The Development of an Artificial Intelligence Artist Assistant (AIAA) Model for the Purpose of Innovative Digital Storytelling in Digital Art Education

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Abstract – **The objective of this research is 1) to develop an Artificial Intelligence Artist Assistant (AIAA) model for the purpose of innovative digital storytelling in digital art education, 2) to evaluate the AIAA model, and 3) to study the results of the implemented model. The sample consists of two groups. The first group is made up of five experts in the field of AI, digital art, and storytelling, while the second group consists of 33 volunteers; they were tasked with creating animated storytelling. The research results show that the developed model consists of 3 elements. The first element is input, the second element is the AIAA process, and the third element is output. The five experts awarded the AIAA model the highest level of satisfaction ($\bar{x}$ = 4.93, S.D. = 0.13), suitable for promoting storytelling. In addition, the 33 volunteers who tested the model awarded it a high level of satisfaction ($\bar{x}$ = 3.78, S.D. = 0.83), that such AIAA model can help artists create better storytelling and enhance the storytelling process, in terms of speed of the process and details that enhance the story.**

Keywords –**Artificial intelligence, AI, innovative, digital storytelling, digital art, education.**

1. Introduction

Currently, the technology that has the greatest impact on human work is AI, because it has replaced human work in many areas. The technology can also engage in advanced analytical thinking faster than humans. AI is therefore an important technology for the 21st century that will change the world, human work, and life [1], [2]. In addition, it has had a huge impact on the digital art world. AI involves the use of machines that have functions with the ability to understand and learn from various aspects of knowledge [3], [4] such as perception, learning, reasoning, and solving problems [5]. Machines with these capabilities are considered essential for the development of AI [6]. Technology increased the capabilities of machines and computers [7], with algorithms and statistical tools being developed to create intelligent software that can imitate complex human abilities such as remembering, discriminating, reasoning, deciding, predicting, and communicating with humans. In some cases, this technology may develop to the point of being able to learn by itself [8]. A feature of AI that is popularly used today is the text to image feature which transform letters and words into images [9], [10]. AI can help humans in many tasks, such as providing data for research, visualization, storyboarding, sound design, and dubbing [11], [12], [13]. In this way it can directly affect the digital art education.

Text to image is a capability of AI to create images from words, sentences, or text [14]. The words used to create the images are called prompts, even if the same prompts are used, AI will always create different images. Images can range from realistic, to cartoonish, to abstract. Based on the text that it uses, the AI model uses natural language processing (NLP) [15] algorithms to understand the textual data and create images based on it. Processing depends on how large the image database is.

If there is a database containing many images, the algorithm will generate pictures in many different styles. In addition, there is "model training" to teach AI, which will allow the AI to learn and create better images [16]. There are many AI - text to image platforms available today which have become popular in businesses that require images to communicate a particular message. These include content creators, as well as users in the art world, especially in the case of digital art. Traditionally, artists required a long time to learn how to draw and use advanced skills, but AI text to image generation is much faster. AI text to image can quickly create complex images in seconds [17]. This has greatly affected the digital art creation system. AI text to image production still has problems [18] and there tend to be errors in the creation of image details [19]. For example, hands, arms, legs, and eyes tend to be distorted when compared with the actual characteristics of the human body. However, AI text to image can be used to create images following specific guidelines or as a framework for images for artists to use to create further works [20]. AI text to image has also developed rapidly and can create increasingly realistic images quickly. It is worth watching whether or not AI text to image in the future will be able to create images that are as perfect as those produced by humans. Therefore, AI-generated images have different details and affect the visual storytelling. Images created with different prompts or styles lead to different stories, both emotional and meaningful.

Digital storytelling is the use of storytelling through digital media. There are many formats including still and moving images, sound, animation, movies, and many more. A good story makes the audience interested and means that they are able to understand the content of the story better. An interesting story can make the audience feel moved by its content. Digital storytelling has been widely applied to convey such content. It can also be used in teaching and learning. Digital storytelling promotes learner motivation and helps teachers create a constructivist learning environment. It also serves as a starting point for thought, reflection, and insight. Researching, creating, and presenting can be carried out through digital media, with researchers synthesizing guidelines for developing learning process models according to critical inquiry and digital storytelling processes. In this way they can upgrade the digital literacy of undergraduate students [21].

