Tangible Multimedia: An Educational Interactive Video in Kindergarten's Visual Perception and Discrimination

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Abstract

The researcher developed interactive video learning for Kindergarten ages 4-6 using Tangible Objects. The main theories that were used are Tangible Multimedia Learning (Tsong et. Al., 2017), Emotional Design (Heidig et.al., 2015), and Constructivist Theory (Tse-Kian, 2003). The researcher used qualitative study specifically, Case Study, it helped the proponent to have an in-depth study of the subject matter through various methods such as interviews. Using all the collected related literature, data gathered, and creative influences, the researcher was able to come up with an Interactive Video Lecture for Kindergarten students using tangible objects.

Keywords: *Tangible Multimedia, Interactive Video Learning, Visual Perception, Visual Discrimination*

I. Introduction

1.1 Background of the Study

Tangible Multimedia currently exists across many mix media domains, such as tangible user interface (TUI), mixed reality, and augmented reality, but there has not been any research into tangibility in multimedia learning for preschools. (Tsong et. al., 2012) Even though there are some tangible user interface research to explore tangible objects and multimedia objects, multimedia object is not their main emphasis. The multimedia objects serve only as testing elements to evaluate the usability of their physical user interface. (Marco et. al., 2009). In response to this, a new form of multimedia learning system has been formed for preschoolers called "Tangible Multimedia Learning System" (Tsong et. al., 2012). With this, it increasingly focuses on tangibility of multimedia output that is conceived through tangible object. Tsong, Chong, and Samsudin adopted the use of the term "tangible" from Ullmer and Ishii's research, (2001) because the term carries the meaning that "physical form is given to digital information." (Tsong et. al. 2012). Unlike the TUI system, the tangible multimedia design is based on real multimedia perspective, from its conceptualization up to its output.

Although there are already existing studies regarding tangible multimedia or "tangilearn", it has not yet been localized in other different languages. It is relevant to "replicate" tangible multimedia to other languages that will help to find out the "system in another language" (Tsong et. al. 2018) that could impact a different learning context. With different socio-economic background here in the Philippines, and by applying Dep-Ed's curriculum or "Standards and Competencies for Five-Year-Old Filipino Children", "young learners" should be engaged with Language, Literacy, and Communication which are defined as "early literacy" learning from self-expression that focuses on "mother tongue" or Tagalog. The curriculum will be based on "Language, Literacy, and Communication" specifically, "Visual Perception and Discrimination" (VPD) defined as "similarities and differences in what children can see" to critically observe and understand things around children's perception. Its specific curriculum is telling which object/pictures are same based on colors, size, shape, direction, and "other details", telling missing parts in objects, identifying letter, number, or word. And finally, telling which two letters, numbers, or words in a group are the same. Tangible multimedia can help Dep-ed's VPD curricula because it is based on identifying objects, colors, and shapes based on Tsong's et. al. Research, the localization of tangible multimedia could help the research to have gap using "mother tongue" or Tagalog in the context of Filipino preschools.

It needed to have an "Emotional Design" pattern in order to make it effective, and interactive (Heidig et. al., 2015). Emotion factors have been widely ignored in multimedia learning research, a question by researcher Heidig, Muller, and Reichelt asked "How can we design a multimedia learning material that are appealing, at the same time is/are effective for learning?". There are several studies that Emotional Design can be fused with the use of video and learning materials. (Plass et. al., 2014; Um et. al., 2012). Emotional Design was depicted at utilization that it can have positive and will encourage learning. Emotional Design structure do not have to be many, but it needed to have well-structured components, for example, the use of proper design, shading, colors, animation, shapes, and form. (Heidig et. al.) According to Um et. al., (2012) and Plass et. al. (2014), warm hues and round shape may bring out positive emotion in students that can encourage

inspiration and positive learning results. Heidig (et. al., 2015) observed the emotional design in aspect of student state, behavior, and impact that is observed during Heeidig's research.

Through this research, the researcher will use interactive video derivable that will show the efficiency of video lecture, and the tangible media to preschool early learning development.

