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Stop Motion Animation for Preschoolers by Master Teachers

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Abstract

This research was conducted with the following aims: to enable master teachers to develop electronic tales for preschoolers using Stop Motion techniques according to the Early Childhood Imagineering Model (ECIM) process; to evaluate the quality of these electronic tales; to evaluate master teachers' ability to develop these tales; to evaluate the effect of master teachers' transfer of the development of electronic tales to early childhood education (ECE) student teachers; and to evaluate master teachers' satisfaction with their development of these electronic tales. The sample comprised 24 ECE instructors in higher education, who were selected as the master teachers, and 480 ECE student teachers. The findings revealed that the master teachers were able to develop 24 electronic tales for preschoolers using the Stop Motion technique according to the Early Childhood Imagineering Model (ECIM) process. They also indicated that the quality of the electronic tales, master teachers' ability to develop these tales and transfer their development to student teachers, and master teachers' level of satisfaction with the development of these electronic tales, were all at a high level.

Keywords: Stop Motion animation, preschoolers, master teacher, electronic tales

1. Introduction

Preschoolers are kindergarten pupils who, to support quality learning, need substantial care and attention (WHO, 2020) from their parents, relevant people, and educational institutes until the age of 8 (NAEYC, 2018). Early childhood education (ECE) is an important area in both art and science that needs expertise because ECE pupils, or preschoolers, will later become the vital force of the nation. Investment in their development is therefore worthwhile in the long term (Zhou, 2017), especially the promotion of knowledge and skills related to digital technology, the latter of which surrounds these children from birth (Li, 2018). Like students in other fields of study, this means student teachers learning ECE must be trained in the skills for their profession (NAEYC, 2018). Having graduated, these ECE students need to teach preschoolers whose physical, intellectual, social, and psychological readiness should be promoted as a basic part of their education at a higher level (UNICEF, 2020). The development of ECE student teachers therefore needs to be enhanced, especially given that, from birth, teachers are digital natives who acknowledge and learn a great deal from information communication technology (ICT). Therefore, instructional management for these student teachers must be active with respect to the promotion and development of skills in problem solving, communication and cooperation, flexibility and adjustment, initiative and self-control, portfolio, leadership and responsibility, information, media and ICT, as well as skills required by 21st Century learners (Partnership for 21st Century Skills, 2009). This is an inevitably lengthy process. However, with the ICT advancement that surrounds them, these student teachers could develop their portfolios to build these skills through various forms of cognitive engagement with ICT. To do so, their instructional management must proceed in the right direction, with the instructor there to give them guidelines and help.

According to the early childhood Imagineering model (NAEYC, 2018) the development of ECE student teachers begins with the training of ECE university instructors as master teachers who develop electronic tales. The training provides instructors with relevant knowledge and enables them to build up their theoretical and practical abilities to develop electronic tales. They achieve this using the ICT tools available for electronic tale development, which can be applied with preschoolers. The master teachers then transfer their knowledge and ability in developing electronic tales to their ECE students. The students can then independently design and

develop the electronic tales according to their own imagination and initiative, assisted by the advice and comments of master teachers. The electronic tales are then presented to their classmates and the master teachers to share information and generate ideas for improvement. This is followed by a contest to select the tales approved by the master teachers, experts in tales as instructional media for preschoolers, and judging reviewers. The development of electronic tales according to the Imagineering model not only helps student teachers learn through real-life practice; it is an active form of learning in which student teachers can practice doing, presenting, expressing ideas about, and reflecting on the development of electronic tales to the master teachers. This can form part of the guidelines and process to adjust learning and teaching strategies and further reform instructional management for ECE student teachers.

2. Related Literature

2.1 Stop Motion Animation

Instructional media are the media of communication between the teacher, as the sender, and the learner, as the receiver. They help the teacher and the learner: build the same level of understanding according to the objectives of the communication, access the content quickly, and reduce the gap between the teacher and the learner. Because there are a multitude of things that cannot be accurately explained either verbally or in writing, instructional media can align communication with the requirements of the teacher and the learner. There are various forms of instructional media available that can be used for different purposes, such as materials, printed materials, audio materials/transmission, video materials, and real objects as well as models/replicas. However, electronic or digital media have better qualities than the aforementioned media as they are multimedia with which learners can interact to efficiently increase their knowledge, skills, ability, and attitudes (Klaisang, 2018). Electronic media are developed by computers and presented and distributed through computer networks such as the Internet. Animation is a form of electronic media that consists of still pictures that are manually or electronically drawn or photographed more quickly in a series where small differences exist between each particular picture and the previous one (Fedkiw, 2018). It can be formed in two or three dimensions. Animation is famous for its use in video games, cartoons, movies, TV series, and commercials, as well as other presentations. The primary techniques of animation development are Hand Drawing Animation, Stop Motion animation, and Computer Animation, each of which has unique characteristics. However, these techniques can also be combined. For example, having been sketched with a pencil, a character's pictures can be photographed and decorated again before being edited as a complete electronic animation that can be rendered more attractive by adding dubbing, subtitles, songs, letters, and effects (Maselli, 2018). Animation development requires an understanding of each characters' movements and emotions (Shaw, 2008) and therefore can be carried out with unlimited fancy. It can be used to explain a complicated and hard-to-understand matter in a simple way and can also transform an abstract issue into a concrete one, as well as focusing on the important parts and clarifying them more effectively (Farrokhnia, Meulenbroeks, & Joolingen, 2020).

