

# The Light

# The Light

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The Light is a peer-reviewed, thematic, and multidisciplinary journal of Father Saturnino Urios University, San Francisco Street, Butuan City. The journal accepts manuscripts in all fields such as Original Articles and Perspectives. Original Articles are manuscripts that report new findings contributing to a new knowledge base in the field. The Perspective section presents stimulating and reflective essays on a focused issue. The Editorial Board encourages submissions from beginning and established scholars in the Philippines and abroad.

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## **EDITOR'S PREFACE**

In response to the emerging Fifth industrial revolution where the industrial structure is transformed by the utilization of Artificial Intelligence, Big data, and Internet of Things, this edition of the Light Journal shares scholarly work contributions on the utilization and development of technological innovations.

The first article of John Ray Francisco et. al looked into the development of a game application that uses augmented reality and geolocation to promote tourism by encouraging visitors to visit local tourist spots.

The second article of Orlando Ritchie Natonton, Lorenzo Ezekiel Turla and Nephi Romano focused on the cyber security among selected educational institutions in Butuan City. Here, the authors shared common cyber security issues and gave recommendations for educational institutions to have sound cyber security protection and policies.

The third article of Jou Marlou Opella shared interesting insights on descriptive analytics and Naïve Bayes algorithm on mobile sales inventory and marketing while the fourth article of RJ May Ancha et. al. focused on the health monitoring system in Butuan City using the Decision Support System with Analytics.

Lastly, the article of Kenneth Clint Cataluna et. al. developed an interactive mobile web-based system designed in the Cebuano dialect to bridge gaps in the delivery of mother tongue- based multilingual education.

In this edition of The Light Journal, it is evident that Artificial Intelligence, Big data, and Internet of Things considerably contributed to the promotion of local knowledge, business and health despite the threats on cyber security that go along with them. Given its opportunities and setbacks, this edition of the Light Journal aims to spark discussions on the proper and effective way of utilizing these technological innovations.

**Shirlene Medori T. Alegre, PhD**

Editor in Chief

# **First -Language -First Education: An Interactive Web-based Mobile MTBL-MLE Learning System for Grades One to Three Learners**

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## **Abstract**

Technology is undoubtedly an integral aspect of contemporary education. Digital technology is also reconfiguring how information and knowledge are created, accessed, and used. However, some challenges must be addressed, especially in the implementation of the mother-tongue based multilingual education (MTB-MLE) in the new curriculum mandated by the Department of Education (DepEd).

This study develops an interactive mobile web-based system specifically designed for the Cebuano dialect to bridge the gaps in the delivery of the mother-tongue based multilingual education.

The system provides interactive activities based on mother-tongue language and focus on picture recognition vocabulary and grammar activities. The system is developed using iterative agile methods to attain rapid development. The system also makes use of the Code Igniter framework, which is open-source software for rapid web development and the creation of dynamic websites. Also, the system can be used with smart mobile platform devices, which make it easier to carry around and use.

The study also used the system usability scale to validate the usability of the system. Results show an average score which depicts that the overall system is fair in terms of ease of use. This means that the teachers have the intention

to use the system in teaching the MTB-MLE curriculum. Results also show that the teachers find the system useful as shown in the good scores of the indicators for user friendliness and usefulness of the system in educational purposes. However, they stressed the need for assistance in terms of technical skills because of the technological complexity in the system use. This study recommends the conduct of activities and programs that would address computer literacy, comprehensive training of end-users, and the use of modules with artificial intelligence.

**Keywords: First Language-First Education, Mobile we-based, Agile Development, MTBL-MLE Learning System**

## 1. Introduction

In the implementation of the K to 12 Program, additional features have been added to further improve it from the previous education system. The Mother Tongue-Based Multilingual Education is one of these features. It mandates teachers to teach the students using their first language as medium.

