: Pie. |
| Android version 10 | Passed, the system successfully operated on Android version 10. |
| Android version 11 | Passed, the system successfully operated on Android version 11. |

|  |  |
| --- | --- |
| Continuation of Table 3.  Android version 12 | Passed, the system successfully operated on Android version 12. |
| Android version 13 | Passed, the system successfully operated on Android version 13. |
| Android version 14  **Screen resolution.**  3088 x 1440 pixels  1080 x 2340 pixels  1080 x 2400 pixels | Passed, the system successfully operated on Android version 14.  Passed, the system Performance was successfully tested.  Passed, the system Performance was successfully tested.  Passed, the system Performance was successfully tested. |

**Project Evaluation**

The "Autism Spectrum Disorder Learning and Guide App" underwent testing by its components to evaluate its functionality in terms of achieving the desired output.

Table 2 presents the results of the test conducted in all the form based on the capabilities of the operating system. The system worked properly in different operating systems. The outcome proves that the system complied with the different version of Android operating system.

The performance of the project was evaluated in different categories such as; Content, Organization and Design, Mechanics, Comprehensibility, Functionality and Maintainability as the criteria.

There were 30 respondents who evaluated the project composed of 12 parents with child diagnosed of ASD in SAMARICA (San Jose, Magsaysay, Rizal, Calintaan)

area, four (4) SPED teachers, one (1) occupational therapist, one (1) Doctor of Medicine, and 12 IT experts/programmers.

In terms of the content performance of the system, it has an overall mean of 4.51 that indicated an excellent rating. This is manifested by excellent means on the following items: clarity of objectives (4.67); selection of topics/characters in accordance with the learning outcome of the application (4.63); accuracy in the discussion of the subject matter. (4.57); inculcation of values and knowledge (4.57); ability to construct a variety of question types to help solve application problems (4.47); ability to understand and communicate the mechanics of the application. (4.33); and use of creative thinking strategies in the application (4.33). This implies that the developed system is compliant in terms of the contents that enabled it to attain the objectives.

The evaluation reveals a highly positive assessment of the system's content performance. Four out of the seven aspects are classified as "excellent," and the remaining three fall within the "very good" range. This suggests that the system excels in most areas, demonstrating a strong alignment with its objectives and a high level of quality in its content delivery.

Table 3. Content performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Clarity of objectives of the application. | 4.67 | Excellent |
| Selection of topics/characters in accordance with the learning outcome of the application. | 4.63 | Excellent |
| Accuracy in the discussion of the subject matter. | 4.57 | Excellent |
| Inculcation of values and knowledge. | 4.57 | Excellent |
| Ability to construct a variety of question types to | 4.47 | Very Good |

|  |  |  |
| --- | --- | --- |
| Continuation of Table 3.  help solve application problems. |  |  |
| Ability to understand and communicate the mechanics of the application. | 4.33 | Very Good |
| Use of creative thinking strategies in the application. | 4.33 | Very Good |
| **Overall Mean** | **4.51** | **Excellent** |

Table 4 depicts the evaluation of the 30 respondents in terms of organization and design performance of the system. The overall mean was 4.51 described as excellent.

This is supported by excellent mean ratings in the following: sequencing of the application topics. (4.43), use of variety of media in the presentation of the subject matter. (4.53), and the application is well organized and easy to navigate. (4.57).

These findings indicate that the system exhibits strong organization and well- thought-out design, enabling users to efficiently navigate and engage with its content.

Table 4. Organization and design performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Sequencing of the application topics. | 4.43 | Very Good |
| Design elements assist students in understanding concepts and ideas | 4.53 | Excellent |
| The application is well organized and easy to navigate. | 4.57 | Excellent |
| **Overall Mean** | **4.51** | **Excellent** |

Table 5 depicts the mechanics performance of the system in terms of the following parameters: Clarity in how the application supposed to use. (4.50); Use of variety of

media in the presentation of the subject matter (4.50); Availability of alternative modes of learning to the users. (4.57); and Provision of means to sustain interest throughout the application. (4.47); The overall mean 4.51 rated as excellent implied that the system has a very clear presentation of topics that leads to sustained interest of its users.

Table 5. Mechanics performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Clarity in how the application supposed to use. | 4.50 | Excellent |
| Use of variety of media in the presentation of the subject matter. | 4.50 | Excellent |
| Availability of alternative modes of learning to the users. | 4.57 | Excellent |
| Provision of means to sustain interest throughout the application. | 4.47 | Very Good |
| **Overall Mean** | **4.51** | **Excellent** |

Table 6 illustrates the comprehensibility performance of the developed system with an overall mean of 4.56, the system is said to be very comprehensible. This is backed up by excellent ratings in the following: Linkage of new concept prior to knowledge or experience (4.43); Correctness of technical terms and terminologies (4.50); Relevance of the guide questions and samples to concepts (4.67), and Correctness of grammar (4.63). The findings suggest that the system goes beyond addressing content and organization; it also pertains to the technical aspects of a program, ensuring the accuracy of terms used and the use of user-friendly grammar for ease of use.

