Facilitating Condition, Effort Expectancy, and Behavioral Intention to the Use of Augmented Reality Application in Teaching Primary Grades

Godivah Irish A. Reyes, LPT
Graduate School Program, Holy Cross of Davao College, Philippines

Neil Bryan B. Booc, LPT, PhD
Graduate School Program, School of Teacher Education, Faculty, Holy Cross of Davao College, Philippines

Abstract

This research investigates the potential of augmented reality applications in teaching primary grades. This research aims to discuss the facilitating condition, effort expectancy, and behavioral intention to use augmented reality in teaching primary grades guided with the Theory of Acceptance and Use of Technology (UTAUT). The researchers utilized a non-experimental quantitative using a description correlational approach with regression analysis. A sample of 100 participants was chosen through a simple random sampling technique. Study reveals a high level of effort expectancy, facilitating conditions, and behavioral intention to use AR Applications in teaching primary grades, while also indicating a significant relationship between effort expectancy and behavioral intention to use augmented reality applications and a significant relationship between facilitating conditions and behavioral intention to use augmented reality applications in teaching primary grades. Moreover, the study shows that facilitating conditions do not significantly influence the behavioral intention to use augmented reality applications in teaching primary grades. Augmented reality applications hold significant potential in making learning more engaging and interesting. Lastly, Augmented reality holds promising potential for enhancing educational experiences, particularly in primary education, yet the factors influencing its successful integration remain understudied. Developers and educators may aim to create and implement Augmented Reality Applications that are accessible, intuitive, and align with teachers' existing workflows to increase the likelihood of successful integration into primary grade teaching.

Keywords: Augmented reality, facilitating condition, effort expectancy, behavioral intention, primary grades, Davao City, Philippines.


Introduction

Augmented Reality (AR) is emerging as a promising tool in the rapidly changing field of educational technology that has the potential to transform the way primary-grade teachers implement the strategy completely. Despite all of mobile augmented reality's advantages, its applications in education are still limited (De Lima et al., 2022). Mobile augmented reality technology has not yet been fully used in education, and instructors are still apprehensive about including mobile augmented reality in their lessons since some teachers still follow the essentialist belief of the use of conventional methods emphasizing the teacher-centered classroom. (Nikou et al., 2022). Teachers who use conventional methods could be seen as opposed to using technology in the classroom, this opposition is often linked that these educators are resistant to change and have a preference for traditional instructions, as some teachers may be
reluctant to embrace new and unknown technology because they feel at ease and familiar with the teaching strategies they have been employing for years (Ali, 2021). A study in Malaysia stated that teachers aren't knowledgeable enough about augmented reality, and teachers don't know how to use augmented reality to boost learner's motivation to learn, (Shafeey & Lakulu 2021). Teachers' insufficient knowledge and skills related to AR, a lack of general digital proficiency, and time constraints impede their ability to explore, learn, develop, and incorporate AR resources into their teaching practices (Perifanou et al., 2022). In the Philippines, a study of augmented reality only focuses on developing an educational augmented reality game on Battle of Mactan using Intel Perceptual Computing (Ong et al., 2016). In Davao City, the study about augmented reality focuses on addressing children's reading difficulty. This study anchored in the theory of Unified Theory of Acceptance and Use of Technology (UTAUT) which examines the acceptance of technology, determined by the effects of performance expectancy, effort expectancy, social influence and facilitating conditions, but this study will focus only on behavioral intention, effort expectancy, and facilitating conditions.

Statement of the Problem
This study aimed to determine the facilitating condition, effort expectancy, and behavioral intention to the use of augmented reality applications in teaching primary grades academic year 2023-2024. To be more specific, this study aims to answer the following:

What is the level of facilitating condition, effort expectancy, and behavioral intention?

Is there a significant relationship between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in primary grades?

Is there a significant influence between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in primary grades?

Hypotheses
The following hypotheses will be tested at the level at 0.01 levels of significance.

H01: There is no significant relationship between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in the primary grade.

H02: There is no significant influence between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in primary grades.

Methods
The research design employed in this study is non-experimental quantitative using a description correlational approach. The researchers conducted the study in Davao City during the school year 2024-2025. The criteria for selecting participants for this study are the primary grade teachers from kindergarten to grade three. The respondents of the study are 100 primary grade teachers residing and teaching in Davao City, who were selected using the simple random sampling method. The researchers used Pearson Product Moment Correlation and Regression analysis. The instrument used in this study is adapted from different researchers: Onaolapo and Oyewole (2018), Chao (2019), and Wut et al. (2022). The researchers ensure that the research conducted is administered and anchored to the ethical principles and code of conduct provided by the Holy Cross of Davao College. The study's ethical conduct and methodological rigor contribute to its overall reliability and validity.
## Results and Discussion

**SOP1:** What is the level of facilitating condition, effort expectancy, and behavioral intention?

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Descriptive Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort Expectancy</td>
<td>3.82</td>
<td>High</td>
</tr>
<tr>
<td>Facilitating Conditions</td>
<td>3.47</td>
<td>High</td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>4.13</td>
<td>High</td>
</tr>
</tbody>
</table>

As shown in the table above, teachers have a high level of effort expectancy (mean = 3.82), facilitating conditions (mean = 3.47), and behavioral intention (mean = 4.13) to use AR applications.