Currently in Butuan City, the first language the kids of this generation are familiar with is Sinugbuanong Binisaya. Teachers in the city teach Sinugbuanong Binisaya as the medium for non- English and Filipino subjects. While the Mother Tongue-Based Multilingual Education (MTB-MLE) has been part of the elementary curriculum for a while, there are still existing problems pertaining to its implementation.

According to Beaudouin- Lafon (1997), an interactive system is a computer application that considers, during its execution, the information communicated by the user or users of the system, and which produces, during its execution, a perceptible representation of its internal state. The difficulties in delivering and understanding the topic is more challenging (Roberto, Gabinete, & Rañola, 2016). This study is the bridge to the existing problem of online interactive learning using the MTB-MLE feature.

This study aims to develop a system where the students will learn different activities wherein their teacher will choose the activities that their students will do. The activities of the said system shall be based on the current curriculum guide of the MTB-MLE program. There shall be activities focusing on picture recognition, vocabulary, and grammar. There shall be stars that will represent the scores of the students. It was in view of these foregoing premises that this study was conceptualized and executed. These include poor picture-word recognition of the students, their reading ability, and a strong foundation in the mother tongue. This study was conceptualized by the researchers to help Grades 1 to 3 pupils in public schools, specifically in the Department of Education, Butuan City Division. This will greatly help the Grades 1-3 pupils and teachers.

## 2. Related Literature

UNESCO has encouraged mother tongue instruction in early childhood and primary education since 1953 (UNESCO, 1953). Many children speak a home language that differs from the language of instruction in education programs. Research confirms that children learn best in their mother tongue as a prelude to and complement of bilingual and multilingual education. Whether children successfully retain their mother tongue while acquiring additional languages depends on several interacting factors. Studies show that six to eight years of education in a language are necessary to develop the level of literacy and verbal proficiency required for academic achievement in secondary school (Ball, 2010).

There is a growing trend around the world to support mother tongue instruction in the early years of a child's education. In Southeast Asia, this is apparent in a rising number of educational programs that utilize this approach. However, the Philippines is the only country in Southeast Asia to have instituted a national policy requiring mother tongue-based multilingual education (MTB-MLE) in the primary school years. While studies have long supported the use of mother tongue as the language of instruction, they have primarily been conducted in community rather than national setting. Existing research that reviews literatures about MTB-MLE stated that MTB bilingual education programs have benefits to the language skills, overall academic achievement, and self-confidence and cultural pride of children (Ball, 2010).

Agile methodologies have been continually sought by software programmers in their rapid application development. According to the study of (Maruping, Venkatesh, & Agarwal, 2009), using agile methodology is most effective for responding to requirements change. The study of (Kumar & Bhatia, 2012) also identified the benefits of choosing agile in the software development process. Their study stated that it dramatically improves the planning phase, detects the faults earlier and improves code development due to continuous testing feedback. The Agile method was also adopted by studies that are focused on improving teaching and learning processes (Dewi & Muniandy, 2014). Furthermore, the agile method has been used by

existing software (Kaleel & Harishankar, 2013); (Rottier & Rodrigues, 2008) in their development process.

The System Usability Scale (SUS) is a simple usability scale developed by (Brooke, 1996) that allows users to quickly assess the usability of a system. According to (Tullis & Stetson, 2004) , the SUS is a useful, empirical quantitative tool for supplementing direct assessments about the use of a software. The SUS was also used by existing learning systems (Arnab, et al., 2015); (Schmidt, Beck, Glaser, & Schmidt, 2017); (Bansal, Nagpal, Ravindran, & Sorathia, 2017)& (Alnuaim, Caleb-Solly, & Perry, 2014) which allowed them to measure not just the usability of their system, but also the user satisfaction in using the services of their system.

### 3. Methodology

This study used the Agile development method for rapid development as shown in Figure 1. "Agile development is more difficult for larger teams," but they cite occasional successful larger agile projects with up to 250 people. Larry Constantine finds agile methods highly attractive for small projects, but he concludes that "The tightly coordinated teamwork needed for these methods to succeed (Maruping, Venkatesh, & Agarwal, 2009). Agile processes like extreme programming (XP),1-3 Scrum,4 Crystal,5 and adaptive software development aim to increase a software organization's responsiveness while decreasing development overhead (Kumar & Bhatia, 2012).