Using Tangible Multimedia, the study will aim to maximize Pre-school's Visual Perception and Discrimination capacity using video deliverable that have excellent transition, effects, motion graphics, and actor/actress based on the standards of Shah (2015) in creating an interesting video lecture, tangible output, and to contribute or future studies of multimedia.

1.2 Statement of the Problem

The research will be the case study of the development of preschool video lecture as an effective interactive pre-school learning tool ages 4-6 preschool student in a "private preschool" in Manila, Philippines that will use non-probability sampling and qualitative data and determining the needs of young preschool student for interactive video lecture to make it entertaining and learning, and other further areas that will be still needing improvements.

1. How Can Emotional Design apply to Tangible Multimedia Learning for Pre-school's Visual Perception and Discrimination learning?
2. How Tangible Multimedia can be used in order to create effective interactive video learning for preschools Visual Perception and Discrimination in the context of Filipino Pre-schools?

1.3 Objectives of the Study

- Create interactive video output that will catch preschool student's attention using Tangible Multimedia.
- Create a meaningful interactive video that the kindergartens to entertain and to learn at the same time.
- Study preschool's behavior in Filipino-context using Tagalog language

1.4 Assumption

The expected output for this study is a well developed interactive video derivable that can be used as a guideline to create fun, entertaining, child friendly videos. Also using Emotional Design example for a good multimedia learning output, and Tangible Multimedia Learning that can make the preschoolers interested in Visual Perception and Discrimination.

1.5 Significance of the Study

The study will focus on the important design elements that will make the preschool interested in interactive video derivable, the study has the expectation to maximize children's learning capacity in able to find the needs of a young learning student. The result that will be obtained from this study will be helpful for multimedia students in creating video lecture for children. Furthermore, the outcome of the research can be helpful to reintroduce/reestablish Philippine educational shows for kids. Lastly, this study is significant to develop skills in video production, motion graphics, and sound design.

1.6 Scopes and Limitations

The study will only focus on preschool students in Shalom Akademeia of Cavite, Inc. the interactive video derivable can be improved over time to make it more friendly to preschools. This will gather information from preschooler to find a pattern or a trait that will be effective for them.

2.1 Theoretical Framework
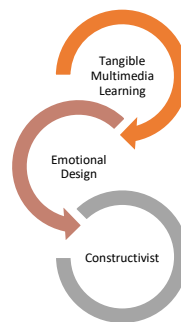
Theoretical Framework

a. Emotional Design

It needed to have Emotional Design in order to be effective, and interactive. According Heidig (et. al., 2015), emotional factors have been used to analyze the design in details and create appropriate design for preschools.

**b. Visual, Auditory and Tangible User Interface (TUI)**

The theoretical framework both includes visual and auditory learning, combination of multimedia objects, graphics, animation, text, video, audio, and tangible object. (The International Journal of Multimedia & Its Applications, 2016)

Visual and Auditory should be well-integrated that displayed in the screen. All components in the tangible multimedia should be also delivered in both, in a way that they are related to each other. This should be helpful for preschoolers in Filipino learning setting.

c. Constructivist Theory

Constructivist theory in the context of multimedia learning defined as learning process where students work individually or groups to explore, investigate, and solve problem and become actively engaged in finding information, rather than passive learning experience (Tse-Kian, 2003).

2.2 Conceptual Framework

Conceptual Framework
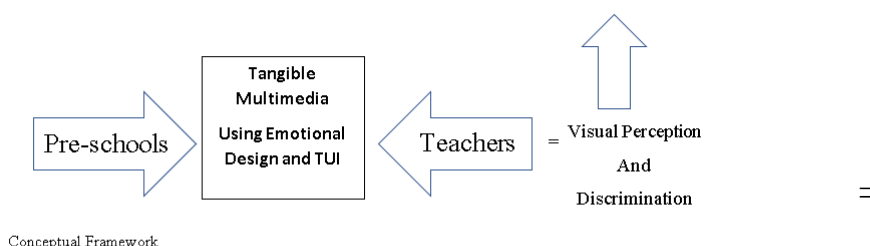
Conceptual Framework

In order to incorporate tangible multimedia and video lecture, information will be reviewed on how to apply the factors. According to Sheridan, Edwards, Marcin, and Konche (2009), early childhood provides "rich, meaningful" educational experiences for

all children. In line with this, professionals or teachers play a big role on how they can influence and produce meaningful required skills, and behavior for young learners. In early childhood learning, the teachers serve as "framework" for practice and assessment, educators are required to meet certain qualification in order to meet educational qualification (Martinez-Beck et. al., 2009). With the guidance of the education practitioners, it is important for the children in this "early stage", according to Piaget (n.d.), young learners can only learn from concrete object because their structure of learning is still at the preoperational stage.