Stop Motion is a form of animation developed using photography. It turns an immobile object into a mobile one through a combination of clay sculpture, paper cutting, and paper folding from a model or a real object (Gao, He, & Shang, 2019). The object is moved and photographed from the beginning to the end of the movement, picture by picture. All the pictures are then put into a sequence, making Stop Motion animation a modern tool for production and publication, akin to a computer, a smartphone, a tablet, the internet, and online social networks.

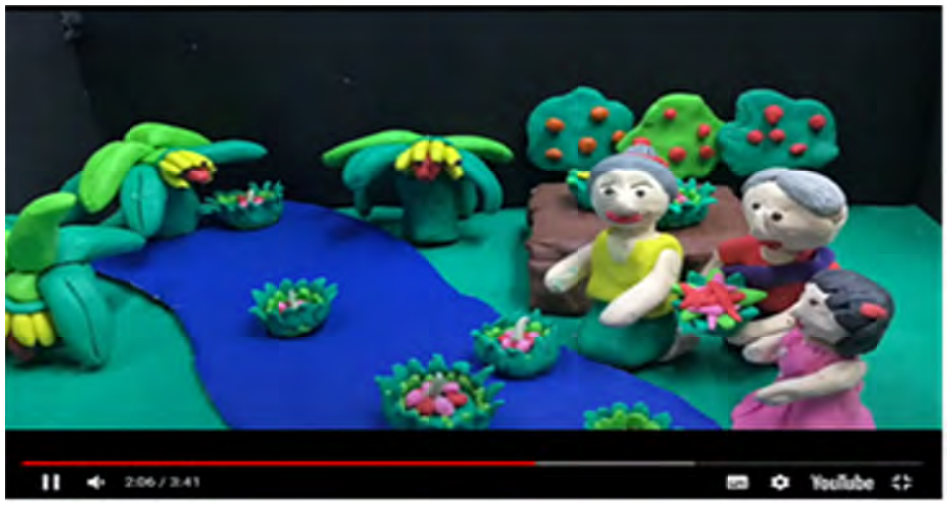

Figure 1. Stop Motion animation scene made with clay sculpture

Figure 2. Stop Motion animation scene made with paper cutting

Stop Motion animation can be developed on both Android and iOS operating systems and has therefore become increasingly popular among smartphone users. This substantially reduces the costs of design and development (Grabuloska et al., 2013). With the capability and advancement of digital technology, Stop Motion animation has become the educational technology employed widely in all levels of instruction (Kahraman, 2015). Digital technology helps teachers and learners develop educational animation to make group work in class and individual work outside the classroom easier and more convenient (Sun, Wang, & Liku, 2017). As both an information-searching source and a learning source, Stop Motion animation is a technique used to make animation simple by taking photos with a smartphone camera and turning all the photos into an animation with the help of a computer program or an application in a smartphone or a tablet. The design and development of Stop Motion animation for learning can therefore be carried out by both teachers and learners. Stop Motion animation tells a story in a digital way that interests and engages learners and makes learning a lot of fun. Learners are therefore eager to learn. It both stimulates learners and challenges their ability, making them want to learn and create their own animation (Farrokhnia et al., 2020). Moreover, learners have been found to be satisfied with this form of instructional management because it allows them to do the activities, figure out ideas, create something, make comments, learn from group members about how to work in a group, learn about the issues and content associated with animation development, and also learn how to use computers and computer programs (Jitsupa et al., 2018). Instructors must first ensure they understand learners. For example, learners who are still young and not very familiar with the digital technology for the design and development of Stop Motion

animation should be taught in a simple and quite straightforward way; whereas learners who are older or better-educated should be taught using more demanding and complicated technology (Melinda, 2011). Either way, learners should be allowed to design and develop the animation they are interested in so they can learn and understand the general concepts of Stop Motion animation. To maintain learner's interest, the initial design and development of animation in each story should not be lengthy as multiple sequential photos are generally required in each scene to tell a story. Having understood the concepts and process associated with animation development using Stop Motion, learners may be taught with longer animation, more special effects, and greater academic demands. Stop Motion animation is also an electronic medium teacher can use as part of their instruction for preschoolers to motivate or inspire learners before starting the lesson. Teachers can utilize additional instructional formats and techniques to improve learners' knowledge, skills, and understanding of technology (Melinda, 2011). Moreover, the media for any course, topic, or issue can be designed and developed using Stop Motion techniques, including English, mathematics, science, social science, health science, art, technology, and media literacy (National Film Board of Canada, 2018).

