



Go-Native: Kinaray-a, Mobile Learning Application Using Adaptive Algorithm

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Abstract

In Philippines's education, a school or educational institution integrates the language a child is most familiar with like the mother tongue or native language into the classroom lesson along with the school's lesson such as English. This is normally the language that the child speaks at home with their family. The Department of Education (DepEd) of the Philippines gets inspiration in its inclusion of Mother Tongue-Based Multilingual Education (MTB-MLE) as a feature of the Enhanced Basic Education Program. Thus, it mandated the use of the language that the students in Grade one to three are familiar with, their first language as medium of instruction to allow them to grasp basic concepts more easily. The Go-Native app has a learning path that could help the child learn Kinaray-a which is the mother tongue of Antique as fast as they could as it offers a child friendly learning environment. Specifically, the application has two learning styles or types: visual and auditory. Additionally, this mobile based application aims to reinforce the teaching of Kinaray-a as it the ability to generate Pre-Test to assess the initial understanding of the pupil and Post-Test to measure the development of learning. In order to meet the aforementioned feature, the application uses the Adaptive Algorithm.

Keywords: Adaptive Algorithm, Kinaray-a, Go-Native, Mother Tongue

1. Introduction

The Go-Native app has a learning path that could help the child learn Kinaray-a which is the mother tongue of Antique as fast as they could as it offers a child friendly learning environment. Specifically, the application has two learning styles or types: Visual and auditory. As mention in the study: The Neural Correlates of Visual and Verbal Cognitive Styles of David J.M. Kraemer, Lauren M. Rosenberg, and Sharon L. Thompson-Schill, 2009, it has long been thought that propensities for visual or verbal learning styles influence how children acquire knowledge successfully. Some individuals prefer learning through pictures, and others through words. This basic notion has inspired and been furthered by theories about visual and verbal cognitive styles, and the related topic of multiple intelligences. With the above mentioned, the Go-Native App lets the child read and listen then work through a couple of exercises to help the pupil strengthen their understanding in Kinaray-a through associating to the pictures or words they see and hear. Basically, the application has three learning contents: Animals,

Foods and Shapes. To ensure the pupil's learning, Go-Native integrates pre-test and post-test to establish what learning type a pupil needs to strengthen and at the same time, measure the learning growth in each learning type through scoring. In order to identify what learning content, the application must generate the most, the application used the Adaptive Algorithm. In this way, the application at the same time serves as teaching aid for the teachers.

2. Method

The researchers used the Prototyping methodology to develop the system. Its focus is on the installation of the software, the Android Package Kit, file format used by the Android operating system for the distribution and installation of mobile applications, debugging, and testing the program. To achieve the intended flow of the application, the developer employed the adaptive algorithm. This procedure was inspired by the study on Development of a Mobile English Teaching System Based on Adaptive Algorithm [1-3].

Table 1 Statistical Tool Used for System Evaluation

MEAN SCALE	INTERPRETATION
4.21 – 5.00	Excellent
3.41 – 4.20	Very Good
2.61 – 3.40	Good
1.81 – 2.60	Fair
1.00 – 1.80	Poor