Multimedia video lecture has been proven to play a big role in early childhood education (Kulik et. al, n.d.). There are also proofs that children learn from the world around them through tangible objects (Chau, 2012). Elsom (2001) also said that going further from multimedia educational delivery system, it must have physical interaction with the information channels. With these, multimedia should embrace tangible objects in multimedia learning to be more effective.

With the help of cognitivism, constructivism, and TUI, through this framework, it will combine both tangible objects and digital information for interaction-friendly output (Ulmer et. al, 1997), both are cognitive and constructivist friendly for preschool leaners. The result will be the preschooler's learning in development of their talent and creative skills (Dep-Ed, 2018), and with the help of Tsong's (2012) model of tangible multimedia learning, it will be more effective using both cognitive and constructivism approach to the study.

3.1 Methodology

The method that will be used in the study is qualitative, since the study focuses on Tangible Multimedia and Visual Perception and Discrimination for kindergarten. The concepts of emotional design, Tangible Multimedia Interface (TUI), constructivism, and cognitivist will be used; the researcher will gather responses associated with behavior, interaction, learning capabilities, and emotional engagement of the young learners to the tangible multimedia output. According to Berkwits et. al. (2998), qualitative research aims to gather data that focuses on user's emotion and experience. The study needed to have direct learning from the participants in order to have clear and in-depth

understanding of the research that requires feedback to the output. The number of participants that will questionnaires will be 3-12 persons, because it is a qualitative study (Patton, 2001).

Case study will be used to support the research; it is defined as engagement of in-depth examination of the "phenomenon" under investigation (Quinlan, 2011). This method allows the research to have deep investigation and examination of the data. Limited number is the variable of the study or a certain group, or in case of the research it is preschool group in individual section. The limited number of individuals as subject of the study allows the research to have detailed qualitative information with the help of case study. Focusing on small number of participants not only explain data in real environment, but also explores the complexities of real-life situation (Zanal, 2007). Since the study involves preschool students, it is required a clear and detailed analysis of the participants in the study. Their experience, concept, learning capabilities, and emotions require deep analysis in order to obtain information needed to the research. The case study will help the researcher to answer the problem stated on the research.

a. **Checklist for Tangible Multimedia Learning**

Tangible Multimedia Learning	
1. Development of the Multimedia output ▪ Appropriate video, animation, colors, sounds, and style for the design. ▪ Developing a design that will be appropriate for preschool (Ravelle et. al., 2005). ▪ Developing output that will be in line with the review of related literature.	
2. Development of Tangible Object ▪ Development of tangible object that is appropriate for multimedia output. ▪ Continuous representation of object and digital output. ▪ Impact of the object in user's interest.	

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3. User Experience

- Physical and digital Engagement

- Applying Tangible User Interface (TUI).

- Direct Manipulation of the object. (Shneiderman, n.d.)

- Logical representation of both object and interactive multimedia output. (Tsong et. al., 2012)

- Relationship of the tangible object, and multimedia output.

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To create an appropriate design for preschool, it needed to have active engagement between user and the design. According to Hourcade (2007) interactive design for young learners needed to promote both interactive and tangibility. Thus, creating and following tangible checklist will be relevant for the progress of the study and development of the output.

Tsong et. al. (2012) procedure of Tangible Multimedia Learning uses TUI or Tangible Multimedia Interface which describes physical objects that are able to translate user's interaction to the object into the computer interface. It is described by Shneiderman (n.d.) as "direct manipulation", and "immediacy", and "haptic quality" as crucial in fostering physical engagement with an object for the purpose of lowering "mental load". It identifies three core components and properties of direct manipulation.

First is the continuous representation of the object of interest, physical actions, or buttons of complex systems, and lastly are the reversible operations that impact the object of interest and user immediately.