The digital storytelling process is divided into 3 phases. The first phase consists of "Getting the Idea", starting with planning, then determining the viewpoint and research for data.

The second phase involves "Creating a Story". This begins with writing a script, creating a storyboard, design sound or music and start production process. The third phase is "Publishing the Digital Story". This is done following revision or improvement leading to assessment, displaying the work or sharing it, followed by reflection and feedback [22]. Creating a good story involves many elements such as characters, story line, synopsis, theme, sound effects, and scene details. The aim is to make the audience believe in the story. Therefore, creating a good story requires many skills [21]. In practice, AI is one of the tools that can be used to create a good story [23], [24].

With regard to innovation related to new products and services arising from using knowledge and creativity, there are 3 elements relating to innovation: 1) Originality. This refers to new products or services that have been developed. These can be developed from previous versions or can be redeveloped. 2) Economic or social benefits. These refer to economic or creative interests that may allow some commercial success. There is innovation leading to the creation of additional value as a result of developing new things. The benefits you will receive can be measured directly in financial or social terms. 3) Knowledge and creativity [25], [26].

The researcher is interested in using AI to help artists to create innovative digital storytelling media. Without doubt AI offers important processes with regard to helping create digital storytelling.

2. Objectives

This research aims to develop the AIAA model so that artists can use AI as an assistant to create better, more convenient, and faster digital storytelling as an innovation in digital art education.

3. Research Scope

For evaluation purposes, the sample consists of five experts in the field of AI, digital art, and storytelling, each of whom has more than 10 years' experience as a university lecturer, holding a doctoral degree and at least an assistant professor in related field. They were selected using the purposive sampling method. For implementing the process, the sample consisted of 33 volunteers who were interested in digital storytelling. The tools of this research consist of the developed model, a questionnaire, and mean and standard deviation with regard to the data.

4. Research Framework

The research framework starting with the independent variables, were AI, Digital Storytelling, Innovation, and Digital Art Education.

The dependent variable was the artificial intelligence artist assistant (AIAA) model for the purpose of innovative digital storytelling in digital art education (Figure 1).
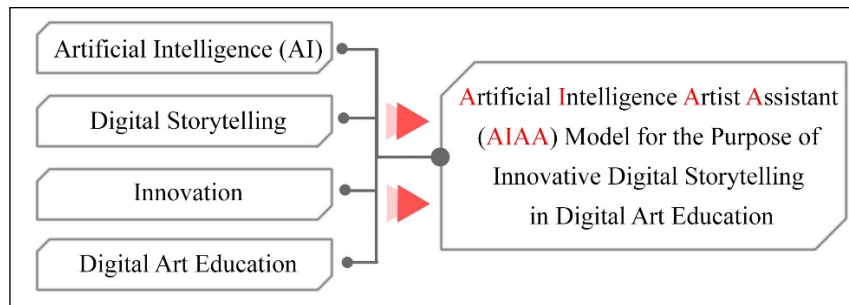

Figure 1. Research framework

5. Methodology

The research was carried out in two phases:

Phase 1 involved developing the artificial intelligence artist assistant (AIAA) model for the purpose of digital storytelling in digital art education by the following steps: 1) study theory and related research. Analyse and synthesize the findings to obtain the structure of the model; 2) design and develop the model according to the studied structure. This will involve studying how AI can help artists in terms of which step is most appropriate; 3) create a tool to measure results. This involved 2 groups:

The first group consisted of 5 experts who assessed the use of a Likert scale in terms of its suitability.

The second group was a sample of 33 students. The Likert scale was used to measure their opinions after using the model. The data was analysed using mean and standard deviation.

The criteria are:
4.21 - 5.00 means highest.
3.41 - 4.20 means high.
2.61 - 3.40 means medium.
1.81 - 2.60 means low.
1.00 - 1.80 means lowest.

Phase 2 involved evaluating the appropriateness of the model by 5 experts. The model was then developed based on the experts' recommendations, and presented as an improved model.

Phase 3 involved implementing the improved model using a sample of 33 students, selected from volunteers aged between 17 and 30 years who were interested in digital art and are currently studying at university for digital arts major. The sample group shared a number of basic components in terms of inspiration and digital literacy skills, which is the input factor in the first component.