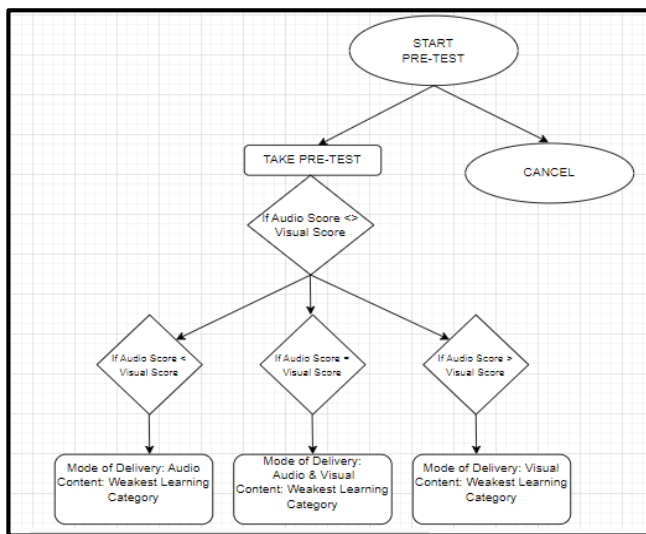


Figure 1 The Flow Chart of The Go-Native Displaying the Flow of The Application

For instance, given a pupil with visual and auditory initial test results, the algorithm may recommend additional confirmatory tests with higher specificity to rule out what category of learning the pupil must learn more. To achieve this, threshold concept in programming was applied. It offers an initial assessment test to evaluate the pupil’s proficiency level in the target learning type. This test typically is the bases of what learning category will be generated most and must be taken by the pupil in the post-test. Thus, measures the learning of the pupil. The Go-Native was evaluated using ISO 25010. A total of forty (40) respondents were targeted as subject for the evaluation of the study: (2), two primary teachers (10) were Information and Communication Technology professionals and (28) pupils in primary grade. Also, a statistical tool Likertz Scale was used for the system evaluation, Table 1 . The researchers have chosen it as a statistical tool due to its reliability compared with other statistical tools in calculating

average of the result from the evaluation forms given to the respondents, as shown in Figure 1.

3. Results and Discussion

3.1. Results

In order to determine the user’s acceptability, it was evaluated at one of the primary schools in Tibiao, Antique by the specified end-users: primary pupils and teachers who were selected based on purposive sampling method. The rest of the technicalities of the system were evaluated by five (5) IT professionals. The performance of the system was evaluated in terms of the functional Suitability, Reliability, Portability, Efficiency, Usability, Security and Maintainability components of the ISO 25010. The pupils and teachers evaluated the system with regards to their respective functions in the system using the application. The developer gave the intended users the privilege to use the application so that they could evaluate the application using the instruments. The IT professionals, knowing their specialization in the field, had access to mobile application interfaces to evaluate the whole system regardless of its functions.

Table 2 Mean Distribution of Usability of the System

Usability	Mean	Interpretation	SD
Appropriateness	4.97	Excellent	0.18
Recognizability	5.00	Excellent	0.00
Learnability	4.97	Excellent	0.18
Operability	4.97	Excellent	0.18
Accessibility	4.97	Excellent	0.18
User Error Protection	4.97	Excellent	0.14
Grand Mean	4.98	Excellent	0.14

Overall, the high user acceptability observed in this study suggests a strong potential for the application’s adoption and sustained use in real-world settings.

Table 3 Mean Distribution of Reliability of The System

Reliability	Mean	Interpretation	SD
Maturity	4.97	Excellent	0.18
Availability	4.86	Excellent	0.35
Fault Tolerance	4.79	Excellent	0.41
Recoverability	4.86	Excellent	0.35
Grand Mean	4.87	Excellent	0.32



Table 4 Mean Distribution of Security of the System

Security	Mean	Interpretation	SD
Confidentiality	4.93	Excellent	0.25
Integrity	4.97	Excellent	0.18
Non-Repudiation	5.00	Excellent	0.00
Protection	4.97	Excellent	0.18
Accountability	4.93	Excellent	0.25
Authenticity	4.93	Excellent	0.25
Grand Mean	4.96	Excellent	0.17

Table 5 Mean Distribution of Efficiency of the System

Efficiency	Mean	Interpretation	SD
Time-Behavior	4.97	Excellent	0.18
Resource Utilization	4.93	Excellent	0.25
Capacity	4.90	Excellent	0.31
Grand Mean	4.93	Excellent	0.25

Table 6 Mean Distribution of Portability of the System

Portability	Mean	Interpretation	SD
Adaptability	4.90	Excellent	0.32
Installability	4.90	Excellent	0.32
Replaceability	5.00	Excellent	0.00
Grand Mean	4.90	Excellent	0.32

Table 7 Mean Distribution of Compatibility of the System

Compatibility	Mean	Interpretation	SD
Co-existence	5.00	Excellent	0.00
Interoperability	4.90	Excellent	0.32
Grand Mean	4.95	Excellent	0.18

Table 8 Mean Distribution of Maintainability of the System

Maintainability	Mean	Interpretation	SD
Modularity	4.90	Excellent	0.32
Reusability	4.90	Excellent	0.32
Analyzability	4.90	Excellent	0.32
Modifiability	5.00	Excellent	0.00
Grand Mean	4.96	Excellent	0.00