Tangibility and direct manipulation are very important concepts for tangible multimedia. Physical representation is only a small part of the concept; more important is the logical representation, which provides important information. Thus, it is essential for the users to understand the flow of information, and the meaning between tangible and multimedia derivable.

b. Checklist for Emotional Design

Emotional Design	

1. Visceral Level
    ▪ Creating first impression of young learners to the output (Vard, 2015)
    ▪ Observing the young learner's interest to the output.	

2. Behavioral Level
    ▪ Exploration of the tangible multimedia output.
    ▪ Manipulation of the object.
    ▪ Interaction of preschool to the interactive and tangible output.
    ▪ Accomplishing, or failing a given task
    ▪ Examining the usability of tangible multimedia output.	

3. Reflective Level
    ▪ Feedback on before and after interacting with the output.
    ▪ Extracting information needed for the improvement of the output (Mendoza, 2016)
    ▪ Defining what is the real experience on interacting with the tangible multimedia.
    ▪ Examining pros/cons.	

Emotional design, as defined in the related literature helps in finding engagement between user and design, in order to have feedback given by the participants. Emotional Design composed of three processes: visceral level, behavioral level, and reflective level (Norman, 2004) wherein the feedback is the last process that can help the research to have in-depth analysis to the output, and the preschools.

The first is Visceral level, defined as "concerning itself with appearance", this level refers to the perceptible qualities of the object and how they make the user feel. In this stage, much of the time is spent on developing the output. This is the act of distinguishing output not on tangible but going into user's attitudes, beliefs, feelings, and how they want to feel. Visceral design aims to get inside the user's head and go to his/her

emotions to improve the user experience, with the use of color, shapes, sounds, and animation the researcher ill able to define what is needed to improve the study.

Second is Behavioral level, it has to do with "the pleasure and effectiveness or efficiency of use", it is more often referred as "usability", two terms are important to this level essentially refer to practical and functional aspects of the output. This method is considered as the "easiest", because performance levels can be measured once the tangible objects are changed or manipulated. Error rates can be measured using behavioral level. The behavioral level refers to the emotion that will be felt by the user as a result of either accomplishing or failing to complete the goals on the output. If it is satisfying, and only requires a little effort, it is more likely to have positive emotion. And on the other hand, product that is hard to interact with, and is restricting is more likely to experience negative emotion.

Lastly, Reflective level where considered as "rationalization and intellectualization" of the tangible multimedia output. This is the highest level of emotional design, representing the conscious, where the user is consciously approaching a design, examining its pros and cons, judging it according to the rational side, and extracting information to define what the real experience of the output is. The reflective level examines the effects of the behavioral level, the users may experience difficulties, and the usability of the object.

Norman's (2004) three levels of design can be simply defined as: the first impression of the design, experience of the user that using the output, and user's reflection of the output both before and during user experience on the output.

Formulating Interview Question	
1. Semi Structured Interview ▪ Introduction, and explaining the research.	

- Identifying the insights, and observation - Gathering qualitative data needed for the research. (McCammon, 2008) - Specific and direct question as possible - Recording the interview	
2. Analyzing the findings. - Interview based on the findings of the use of Emotional Design, and Tangible User Interface. - Report of data analysis, and building ethnographic survey, and qualitative research. (Keene, 2017)	

c. Checklist for interview with the teacher

Interview can be described as "elicitation of data by one person from another though person to person encounters" (Nunan, 1992). Semi structured interview will be used in the research, where interviewers will use the questionnaires for the interview process to guide the researcher to the process, and also provide the researcher with the ability to probe the participant for additional details.

Providing a specific question, in relation with the research is important to the research so that it can analyze the needs for the output. (Keene, 2017) By observing the preschools, it can formulate a question based on them, and based on Emotional Design, and TUI. Thus, by analyzing and recording the interview, the report will be needed so that it can have ethnographic that will examine the behavior of the participants, and findings of the research. (Dewan, 2018)

IV. Data Analysis and Interpretation

4.2.1 Preschool Pre-Interaction, Interaction, and Post-Interaction Observation

The proponent's data interpretation is based on Emotional Design (Heidig et. al., 2015) which are composed of visceral level or observing the student's first impression of

the interactive design. The second one is behavioral level, or how they interact with the design and this is where done during the interaction of the students. And lastly, reflective level which the student's reaction after the said interaction with the tangible multimedia derivable.