The design and development of Stop Motion animation for preschoolers is mostly carried out by instructors. Having developed a certain level of expertise, the instructors can transfer their design and development of Stop Motion techniques to their students. The students can then design and develop their own animation according to the early childhood Imagineering steps they have learned. This is an active way for these students to deal with activities in group work or as individuals, depending on the requirements of the course or their instructors. The instructors should study information about the core curriculum of early childhood education issued by the Ministry of Education (2017) so as to meet learners' developmental requirements. Their design and development of media according to the early childhood Imagineering process can be carried out in a simpler and more efficient way as there are clear steps to follow. This provides the teachers with more time to thoroughly think about, imagine, and create Stop Motion media. The use of simple computer programs such as Microsoft PowerPoint and Windows Movie Maker—installed on most computers—to design and develop Stop Motion media means teachers do not waste time learning complicated computer programs. Furthermore, to engage learners' attention, additional sounds such as dubbing, music, and other sound effects should be added. These are available free of charge on most websites. Alternatively, teachers can also make sounds using the microphone on their smartphones. Several educational academics have studied and developed Stop Motion animation to apply with their learners. For instance, Deaton et al. (2013) studied how to make Stop Motion with iPads to promote students' understanding of the functional process of cells. They found that this promoted students' learning about science, cooperation, and information retrieval for instant access to online resources. Moreover, the students believed that Stop Motion promoted their understanding and learning of the lesson content and increased their learning outcomes by 58.53%. Shepherd, Hoban and Dixon (2013) studied the use of Stop Motion animation with slow-motion to develop the interpersonal skills of four primary pupils with an intellectual disability. They found that the pupils could use Stop Motion techniques to develop their own electronic social tale. Kamp and Deaton (2013) studied mitosis through moving pictures using Stop Motion animation and found that collaborative learning using such techniques brought more happiness and fun to learning than traditional methods; and that the video clip with moving pictures led to a better understanding of cell division. Hoban and Nielsen (2014) studied the development of dubbing with Stop Motion animation using moving pictures to explain scientific concepts to primary teachers about the positions of the moon while orbiting the Earth. The findings revealed that the teachers needed to understand scientific concepts to explain their own work (with a model), examine the information, and exchange personal experiences.

2.2 Stop Motion Animation and Preschoolers

Preschoolers or kindergartners are children from birth through to age 8 who have the right to be taken care of, developed, and encouraged through appropriate forms of learning that involve positive interactions with their parents, teachers, caregivers, or others who are knowledgeable and capable of caring for, developing, and educating them. This will help them develop, at their own rate and potential, their thinking skills, communication skills, their intellect, and acquire knowledge appropriate for their age. These aims accord with Standard 9 on meaningful language communication within appropriate age standards, Standard 10 on the development of thinking skills for basic learning, Standard 11 on imagination or creative thinking, and Standard 12 on positive attitudes towards learning and ability to search for knowledge. Children at this age can acknowledge and express ideas and feelings through media, objects, toys, and work piece/products, therefore the management of their learning experience should focus on their interactions with various media and learning resources in order to combine their ECE learning with Prathom 1 learning. This is because education for preschoolers is significant in the educational system and preliminary to life-long learning (Wang, Sun, & Li, 2019). In particular, preschoolers

should gain experience in using information technology as part of learning through activities. Wang, Sun and Li (2019) demonstrated their achievement in applying computer multimedia technology and internet technology (IT) with instructional management. Preradovic, Lesin and Boras (2016) also found that preschoolers who learned through IT with digital storytelling development gained a better understanding of mathematics and computer science than preschoolers who learned through traditional storytelling. This aligned with Cheng and Chuang (2019), who discovered that digital storytelling, which combined digital technology with storytelling techniques, could increase students' ability to investigate and link ideas in the development of early childhood Imagineering in science as well as develop their skills in communication and collaborative work (O'Byrne, Stone, & White, 2018; Sun et al., 2017). This resulted in learners becoming eager to read tales, with or without the teacher to support them (Prasetya & Hirashima, 2018). Although a study by Gjelaj et al. (2020) reported that teachers and parents insisted preschoolers learn through play rather than technology, the integration of play into digital technology should nevertheless be useful to preschoolers.