The result implies that the use of augmented reality applications makes learning more interesting. The integration of (AR) applications holds significant potential for making learning more engaging and interesting. Moreover, the facilitating conditions showed the least means of the result. Specifically in the indicator Clear instruction item “There is adequate training on the use of augmented reality applications in teaching primary grades”, it implies that without sufficient training, teachers might not fully grasp the potential educational benefits and diverse applications of AR in primary education. They may be unaware of how to align AR activities with specific learning objectives or struggle to adapt the technology to suit the unique needs and developmental stages of primary-grade students. In the indicator accessibility, the item “presence of an unstable power supply hinders the effective use of augmented reality applications in teaching primary grades and a specific person (group) is available for assistance with the platform difficulties” showed the lowest mean. This implies that the reliance on technology for teaching with AR means that a lack of consistent power can hinder teachers’ ability to execute well-prepared lesson plans, diminishing the overall educational impact thus the presence of an unreliable power supply significantly hampers the effective utilization of augmented reality applications in teaching. Furthermore, in the indicator suitable environment the items “I have the resources necessary to use the augmented reality applications” and “In general, the country in which my school is located has support (Infra-structure, policies, etc.) for augmented reality” it implies that technical issues with AR platforms can disrupt planned lessons that depend on the seamless integration of augmented reality. Teachers may need prompt assistance to troubleshoot and resolve issues to prevent interruptions in the flow of instruction and maintain student engagement. Moreover, the result also shows that teachers may not have easy access to the devices required for AR applications, making it challenging to integrate this technology into their teaching methods.

Augmented reality has the potential to enhance interactive engagement with educational content, foster student collaboration, boost motivation, and amplify educational achievement (Loveless, 2024). Augmented reality applications offer a multitude of possibilities for people of various age groups to engage with both the actual and augmented surroundings simultaneously, which can create an immersive and captivating learning atmosphere for students (Akçayır & Akçayır, 2017). Incorporating augmented reality into lessons fosters increased involvement and promotes collaborative learning, Misha 2023.

**SOP2:** Is there a significant relationship between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in primary grades?
Table 2. Significance on the Relationship of Effort Expectancy and Behavioral Intention to use Augmented Reality Applications in Teaching Primary Grades

<table>
<thead>
<tr>
<th>Effort Expectancy</th>
<th>Behavioral Intention</th>
<th>r</th>
<th>p-value</th>
<th>Decision on Ho</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.679</td>
<td>.000</td>
<td>Reject</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Note: *p < 0.01

As shown in the table above, there is a significant relationship between effort expectancy and behavioral intention to use augmented reality applications in teaching primary grades (*p=0.000). The r-value of .679 means that there is a moderate positive correlation between effort expectancy and behavioral intention to use augmented reality applications in teaching primary grades. It implies that as the level of effort expectancy increases, the level of behavioral intention to use augmented reality applications in teaching primary grades also increases.

The result implies that primary teachers may adopt and integrate augmented reality applications into their teaching methods if they find them to be user-friendly, requiring little effort to implement and incorporate them into their existing teaching practices. It is important to highlight that understanding teachers' perceptions of the effort required is essential when introducing new educational technologies. Developers and educators may aim to create and implement Augmented Reality Applications that are accessible, intuitive, and align with teachers' existing workflows to increase the likelihood of successful integration into primary grade teaching.

Table 3. Significance on the Relationship of Facilitating Conditions and Behavioral Intention to use Augmented Reality Applications in Teaching Primary Grades

<table>
<thead>
<tr>
<th>Facilitating Conditions</th>
<th>Behavioral Intention</th>
<th>r</th>
<th>p-value</th>
<th>Decision on Ho</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.564</td>
<td>.000</td>
<td>Reject</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Teachers are open to integrating AR into their instructional methods due to the perceived benefits and ease of use associated with this technology (Jamrus & Razali, 2021). According to Ghobadi et al. (2023), mobile augmented reality suggests that perceived usefulness and ease of use are important factors that influence users' intentions to utilize the technology.

As shown in the table above, a significant relationship exists between facilitating conditions and behavioral intention to use augmented reality applications in teaching primary grades (*p=0.000). The r-value of .564 means a moderate positive correlation between Facilitating Conditions increases and the level of behavioral intention to use augmented reality applications in teaching primary grades. It implies that as the level of facilitating conditions increases, the level of behavioral intention to use augmented reality applications in teaching primary grades also increases.

The result implies that when primary teachers perceive that there are favorable facilitating conditions, such as adequate technical support, access to necessary devices, and training opportunities, they are more likely to have a higher intention to use augmented reality applications in teaching in the primary grade. Understanding and improving facilitating conditions is crucial for the successful adoption of educational technologies. Providing teachers with the necessary support and resources can positively impact their intention to integrate Augmented Reality Applications into their teaching methods for primary grades. This includes addressing technical challenges, offering training programs, and ensuring access to the required tools and infrastructure.