A. Visceral Level

Introduction of "Pag-Aralan Natin!" (blur faces)

Before the interaction started, the proponent introduces the platform by explaining, grouping the students by 3, giving them the tangible object, and then playing the video introduction for them. The instruction where based on Constructivism model where students will be guided by someone who are more experienced than the young learners. (Mcleod, 2019) In the research case it is guided by the proponent, and the teacher before, during, and after the video learning presentation. The catching the student's attention is a bit challenging because of their Pre-operational stage, and their age (4-6). It needed something to catch their attention which is mentioned in the related literature by Piaget (n.d.) where young learners need "engagement", and "something to grasp" experience, which were provided by the proponent.

Groupings, and Video Introduction

Giving of the tangible object to the young learners

During the video presentation, they are really paying attention in the video, which includes the introduction on how to use the tangible multimedia. With the use of sounds, interactive graphics, interaction between the video and students, they were able to easily understand the derivable.

B. Behavioral Level

Interaction of the young learners between Video Presentation and Tangible Object (Group 1)

After the assessment of the tangible multimedia, they begin to interact with the video. The researcher observed the young learners are significantly listening to the interactive video, because they can see the object, at the same time they are grasping the object. It is very relevant that they are paying attention, because it proves Tsong's (2016) theory that the young learner's will be interacting more in the tangible multimedia object. Through this interaction, they are able to effectively learn, and have fun with the interactive video using tangible multimedia.

Interaction of the young learners between Video Presentation and Tangible Object (Group 2)

The proper, clear, and easy to understand object, and is appropriate for this group of age. It allowed for exploration, discovery, expression, and reflection (Ferris et. al.), it also provides learners video a "tool to think with" (Resnick et. al. 1998) that allows student to learn abstract concepts using concrete representation like these shapes, and finally, it offers collaborative effort activity among learners.


Interaction of the young learners between Video Presentation and Tangible Object (Group 3)

C. Reflective Level

After the interactive video lesson, they were asked if they had fun with the video, and their response was "Yes", as a result they are more likely to pay attention to the teacher because of its interactivity, and graspable objects, and with the help of Tsong's (2012) model of tangible multimedia learning, it became an effective tool in learning using both constructivism approach to the study.
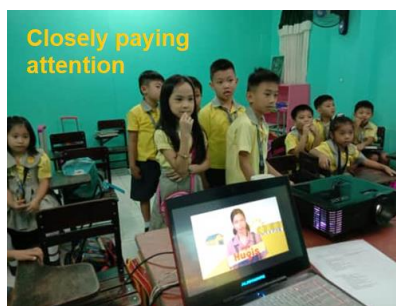
Post-Interaction

Groups 1-3 (Left - Group 1, Center - Group 2, Right- Group 3)

4.2.2 Teacher's Observation

Interview

The findings are based on the interview with the teacher, based on their observation on the 10 pre-school students who interacted with tangible multimedia medium.

Evaluation Items	Rating (1-5) 1-Poor, 2-Below Average, 3-Average, 4-Above Average, 5-Excellent
1. The students are comfortable in using the tangible multimedia medium	3-Average
2. The concept of Tangible Multimedia Learning	5-Excellent
3. Pre-school's interest in Tangible Multimedia Learning	4-Above Average
4. The students enjoyed using the tangible multimedia medium	5-Excellent
5. The enjoyment of student in grasping object while	4-Above Average

interacting with the tangible multimedia learning.	

Interpretation:

Based on the findings and observation of the teacher, at the beginning the students were not comfortable with the platform because the young learners encountered "something new" in their learning unlike traditional video learning. The researcher needed to repeat the explanation, and teacher's guide helped for the student to use the tangible multimedia learning.