Stop Motion animation is a form of storytelling that is renowned for arranging activities for classroom learners (Grant, 2009). Animation refers to an animated form of real-life objects created by frame-by-frame shooting using photographic techniques (Gao et al., 2019). It can be designed and developed easily with the digital technology most learners have to hand, such as computers, smartphones, tablets, applications, and online networks. This means learners have a chance to easily engage in the creative thinking, imagination, design, and development of Stop Motion animation using the skills they possess, such as clay modeling, drawing, and photography. This helps learners to move their bodies and develop and present abstract or complicated concepts in the form of concrete entities that are more easily understood and clearly seen (Melinda, 2011), with the teacher as their coach or mentor to give advice and help when they need it. This promotes active learning as they are given the opportunity to learn the contents and practice by themselves. If the lesson content is changed into a classroom activity using Stop Motion animation, learners can learn to work in groups, communicate with others, and share their knowledge. Such skills are necessary for 21st Century learners and enable them to learn and play with fun while applying their creativity to the development of their own animation (Gao, He, & Shang, 2019; Palaiologou & Tsampra, 2018; Tse, Chan, & Chu, 2020; National Film Board of Canada, 2018; Li, 2018; Kervin & Mantei, 2016; Jaafar, Ramli, & Fauzi, 2013; Grabuloska et al, 2013; Kamp & Deaton, 2013; Melinda, 2011).

However, before learners engage in active learning using their developed Stop Motion animation, the teacher first needs to learn and understand the process and steps involved in designing and developing Stop Motion animation. The teacher can then efficiently transfer the knowledge to preschoolers because it is their direct experience that teachers can learn and transform into knowledge, skills and behavior important for instructional management. They achieve this by giving help and advice, co-learning with and learning from preschoolers, and planning and preparing appropriately for learning activities (Melinda, 2011; Jitsupa et al., 2018) to achieve the goals that have been set.

2.3 Process of Developing Electronic Tale for Preschoolers Using Stop Motion Techniques

The process of designing and developing electronic tale for preschoolers using Stop Motion techniques consists of the following steps: leading-to-learn, active learning, opinion sharing, and reflective thinking, as depicted in the Early Childhood Imagineering Model (ECIM) (Jitsupa et al., 2018, 2021) presented in Figure 3.

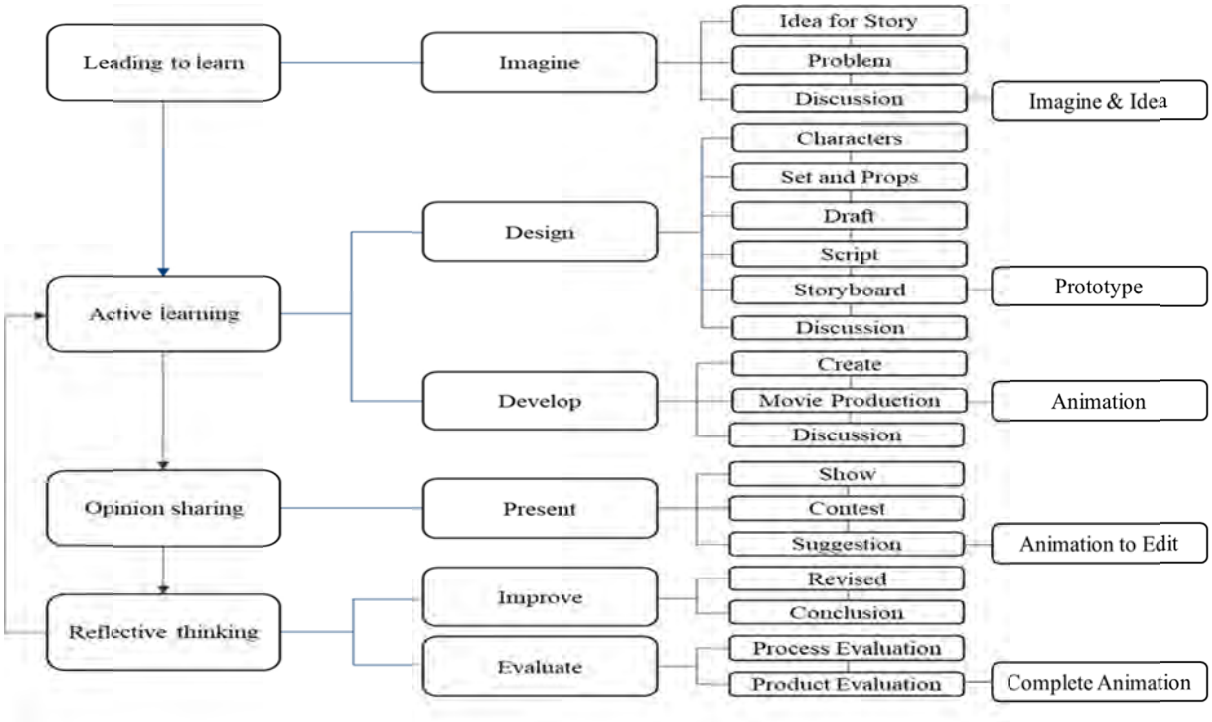

Figure 3. Process of developing electronic tale for preschoolers using Stop Motion techniques according to the Early Childhood Imagineering Model (ECIM) (Jitsupa et al., 2021)

3. Objective of Research

To develop master teachers' ability to invent electronic tales for preschoolers, using Stop Motion animation according to the Early Childhood Imagineering Model (ECIM) process, to evaluate the quality of electronic tales for preschoolers developed by the master teachers, to evaluate master teachers' ability to develop electronic tales for preschoolers, to evaluate the effect of transferring the development of electronic tales for preschoolers to ECE students, and to evaluate master teachers' satisfaction with the development of the electronic tales for preschoolers.