3.2. Discussion

The table 2 shows that the evaluators are in congruence with the usability of the system as represented by appropriateness, recognizability, learnability and user error protection with mean ratings of 4.97, 5.00, 4.97, 4.97 and 4.97. Moreover, the grand mean 4.98 and standard deviation of 0.14 shows that the application is efficient and effective in meeting the user's goals and satisfaction. The reliability of the application as reflected in Table 3 was evaluated in terms of maturity, availability, fault tolerance and recoverability, Table 4. As a result, the system maturity was rated 4.97, excellent, which implies its readiness for deployment. The availability rated 4.86, excellent which shows that the application is accessible and functionable if required to be used. Further, the fault tolerance of the application is rated 4.79, excellent which implies that the application is able to continue operating properly in the event of component failures or unexpected errors. The recoverability of the application is rated 4.86, excellent which shows that in case of power interruption, the application can be back to its state. The grand mean was rated as 4.87 and standard deviation as 0.30 which proved that the application is considerably good in quality and performance. The security of the system was evaluated in terms of confidentiality, integrity, non-repudiation, accountability, protection and authenticity using the 5-point Likert scale with mean scores of 4.93, 4.97, 5.00, 4.97, 4.93 and 4.93 with the grand mean of 4.96 respectively which are interpreted as excellent. It ensures that the application is designed, developed, and deployed in a way that minimizes risks and vulnerabilities related to unauthorized access, data breaches, and other potential threats. The table 5



shows that the evaluators are in congruence with the performance efficiency of the application as represented by time-behavior, resource utilization and capacity with mean scores of 4.97, 4.93 and 4.90. The score 4.93 in grand mean and standard deviation 0.25 affirms that the application has ability to perform tasks or operations in a timely manner while utilizing minimal resources. The portability of the system was evaluated in terms of adaptability, durability, installability and replaceability. The result of the evaluated affirmed that the application is portable in nature, Table 6. To state, the adaptability, installability and replaceability were rated 4.97 respectively. It means that the application has ability to be easily moved or transferred from one environment to another without requiring significant modifications or adaptations. The compatibility of the system as show in Table 7 was evaluated in terms of co-existence and interoperability. As a result, the co-existence is rated 5.00 and interoperability 4.90. With its grand mean 4.95 and standard deviation 0.18, it manifests that application can function properly within a particular environment or alongside other software components. The table 8 shows that the evaluators are in congruence in the maintainability of the application. With the mean scores 4.90, 4.90, 4.90 and 4.90, 4.96 as grand mean and 0.00 as the result of standard deviation, it affirmed that the application is excellent in terms of maintainability. Moreover, it shows that the application is easy and effectively can be maintained, updated and modified throughout its lifecycle. The data in table 8 shows the result in Functional Suitability of the application in respect to completeness, correctness and appropriateness. The completeness of the system was rated 4.80 which interpreted as excellent. Thus, this shows that the application served the purpose and met its objectives. The correctness of the system was rated 4.90, interpreted as excellent. Thus, the application provides correct results. On the other hand, the appropriateness was rated as 5.0, interpreted as excellent. This shows that the application is aligned to its intended purpose and the designed appropriately to the target audience. With its 4.90 grand mean, it simply shows that the application

serves its purpose as far as functional suitability is concern.

Conclusion

Based on the results of the evaluation of this study using the ISO 25010 standards criteria, after thorough analysis and evaluation of the data gathered from respondents, it was manifested that:

1. The application provides interactive lessons covering various aspects of Kinaray-a learning, including visual and hearing comprehensions. Lessons are engaging, well-structured, and tailored to the module used by the teacher teaching mother tongue.
2. The application is able to identify whether the pupil learned or not through providing pre-test and post-test. This was made possible by integrating adaptive algorithm. With this being said. The application could re-enforce the teaching and learning of the mother tongue among the pupils in primary grades.
3. The application allows users to download the app for offline access. Thus, ensures uninterrupted learning at school or at home, especially for users with no internet connectivity or when traveling.
4. The application has successfully performed according to the desired specifications based on ISO 25010. The high scores obtained in the evaluation and performance feedback tests how that the app was effective, efficient, and tested to be ready for deployment.

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Highest Glory.

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