The concept of Tangible Multimedia Learning is "interesting", "something new", and "can be used in other curriculum" or subjects for pre-school as mentioned by the teacher. The Pre-school's interest to the tangible multimedia learning results are positive, the student's attention is caught by the visually pleasing, "child-friendly", and interactive medium. The enjoyment of the students with the medium are very evident, because based on the observation of the students, they are having fun with the multimedia medium, and are not losing their attention to the screen. The concept of tangibility, and students grasping on object makes them more interested to the tangible multimedia learning concept, and are able to pay attention to the screen because of the tangible objects.

Interview Question	Summarized Answer
1. Do you find the Tangible Multimedia Learning Interesting?	Tangible multimedia is very interesting because it is new, and something that has not been done yet here in local settings.
2. Does localizing Tangible Multimedia Learning help the students to pay more attention to the platform?	Yes, it helped a lot, because the Tagalog language is their familiar language, and able to understand each question asked to the students.
3. Does the student's attention increase with the use of the platform?	Pre-school's attention increased, because of the object they are grasping, and the significant relationship of both objects, and the interactive video.
4. Does the learning of the students gain significantly?	It doesn't really "gain" but, it creates interest to them, it is more of engagement, and interactivity of the tangible multimedia learning.

5. Do you recommend Tangible Multimedia Learning for Pre-school students?	Yes, it has a lot of potential for more topics, and have the potential to be used in other preschool, or in localizing it more with different topic.

Interpretation:

During the interview, five questions were presented to the Kindergarten's teacher, where the teacher evaluated the tangible multimedia deliverable, and based on Emotional Design's third and final process which is Visceral Level or feedback after interacting with the output, extracting information needed for the improvement of the output (Mendoza, 2016), defining what is the real experience on interacting with the tangible multimedia, and examining pros/cons.

First and second question can be summarized as the evaluation, and impression of the tangible multimedia model in localizing them. The teacher described tangi-learn as "interesting", "new", "fresh" and not has been localized. Meaning that the recommendation of Tsong (et. al., 2016), and making it Tagalog are interesting and engaging to the children.

Third is the interest, and attention span of the students, as the observation of the proponents to the engagement of the Shalom's kindergarten students, they are constantly paying attention to the tangi-learn platform. Because it uses graspable object, and then making it relevant to the video lecture, as well as Shneiderman (n.d.) study of tangible multimedia where "direct manipulation", and "immediacy", and "haptic quality" as crucial in fostering physical engagement with an object for the purpose of lowering "mental load".

Fourth, the learning of the students where the teacher noted that it does not necessarily "improve" their learning but, the interest of the children to the tangible multimedia learning exponentially grew, by guiding the students they will be engaged, and not confused of the interactive video. Where in the same finding as Tsong's (2012) study where the children do not increase in learning, but it became more engaging to them. So, it does not prove that it will increase learning, but improve the engagement of the student because of its interactive nature.

Lastly, the recommendation of the platform to other subjects, and pre-school learning. The teacher said that it has a lot of potential to branch into other subjects, especially the subject that has objects in it. The mentor also noted that it has the potential to use in other grade level with different approach, but same idea as tangible multimedia. Overall, it proves that tangible multimedia is effective, and engaging way to teach kindergarten, and has the potential to be considered in other level of the students.

V. Conclusion

Using a qualitative method of studies, the researcher was able to collect data that are effective, and efficient for output. Using aesthetic theories: Tangible User Interface and Emotional Design, it resulted an appropriate approach to the derivable so that it can be interactive, fun, "playable", and attractive as the researcher's target are preschool students. In learning approach, the researcher used the constructivism theory to support the interactivity of the medium, using the said theory helped, and strengthens the aim of the study which is to make it interactive by the used of appropriate design, and graspable object.

After the usage of the said aesthetic theories, the researcher created output that supported by the aesthetic theories of the study. The process of output creation can be summarized into three processes: conceptualizing, shooting (or the production stage), and editing (post-production stage). The medium also included programming to create interactive design, creating program for the buttons, flow of the interactive medium, and finally the object identification program.

After the creation of the output, the researcher tested the output with the Shalom Akademeia of Cavite Inc. pre-school students, and after the demonstration of the medium to test the interactivity, teacher was interviewed after observing the pre-school's learning capacity, and finally, evaluated the medium. The usage of Emotional Design in conducting the evaluation helped the research for further improvement of the tangible multimedia output.