4. Scope of Research

The sample in this study comprised two groups: 1) 24 ECE instructors in higher education, who teach ECE students in public universities under the supervision of the Ministry of Higher Education, Science, Research and Innovation, applied for and were selected to join the workshop as master teachers; and 2) 480 ECE student teachers in public universities under the supervision of the Ministry of Higher Education, Science, Research and Innovation, to whom the development of electronic tales for preschoolers was transferred in a workshop on the use of Stop Motion animation according to the Early Childhood Imagineering Model (ECIM). These student teachers were selected from those registering on ECE courses with the master teachers. The variables comprised the independent variable, training in electronic tale development for preschoolers; and the dependent variables, namely master teachers' ability, the quality of the electronic tales, the effect of the transfer of electronic tale development, and master teachers' satisfaction with the development of electronic tales for preschoolers.

5. Methodology

The development of master teachers so that they can develop electronic tales for preschoolers using Stop Motion techniques according to the Early Childhood Imagineering Model (ECIM) was divided into the following 2 phases.

Phase 1: This phase was divided into the following steps.

1) The curriculum and supplementary materials for the training were prepared and the trainers were selected. A call was made for ECE university instructors to apply for this project and be selected as master teachers to develop electronic tales. Overall, 24 instructors were selected and took the pre-test prior to training.

2) The master teachers were trained for 30 hours as follows.

2.1 Leading-to-learn Step: This was conducted through the activity of telling tales and stories to draw master teachers' attention to the requirement of developing electronic tales for preschoolers. The teachers were asked to use their imagination (= Imagine) to write or draw electronic tales on paper (= Problem). Each teacher presented his/her work for discussion (= Discussion) and analyzed how feasible their idea was (= Feasibility) for development into an electronic tale. The output in this part comprised information in the form of comments or advice about the writing or the drawing.

2.2 Active Learning Step: The master teachers practiced applying the outcome from the Leading-to-learn Step to the design of characters, setting, and props for their electronic tales using Stop Motion techniques by making a draft, script, a story board and prototype, respectively using the Microsoft PowerPoint program. Each master teacher then presented the prototype of their electronic tale to the class for discussion, review, and revision. This resulted in a complete story board and prototype for each electronic tale that was ready to be developed using a computer program (= Develop) for preschoolers (= Create). The electronic tales were then tested in terms of functions (= Test). The master teachers presented their electronic tales to the class once more for discussion, review, and revision (= Discussion). The output in this part was the complete version of the electronic tales.

2.3 Opinion Sharing Step: The master teachers presented their electronic tales (= Present) to the reviewers (= Show), who then reviewed the tales (= Contest), shared information, and made suggestions (= Suggestion). The output in this part was the summary of suggestions for revising the electronic tales for preschoolers.

2.4 Reflective Thinking Step: The electronic tales for preschoolers were then adjusted (= Improvement) according to the summary of suggestions until they were completely revised (Revised). The development of electronic tales for preschoolers was then summarized (= Conclusion). The output in this part was the finalized version of the electronic tales for preschoolers. The development of electronic tales for preschoolers at all levels was then evaluated (= Evaluate) in terms of operational process (= Process Evaluation) across all steps and in terms of quality by the reviewers (= Product Evaluation) before generating a complete version of the electronic tales.

3) The quality of the electronic tales for preschoolers using Stop Motion techniques was then evaluated.

4) The master teachers' ability to develop electronic tales for preschoolers using Stop Motion techniques was then evaluated.

5) Finally, the master teachers' satisfaction with the development of electronic tales for preschoolers using Stop Motion techniques was evaluated.

Phase 2: The master teachers transferred the development of electronic tales for preschoolers to the 480 ECE student teachers using the Stop Motion technique according to the Early Childhood Imagineering Model (ECIM) process. After that the student teachers evaluated the master teachers' ability to transfer the development of electronic tales for preschoolers.