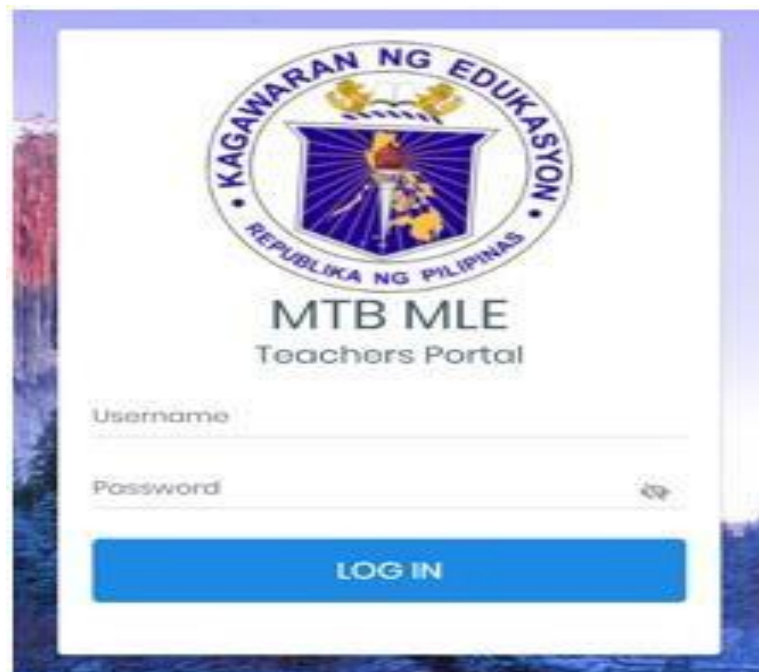


**Figure 1: Agile Method**

Further, the system will be evaluated by System Usability Scale using the 5-point Likert scale. The standard SUS consists of ten items (odd-numbered items worded positively; even-numbered items worded negatively). The test question used in SUS are the following:

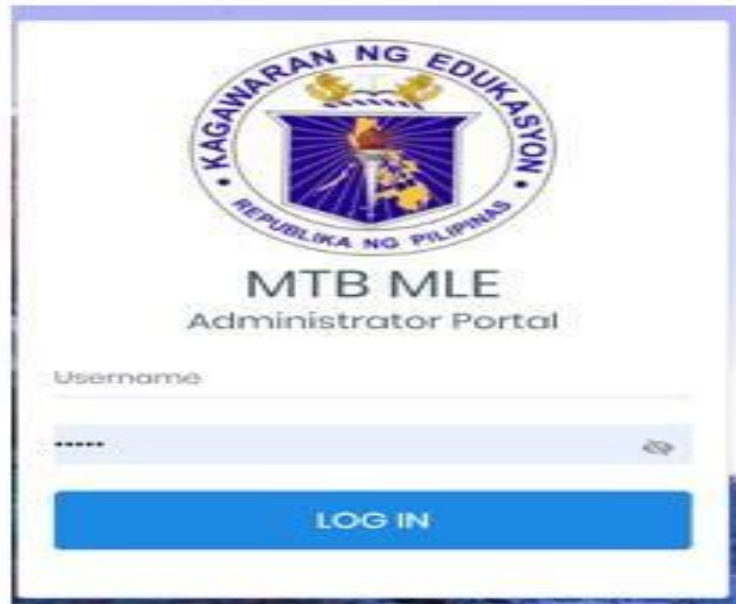
1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found that the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