The second component is the use of AI to help artists engage in digital storytelling. In this step, the students were asked to create a digital story through an AIAA process: Getting the idea (plan, determine and research or explore), creating a story (script, storyboard, sound and production), publishing the digital story (revision, assessment, sharing and reflection). AI can help with regard to certain steps. These include: AI for research - using AI such as chat GPT to help find information quickly and comprehensively. AI for script writing - using AI such as chat GPT to help write scripts. AI for storyboarding - using AI such as chat GPT, Bing, and Mid Journey to help draw a storyboard. AI for creating a sound or music - using AI such as AI voice generator website to create an AI voice to help create sound effects, a sound environment or a music background. As for the other steps, the artist will customize it himself because it is the part of the process that requires the artist's thinking to maintain the uniqueness of the work. In this context, the use of the artist's ability is an important aspect of creating digital stories. With the process of creating digital stories using AI to help, this can be thought of as a digital storytelling innovation. The third component is digital storytelling innovation evaluation. In this step, the digital storytelling process involved using AI as a creative assistant, but still maintaining the artist as the originator of the main idea and as the director. The key point is that the artist will be the main actor in terms of producing the digital story, with AI helping as an assistant. AI will help the students by saving time in terms of research, accessing more data, and quickly producing a picture for storyboarding, and saving time and offering more choice when it comes to sound selecting. All of these aspects are beneficial when using AI as an artist's assistant.

6. Research Results

The research results are presented in 3 parts. The first part relates to the development of the AIAA model, starting from a study of the related research and then synthesising the process of digital storytelling creation.

From studying the research related to AI and digital storytelling there appears to be three main processes associated with creating digital stories. These are getting the idea, creating the story, and publishing the digital story. In addition, there are minor processes associated with each main process.

These are as follows: planning, determining, researching or exploring, script writing, storyboarding, sound production, production, revision, assessment, sharing, and reflection. The process is based on the digital storytelling process [22].

The researcher then studied the international research to see what steps can be taken to use AI to help the process. The results of the study found that there were 6 studies showing that AI can be used to help create digital storytelling with regard to the various stages - research, script, storyboard, sound, and storytelling. The details are presented in Table 1.

Table 1. The synthetic of AI assistant stages

AI Assistant Stages	[23]	[24]	[27]	[10]	[28]	[29]
AI for Research	/		/	/	/	/
AI for Script Writing	/	/	/	/		/
AI for Storyboarding	/		/	/	/	
AI for Sound Creation	/		/	/		
AI for Storytelling	/	/	/	/	/	/

From Table 1 it can be seen that AI can help in researching scripting, storyboarding, sound production, and storytelling. The researcher then applied the findings to the AIAA model.

The AIAA model consists of 3 components. Component 1 is input involving inspiration and digital storytelling skill. The artist needs to have their own inspiration and digital storytelling skills to start the digital storytelling project. Component 2 is the AIAA process which involves 11 minor steps. However, some of these steps will involve using AI as an artist's assistant.