6. Data Collection

There was an opening for 36 ECE Instructors in higher education to apply for the training; 24 of whom were selected to join the training as master teachers. The master teachers completed the pre-test, which evaluated their ability to develop electronic tales for preschoolers using Stop Motion animation according to the Early Childhood Imagineering Model (ECIM) process. The master teachers were then trained to develop electronic tales for preschoolers using Stop Motion animation. The quality of the electronic tales for preschoolers was evaluated. The master teachers' ability to develop electronic tales for preschoolers was evaluated after the training. The master teachers completed a post-test after training to evaluate their ability to develop electronic tales for preschoolers using Stop Motion animation. The master teachers transferred the development of electronic tales for preschoolers to the 480 ECE student teachers. The student teachers evaluated the master teachers' ability to transfer the development of electronic tales for preschoolers. The master teachers evaluated their satisfaction with the development of electronic tales for preschoolers.

7. Results

General Information about Master Teachers as presented in Table 1.

Table 1. General information about master teachers

General Information about Master Teachers	Number	Percent **(%)**
Genders		
Male	4	16.66
Female	20	83.34
Ages		
20–30 years	4	16.66
31–40 years	16	83.34
41–50 years	4	16.66
Levels of Education		
Master's Degree	22	91.67
Doctoral' s Degree	2	8.33
Teaching Experience		
1–5 years	3	12.50
6–10 years	10	41.66
11–15 years	8	33.34
16–20 years	3	12.50
Academic Titles		
Instructors	23	95.83
Assistant Professor	1	4.17
Total	**24**	**100.00**

The master teachers' achievement in developing the electronic tales for preschoolers after training was higher than before the training (at a significance level of .01), as presented in Table 2. The master teachers were able to develop 24 electronic tales for preschoolers using Stop Motion techniques according to the Early Childhood Imagineering Model (ECIM) process. The evaluation of the electronic tales for preschoolers was found to be at a high level, as presented in Table 3. The overall result of master teachers' ability to develop electronic tales for preschoolers was at a high level, with an overall mean and standard deviation of 3.81 and 0.74, respectively, as presented in Table 4. Master teachers' satisfaction with electronic tale development for preschoolers was found to be at a high level, with an overall mean and standard deviation of 3.59 and 0.59, respectively, as presented in Table 5. And master teachers' transfer of electronic tale development for preschoolers was found to be at a high level, with an overall mean and standard deviation of 3.69 and 0.70, respectively, as presented in Table 6.

Table 2. Master Teachers' Achievement in Developing Electronic Tales for Preschoolers

Groups	**Master Teachers' Achievement**					
	Before Training		**After Training**		**t**	**P-value**
	Mean	S.D.	Mean	S.D.	16.54	.000**
Master Teachers	12.50	0.93	16.54	0.98		

Note. ** P < .01.

Table 3. Quality evaluation of electronic tales for preschoolers

Quality Evaluation Issues for 24 Electronic Tales	**Evaluation Result**		**Level of Quality**
	Mean	S.D.	
Concepts for development of the Stop Motion animation outline	3.56	0.50	Good
Development of storyboard	3.04	0.59	Good
Development of characters	2.96	0.52	Good
Development of setting and props	2.95	0.56	Good
Design	2.99	0.46	Good
Development of Stop Motion animation	2.91	0.50	Good
Creativity	3.07	0.38	Good
Presentation	3.29	0.59	Very Good
Total	**3.10**	**0.55**	**Good**

Table 4. Master teachers' ability to develop electronic tales for preschoolers

Issues in the Evaluation of Master Teachers' Ability	**Evaluation Result**		**Level of Ability**
	Mean	S.D.	
Leading-to-Learn Step	3.94	0.76	High
Active-Learning Step	3.74	0.72	High
Opinion-Sharing Step	3.72	0.71	High
Reflective-Thinking Step	3.76	0.70	High
Total	**3.81**	**0.74**	**High**