### 3.1. Results



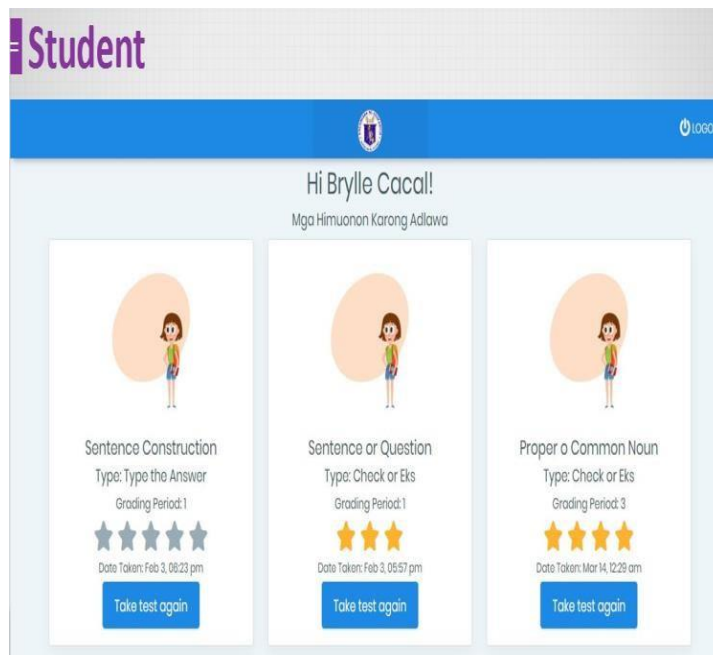
**Figure 2. Teachers' Portal**

Figure 2 shows the Teachers' Portal. This module allows the teacher to insert their credentials to enter the teacher main page.



**Figure 3 Admin Portal**

Figure 3 shows the Admin Portal where the admin can login to access the admin dashboard.



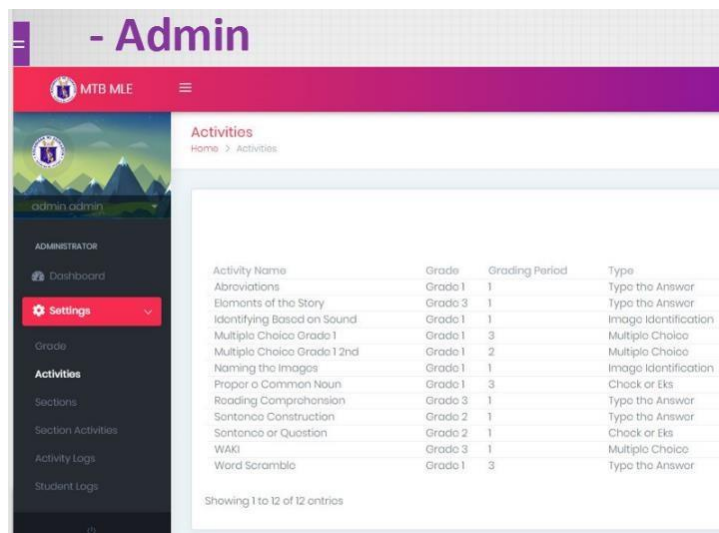
**Figure 4. Student Portal**

In Figure 4, there are activities shown in which the students can take. Other data such as the name of the activity, type of activity, stars which represents the score of the student, and date taken are also shown per activity.