Table 6. Comprehensibility performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Linkage of new concept prior to knowledge or experience. | 4.43 | Very Good |
| Correctness of technical terms and terminologies. | 4.50 | Excellent |
| Relevance of the guide questions and samples to concepts. | 4.67 | Excellent |
| Correctness of grammar. | 4.63 | Excellent |
| **Overall Mean** | **4.56** | **Excellent** |

Table 7 reflects the functionality performance of the system. The overall mean of the system was 4.52 that is rated to be excellent. Ease of operation (4.53); Provision for comfort and convenience/ease of use for user (4.37), and User-Friendliness (4.67). The findings imply that the system is very functional that allows its user to easily operate the said system. Moreover because of its being user-friendly the user feels convenient and comfortable in using it.

Table 7. Functionality performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Ease of operation | 4.53 | Excellent |
| Provision for comfort and convenience/ease of use for user | 4.37 | Very Good |
| User-Friendliness | 4.67 | Excellent |
| **Overall Mean** | **4.52** | **Excellent** |

Table 8 shows the maintainability performance of interactive module with a very good rating and a mean of 4.46, Ease of maintenance. (4.47); Provision for diagnostic tools

and procedures. (4.43). and Provision for enhancement and modifications. (4.47). The finding suggest that developed interactive module is very easy to maintain and that it could continuously call for enhancement.

Table 8. Maintainability performance of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Content** | **Mean** | **Descriptive Rating** |
| Ease of operation | 4.47 | Very Good |
| Provision for comfort and convenience/ease of use for user | 4.43 | Very Good |
| User-Friendliness | 4.47 | Very Good |
| **Overall Mean** | **4.46** | **Very Good** |

The summary of the evaluation results presents the mean scores and their corresponding quantitative interpretations as displayed in Table 9. The system's content received an impressive overall mean rating of 4.51, signifying excellence. This confirms that the software features up-to-date and accurate content that is effectively presented.

Furthermore, the system's organization and design garnered an outstanding overall mean of 4.51, which is also categorized as excellent. This indicates that the arrangement of topics is well-structured, and the utilization of textual elements, images, and videos in the system aligns effectively with the predefined objectives.

The assessment reveals that the system's mechanics achieved an overall mean of 4.51, denoting a rating of excellence. This underscores the significance of clear presentation, offering diverse learning modes to students, and sustaining learners' interest within the system, all of which are pivotal in achieving the system's objectives.

The system's comprehensibility garnered an impressive overall mean of 4.56, confirming that the integrated concepts within the system are readily understandable, deserving an excellent rating.

The system's functionality earned an overall mean of 4.52, signifying excellence. This suggests that the system adeptly performs its required tasks and fulfills its intended purpose. Additionally, it is noted that the software is user-friendly, providing comfort and convenience to end-users.

Lastly, the system's maintainability received an overall mean of 4.46. This demonstrates its capacity to facilitate efforts for making specified modifications and rectifying errors within a software component.

Table 9. Summary of Evaluation of Autism Spectrum Disorder Learning and Guide App.

|  |  |  |
| --- | --- | --- |
| **Criteria** | **Mean** | **Descriptive Rating** |
| Content | 4.51 | Excellent |
| Organization and Design | 4.51 | Excellent |
| Mechanics | 4.51 | Excellent |
| Comprehensibility | 4.56 | Excellent |
| Functionality | 4.52 | Excellent |
| Maintainability | 4.46 | Very Good |
| **Overall Mean** | **4.51** | **Excellent** |

***Legend:*** *4.51-5.00 – Excellent 3.51-4.50 – Very Good 2.31-3.50 – Good 1.51-2.50 – Fair 0.0-1.50 – Poor*

The overall mean score of 4.51 indicates that the Autism Spectrum Disorder Learning and Guide App effectively fulfills its intended purpose and aligns with the standards typically associated with the development of such software. Consequently, it can be considered valuable and functional.

The purpose of the mobile application, Autism Spectrum Disorder Learning Guide App, is to help families and parents understand autism spectrum disorder (ASD) better. It offers useful data and resources to expand their understanding of ASD. Conversely, the Otsimo app employs alternative communication approaches and applied behavior analysis with the goal of supporting kids in meeting speech development benchmarks according Olech (2023), these programs add to a holistic approach for learning about ASD and providing children with useful developmental skills by fusing interactive exercises with educational information.

**Modification of the system**

At this stage of the system development, recommendations, and suggestions

given by the researcher's adviser, IT experts, and end-users response served as bases for modification of the system. Important suggestions and recommendations were presented for the finalization of the system such as: (1) Making the application more interactive, (2) Correcting the grammar used in the application, and (3) Improving the system design.

During the evaluation, respondents were invited to provide suggestions and recommendations for the developed system, resulting in the following valuable insights:

1. Consider revision of Tagalog questions (symptoms).
2. Add tips/ interventions and instruction how to use app.
3. Create video tutorial on how to use your application.
4. Add informational pictures.
5. Make it more interactive or add infographics.
6. Modify the settings of the sound/audio.
7. The definition or explanation of the topic need to be specific.
8. To sustain the interest of the users make it more interactive.

**Finalization of the System**

The finalization of the system involved extensive revisions and enhancements to the system design, guided by the valuable suggestions and recommendations provided by the evaluators. These recommendations were carefully analyzed, leading to necessary improvements in line with software development criteria. The system was rigorously modified and tested to ensure that it met the highest standards and was fully aligned with user feedback and expectations.