For the process, it consists of 3 main types. - getting the idea, creating the story, and publishing the digital story. This in turn is divided into 11 minor steps: planning, determining, undertake AI research or exploring, AI script, AI storyboard, AI sound, production, revision, assessment, sharing and reflection. Component 3 relates to output which is digital storytelling innovation evaluation. The artist evaluates the AIAA process that can help him when it comes to creating the digital story in terms of it being interesting, easily understood, original, providing economic or social benefit, and incorporating knowledge or creativity. The AIAA model is as shown in Figure 2.
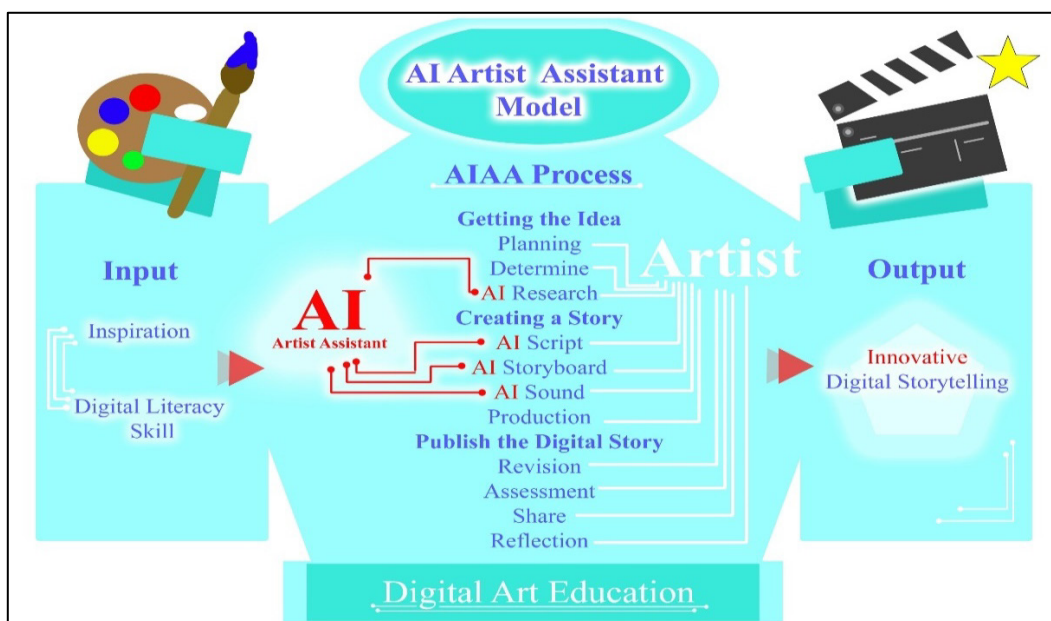

Figure 2. Artificial intelligence artist assistant (AIAA) model for the purpose of innovative digital storytelling in digital art education

Part 2 of the research results relate to determination of suitability by 5 experts, each of whom have more than 10 years' experience of university lecturing in the field of AI, digital art and storytelling, and has an academic position not lower than assistant professor and graduated with a Ph.D. They were selected by using the purposive sampling method. Five Likert rating scales were used. The results show that, in their opinion, the suitability of the AIAA model was at the highest level of appropriateness ($\bar{x}$ = 4.93, S.D. = 0.13). Specifically, component one input was at the highest level ($\bar{x}$= 4.90, S.D. = 0.22), component 2 input was at the highest level ($\bar{x}$ = 4.93, S.D. = 0.13), while the component 3 output was at the highest level ($\bar{x}$= 5.00, S.D. = 0.00). The additional advice from the expert is carefully using AI because this can cause copyright infringement.

Details are provided in Table 2.

Table 2. Results from 5 experts

Components	($\bar{x}$)	(S.D.)	Satisfaction
1. Input			
1.1 Inspiration	4.80	0.45	Highest
1.2 Digital Literacy Skill	5.00	0.00	Highest
Sum of Component 1	4.90	0.22	Highest
2. AIAA Process			
2.1 Planning	5.00	0.00	Highest
2.2 Determining	5.00	0.00	Highest
2.3 AI Research	4.80	0.45	Highest
2.4 AI Script	4.60	0.55	Highest
2.5 AI Storyboard	5.00	0.00	Highest
2.6 AI Sound	4.80	0.45	Highest
2.7 Production	5.00	0.00	Highest
2.8 Revision	5.00	0.00	Highest
2.9 Assessment	5.00	0.00	Highest
2.10 Share	5.00	0.00	Highest
2.11 Reflection	5.00	0.00	Highest
Sum of Component 2	4.93	0.13	Highest
3. Output			
3.1 Innovative Digital Storytelling	5.00	0.00	Highest
Sum of Component 3	5.00	0.00	Highest
Sum All	4.93	0.13	Highest

The research result with regard to part 3 related to the 33 volunteers who were interested in digital art, cartoons, animation, digital storytelling, and technology that promote the creation of art such as computer art application and AI technology.

They were aged between 17 and 30 years of age, and were students in the digital art field. The tool used was a five level Likert rating scale. The learning process was one of creating a digital story in the form of a personal 3d animation project, using the AIAA model.