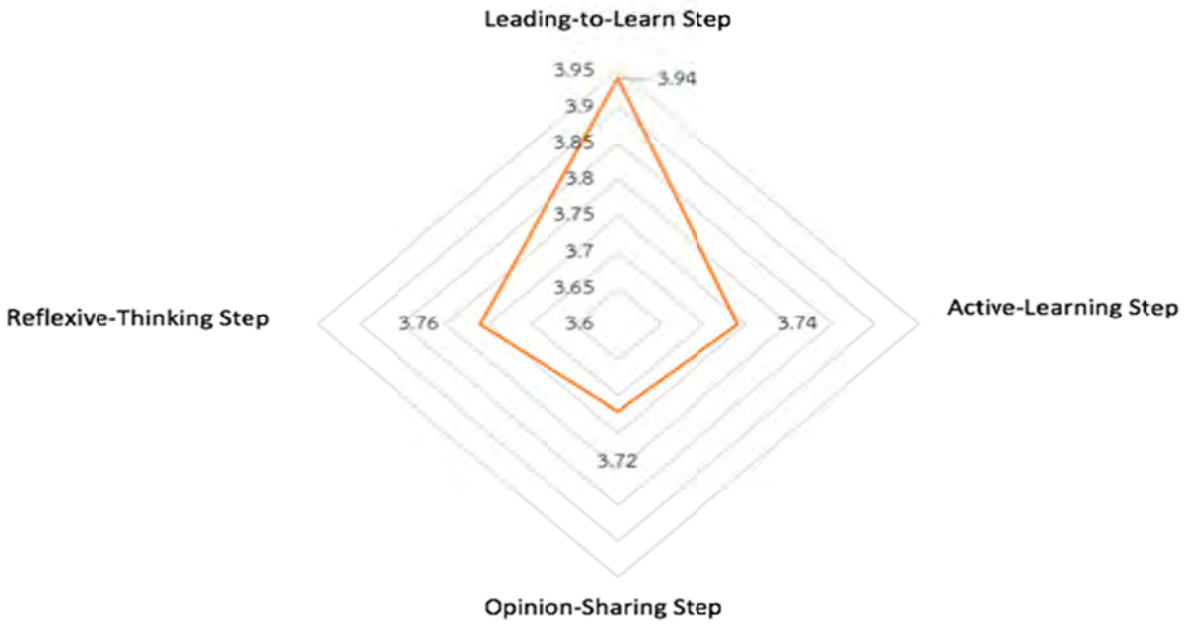

Figure 4. Master teachers' ability to develop electronic tales for preschoolers

Table 5. Overall evaluation of master teachers' ability to develop electronic tales for preschoolers

Issues in the Evaluation of Master Teachers' Satisfaction	Evaluation Result		Level of Satisfaction
	Mean	S.D.	
Leading-to-Learn Step	3.63	0.56	High
Active-Learning Step	3.56	0.59	High
Opinion-Sharing Step	3.56	0.63	High
Reflective-Thinking Step	3.61	0.64	High
Total	**3.59**	**0.59**	**High**

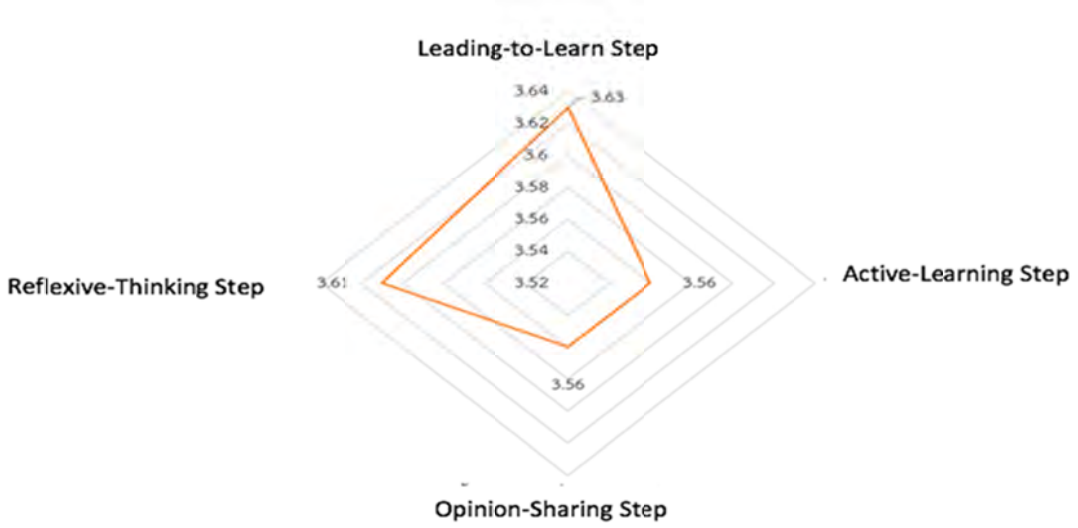

Figure 5. Master teachers' satisfaction with developing electronic tales for preschoolers

Table 6. Evaluation of master teachers' transfer of electronic tales for preschoolers

Issues in the Evaluation of Master Teachers' Transfer	Evaluation Result		Level of Transfer
	Mean	S.D.	
Leading-to-Learn Step	3.59	0.65	High
Active-Learning Step	3.62	0.67	High
Opinion-Sharing Step	3.90	0.74	High
Reflective-Thinking Step	3.85	0.75	High
Total	**3.68**	**0.70**	**High**