Using case study method, the researcher was able to have in depth study of the medium, and was able to formulate proper recommendation/s for further study of the research.

Through the various applications, and collection of gathered related literature, interviews, observations, and gathered data, the researcher was able to conclude that Interactive Tangible Multimedia caught the attention of the students because of its interactivity, and the use of tangible object to the pre-school. It proves Chong (et. al., 2012) findings that it can boost their "learning process", by not just only seeing or hearing, but also depending on the usage of a graspable object by the pre-school students. Preschool learning process can be also defined as "pre-operational" stage in which the children begin to "engage", and learn to "manipulate" object (Piaget, n.d.). In application, the researcher observed that preschool is into not just "seeing, or "hearing", it is more interesting to them to use tangible objects for a more engaging learning.

Due to the learning capacity of young learners, at the beginning, the preschool students were not really focused on the medium, they needed to have teacher in able to instruct them what will they do. But it is in-line with the theoretical framework's Constructivism Theory (Ulmer, et. al., 1997) because it is based on learning that are based on "experiencing" the object, and with the help of the "more experienced" which is the teacher that tested the medium first. The application of the Tangible Multimedia Learning to Dep-Ed's curriculum "Visual Perception and Discrimination" (2017). Although there are good effects in the research, the results vary depending on the interest of the pre-school students, like the study of Chong (et. al., 2012) the result of tangible multimedia to the students depends on their capacity to load information. But with the help of "kids friendly vibe" of the output, most of them are very interested to the study. With the help of recommendation of Chong's et. al. new study (2018), the research has been localized through the Filipino language, using mother tongue "Tagalog". (DepEd, 2016)

After detailed analysis, we learned that physical artifacts should have design considerations. If tangible objects are used arbitrarily, multimedia objects can disadvantage them, or vice versa. The entire display in TangiLearn (Chong et. al. 2017) could be cluttered. The collection of tangible objects for use in TangiLearn greatly affected the level of enjoyment of the students. The size of the selected tangible objects should be sufficient for pre-school students. If physical items are too large, they not only

obstruct the children's view of the computer screen, but also take up a large portion of the display table space, giving the children a very heavy "filled" feeling. In comparison, big physical items appear to be the children's regular preference.

When tangible objects are too small, however, the sense of holding tangible objects will become weaker. Through observation, the optimal size of tangible objects is the size of the preschooler's hand palms slightly larger, and for consistency all tangible objects should be placed around this scale. Likewise, the table size to show tangible objects should not be too large to ensure that contact points between pre-school students are reachable. If not, visual quest will be affected for the desired tangible objects.

Maximizing means making it aesthetically pleasing, developing an engaging to the pre-school students, and therefore combining qualitative study specifically Case Study, and theories on Tangible Multimedia Learning (The International Journal of Multimedia & Its Applications, 2016), Emotional Design (Heidig et. al., 2015), and Constructivism Theory (Bruner, 1966) creates a result that gives engagement, interest, and fun Tangible Multimedia design to the pre-school students. The preschool students reveal that most of them are motivated in learning using tangible multimedia. This case study sought to uncover the possible role that tangible objects in multimedia learning played in impacting preschoolers' learning performance and level of enjoyment. Despite the technical problems, the overall results of the study were highly positive in terms of the enjoyment, the feasibility and usability of TangiLearn system. And lastly, Multimedia from different fields of study contexts, diverse perspectives, and varying methodological approaches are also given high priority. Consequently, the multimedia community tends to be the perfect platform for putting together all those researchers and educators of different backgrounds to help improve multimedia-based education and thus teaching and learning in general. And utilizing it to various curriculum for pre-school student creates more interesting teaching approach for student's learning.

The following recommendation can be used for further studies:

- The medium's topic is only limited thus, it can be applied to another curriculum that are applicable.

- The research is only limited to kindergarten/pre-school group, it has more potential by applying it on other level of education such as: elementary, high school, senior high school, and college.

- It can be tested in other schools, to test the efficiency, and effectivity of the medium.

- Adding more characters and questions to the platform so that it can maximize its interactivity.

- A wide study, not only limited to a certain group.

- It can be applied to any language, depending on their mother tongue, so that it can be more engaging.

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