Continuous professional development for teachers is essential to raise awareness about the benefits of AR in education and enhance their digital skills for effective integration of this technology into teaching practices (Perifanou et al., 2022). When educators have access to the necessary resources, training, and
support systems required for using AR technology, they are more likely to positively intend to incorporate AR into their instructional methods (Nikou, 2024). Teachers need to be equipped with technological training to understand what AR is, its potential, and how to integrate it into their teaching practices (Fernandez, 2017).

SOP3: Is there a significant influence between facilitating condition effort expectancy and behavioral intention to augmented reality application of teachers in primary grades?

Table 4. Significance Influence of Effort Expectancy and Facilitating Conditions to the Behavioral Intention to Use Augmented Reality Applications in Teaching Primary Grades

<table>
<thead>
<tr>
<th>Behavioral Intention to Use Augmented Reality Applications in Teaching Primary Grades</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Constant</td>
<td>1.452</td>
<td>0.299</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>0.611</td>
<td>0.119</td>
</tr>
<tr>
<td>Facilitating Conditions</td>
<td>0.098</td>
<td>0.116</td>
</tr>
</tbody>
</table>

Note: R = .681; R² = .464; F-value = 42.036; p-value = .000

As shown in the table above, the result of this test indicated that facilitating conditions do not significantly influence the behavioral intention to use augmented reality applications in teaching primary grades. The implication could be because the level of the indicators of facilitating conditions is almost low (Clear Instruction – mean =3.73; accessibility – mean=3.32; suitable environment – mean=3.35). This study shows that it has a 46.4% degree of influence on effort expectancy and facilitating conditions of behavioral intention to use augmented reality applications in teaching primary grades. There are other 53.6% factors that could possibly influence the behavioral intention to use AR Applications. Model: y = 0.611x + 1.452 where y is the Behavioral Intention and x is the EE. The result of the study implies that the result disproves the theory.

The result implies that facilitating conditions (which include factors like clear instructions, accessibility, and a suitable environment) do not have a significant impact on the behavioral intention of teachers to use augmented reality applications in teaching primary grades. The implication provided is that this lack of significant influence could be attributed to the fact that the indicators of facilitating conditions have relatively low mean values. The lack of significant influence on Behavioral Intention suggests that, in this particular context, even though facilitating conditions are present, they may not be perceived as sufficient or effective by teachers. The low mean values for the indicators could be a contributing factor to this lack of influence.

Ping and Liu (2020) found that K–12 students demonstrate a strong inclination to use augmented reality (AR) for learning, evident in their high perceived utility, ease of use, and enjoyment in AR-based learning. The ease of use of AR tools can influence teachers' willingness to integrate this technology into their teaching practices (Sunardi et al., 2022). If teachers do not perceive facilitating conditions as effective or sufficient, it can impact their intention to use AR (Jamrus & Razali, 2021).

Conclusion

The study reveals that teachers have a high level of behavioral intention to use AR applications. The integration of (AR) applications holds significant potential for making learning more engaging and interesting. AR has the capability to transform traditional teaching methods by overlaying digital content in the real-world environment, AR not only captures students' attention but also allows teachers to create
immersve and interactive learning experiences. Teachers can enhance their teaching styles using new approaches such as augmented reality; by integrating this kind of technology in teaching practices, it can ultimately create a more vibrant and stimulating learning environment for their students. In addition, the integration of augmented reality has the potential to greatly enhance the way students learn. Furthermore, integrating AR into teaching practices showcases a teacher's commitment to innovation and adaptability. Embracing new technologies demonstrates a forward-thinking approach to education, preparing students for the evolving digital landscape. Nonetheless, as there is limited research on the integration of augmented reality and active learning in primary education, the necessity for additional investigation in this area has become apparent.

Recommendations

In order to support the use of augmented reality in teaching primary grades. The efforts might need to be directed toward improving the clarity of instructions, enhancing accessibility, and creating a more suitable environment for integrating these applications into primary-grade teaching. By addressing these specific areas, the facilitating conditions may become more influential in shaping teachers' intentions to adopt the technology. It would be beneficial to enhance the clarity of instructions provided to teachers on how to use Augmented Reality Applications. This could involve creating comprehensive user guides, conducting training sessions, and offering ongoing support to ensure teachers feel confident and informed about the technology. There may be challenges in terms of how easily teachers can access the necessary tools and resources for using Augmented Reality Applications. Efforts may be made to improve accessibility, which could include providing easy access to devices, software, and technical support. It may be beneficial to conduct awareness programs to highlight the benefits of using Augmented Reality Applications in teaching. Additionally, providing training programs can help teachers feel more comfortable and confident in incorporating these applications into their pedagogical practices.

Conflict of Interests

No conflict of interest.

References