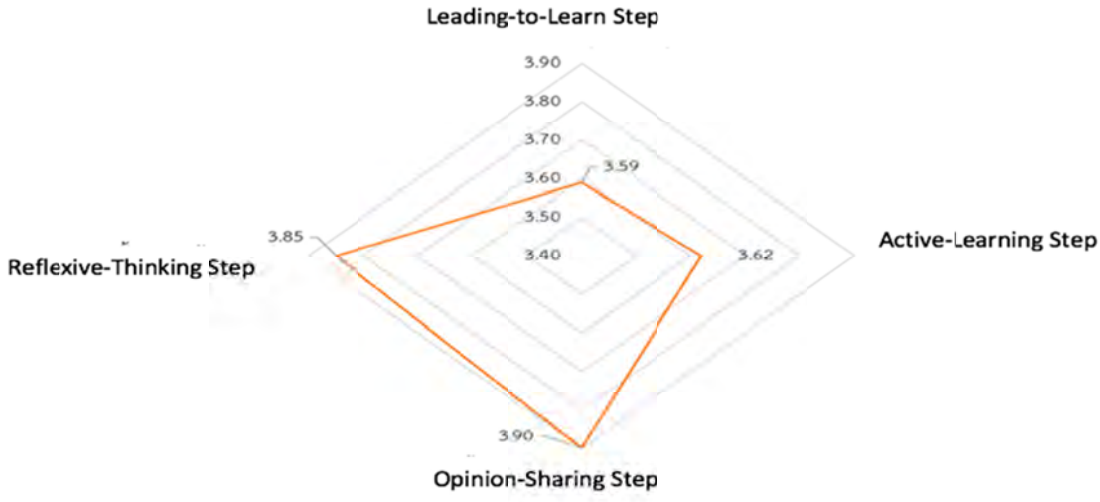

Figure 6. Overall evaluation of master teachers' transfer of electronic tales for preschoolers

8. Conclusion and Discussions

The master teachers had not previously had to learn how to design or develop electronic tale using Stop Motion animation. Nevertheless, they were able to develop electronic tales for preschoolers using Stop Motion animation according to the Early Childhood Imagineering Model (ECIM) process. According to the overall evaluation results, all electronic tales for preschoolers met the evaluation criteria of quality at a high level. This aligns with a study by the National Film Board of Canada (2018), which revealed that master teachers could develop electronic tales with Stop Motion animation for preschoolers. The major factors that enabled master teachers to successfully invent the electronic tales were the steps and process of the Early Childhood Imagineering Model (ECIM). This enabled them to develop electronic tale for preschoolers that were accurate and appropriate and systematically separated major and minor components. Furthermore, the master teachers were able to transfer the technique involved in developing electronic tales for preschoolers using Stop Motion animation to their fellow teachers or student teachers. Each master teacher was assigned to transfer the development of these electronic tales for preschoolers to 20 ECE student teachers. Overall, 480 student teachers evaluated the transfer. The data indicated that the master teachers should not only design and develop the electronic tales for preschoolers but also transfer the technique of how to develop these electronic tales to others.

However, some areas of evaluation were found to be at middle levels. First, in the warm-up/leading-to-learn step, the arrangement of activities to stimulate attention and passion for learning and the management of questions for imagining the tales for preschoolers differed from other areas of evaluation of master teachers' ability and satisfaction, which were all considered to be at a high level. Second, in the active-learning step, the design of characters, setting and props, making drafts and scripts for developing electronic tales, and presentation of electronic prototype tales also generated middle level results that differed from the high-level results for other areas of evaluation. Because these 24 master teachers were not experienced in designing and developing electronic tales for preschoolers with Stop Motion animation according to the Early Childhood Imagineering Model (ECIM) process, they might need some time to learn and practice this. However, the overall results of student teachers' evaluation of master teachers after the transfer of development of electronic tales for preschoolers using Stop Motion animation was at a high level. This revealed that all master teachers could successfully design, develop, and transfer the development of electronic tales for preschoolers to their fellow teachers and student teachers. Indeed, Dechakoopt and Yindeesook (Dechakoopt & Yindeesook, 2018) stated that one of the ways to enable instructors to develop their learners' skills was to enhance their own skills in inventing and applying learning innovation in classrooms.

The master teachers' satisfaction with their training in the development of electronic tales for preschoolers using Stop Motion animation was at a high level. Their satisfaction with the warm-up/leading-to-learn step was higher than for the other three steps. This probably resulted from the fact that this step consisted of activities that the master teachers, who were full-time lecturers in ECE, were familiar with and were used to providing their students with such activities. These activities involved the stimulation of learners' interest and passion, concepts and imagination for developing creative tales, writing or drawing concepts and imagination for the development of tales, presentation of concepts and imagination to develop tales, and responses to questions and ideas about the concepts and imagination related to this development. These activities also helped the master teachers have fun and practice thinking to create animation work. They were also more relaxed as they could join in and do the activities, make comments, use their knowledge, and be stimulated to write about or draw and present concepts and ideas from imagination as the outline of the tale (Farrokhnia, Meulenbroeks, & Joolingen, 2020; Melinda, 2011; Tse et al., 2020; Tse, Chan, & Chu, 2020; Jitsupa et al., 2018). In addition, these activities also involved the unlimited use of imagination (Kahraman, 2015). Thus, the design and development of Stop Motion animation was something instructors and learners could develop that interested learners and transformed learning into an activity filled with fun and excitement. This could stimulate learners while also challenging their ability to learn and develop their own animation (Kahraman, 2015).

Acknowledgments

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