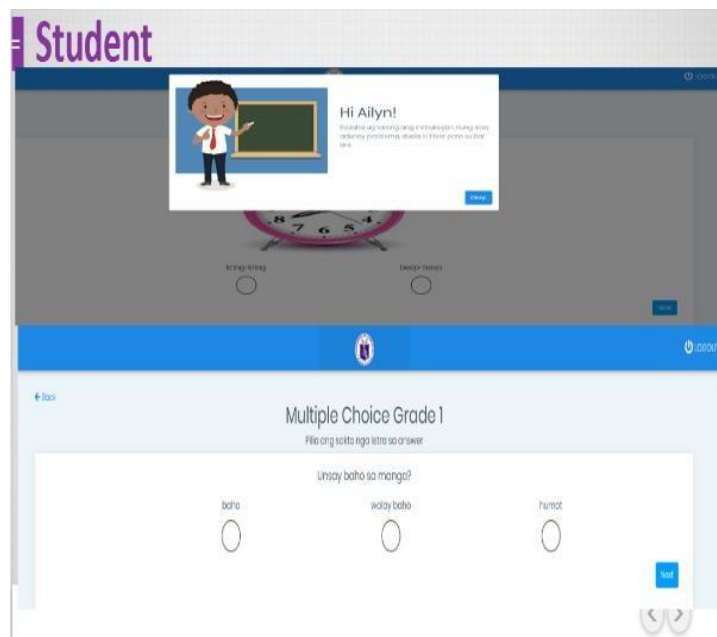
**Figure 5. Student Portal**

Figure 5 shows where the students will log-in.



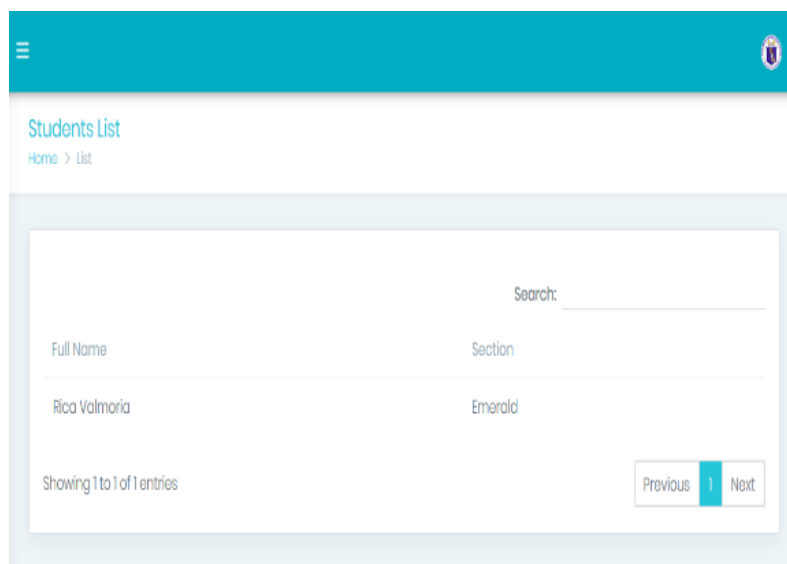
**Figure 6. Admin Page**

In Figure 6, it shows the Student Page. This page shows questions, the choices, and the correct answer of the question. The admin can add additional questions as well as edit or delete the existing ones.



**Figure 7. Student Page**

In Figure 7, it shows the students under the supervision of the teacher assigned to them and their respective section.



**Figure 8. Teacher Panel**

In the teacher panel, teachers can view or search the student information.

#### 4 RESULTS AND FINDINGS

SUS Score	Adjective Rating
92	Best imaginable
85	Excellent
72	Good
52	OK/Fair
38	Poor
25	Worst imaginable

**Table 1: System Usability Scale (SUS) Interpretation Table**

The system was evaluated using the System Usability Scale and participated in by fifty (50) Grades 1 to 3 public school teachers. Data analysis resulted with an SUS score of 51.9, which, according to the Adjective Rating Scale of (Bangor, A., et. al., 2009), that the overall system was Fair. This means that the system was acceptable in achieving its purpose.

#### 5. Summary, Conclusion, and Recommendations

Teachers have the intention to use the system in teaching the MTB-MLE curriculum. In addition, the system plays a vital role in the learning process of every student in the public schools. Further, the system enhances the productivity of the pupils and teachers. Results also showed that the teachers find the system useful. Moreover, the good scores of the indicators for user friendliness and usefulness of the system highlights the educational purposes of the system. However, technical assistance is necessary to familiarize the functions of each module due to the complexity of the system.

This study contributes to the body of knowledge, thus recommending the conduct of activities and programs that would address computer literacy and comprehensive training of the pupils and teachers. Also, additional modules for data analytics are necessary for decision making support. Lastly, in view of future studies, the researchers recommend exploring other methods and instruments to evaluate other factors.

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