The volunteers had basic skills in digital literacy and were inspired to create their own digital storytelling project. They used the AIAA process to develop the project such as using Chat GPT for researching the information and using an AI text-to-image generator website to create pictures for the storyboard. After they had completed the digital storytelling process via the use of a 3d animation project, they undertook an evaluation. In order to evaluate the digital storytelling innovation, the questions were, compared with a traditional approach: Is the digital storytelling project using AI more interesting? Is the digital storytelling project using AI easier to understand? Is the digital storytelling project using AI more original? Does the digital storytelling project using AI have more economic or social benefits such as saving time to produce? Can digital storytelling using AI increase knowledge and creativity? The results are shown in Table 3.

Table 3. Innovative digital storytelling evaluation from 33 volunteers

Questions	($\bar{x}$)	(S.D.)	Satisfaction
Is the digital storytelling project using AI more interesting?	4.15	0.79	High
Is the digital storytelling project using AI easier to understand?	3.42	0.87	High
Is the digital storytelling project using AI more original?	3.06	0.93	Medium
Does the digital storytelling project using AI have more economic or social benefits such as saving time to produce?	4.45	0.56	Highest
Can digital storytelling using AI increase knowledge and creativity?	3.82	0.98	High
Sum All	3.78	0.83	High

From Table 3 the evaluation of the digital storytelling innovation shows that the 33 volunteers agreed that the AIAA model can create digital stories at high level of satisfaction ($\bar{x}$ = 3.78, S.D. = 0.83). In terms of enhancing interesting, it is at high level of satisfaction ($\bar{x}$ = 4.15, S.D. = 0.79). In terms of enhancing understanding, it is at high level of satisfaction ($\bar{x}$ = 3.42, S.D. = 0.87). In terms of enhancing originality, it is at medium level of satisfaction ($\bar{x}$ = 3.06, S.D. = 0.93) In terms of enhancing economic or social benefits, it is at the highest level of satisfaction ($\bar{x}$= 4.45, S.D. = 0.56). In terms of enhancing knowledge and creating original ideas, it is at high level of satisfaction ($\bar{x}$ = 3.82, S.D. = 0.83).

7. Discussion

From the evaluation of the suitability of the model by the five experts it is clear that the AIAA model is appropriate for use as an artist's assistant. As suggested by Schleser [23], AI can create smart stories in the era of digital disruption and digital technology becoming the power of storytelling media. Spanos [30] also suggested that using AI in conjunction with human intelligence can improve the process, enhance the power of storytelling and have a huge impact in terms of social benefit.

This is because, when people use AI as an assistant, the human will be the leader, and they will have AI is an assistant with great potential. The results match with the opinion of Bender [31] that AI will be a powerful and beneficial tool for media education in terms of practice, study, and the creative process.

8. Conclusion

The AI artist assistant (AIAA) model containing three components was developed as an innovation with regard to digital storytelling. Component one is an input consisting of inspiration and digital literacy skills, both of which are necessary inputs for artists as digital storytellers. Component two is the AIAA process which consists of 3 main categories: getting the idea, creating a story, and publishing the digital story. These can be separated into minor 11 steps in the form of planning, determining, undertaking AI research or exploring, AI script writing, AI storyboard creation, AI sound production, story production, revising, assessing, sharing and reflecting. AI will be combined with some of the steps because the main production step will let the artist be the director and make key decisions in such a way as to make the project unique and to improve the quality of the content.

Component three relates to output, consisting of evaluation of the digital storytelling innovation in terms of interest, degree of understanding, originality, economic or social benefits, and knowledge or creativity. The AIAA model was accepted at highest level of suitability by five experts, and accepted at high level with regard to satisfaction by the 33 student volunteers. The AIAA model can be used to create digital storytelling innovations in terms of saving production time, engaging in conceptual analysis, and offering more choices for the human director to decide upon. It was also found that AI cannot be used to create all of the digital stories because there are still quite a few errors in AI-generated work. An important thing to keep in mind when using AI is to be wary of copyright infringement. Thus, the user must check carefully before using the work from AI. However, AI is evolving rapidly. In the future, working with AI may be completely different as AI develops more intelligence and accuracy of data. These might mean that AI might directly affect the teaching style when it comes to digital art education. The digital arts teaching curriculum must be adapted to be up-to-date and knowledgeable with regard to AI technology in order to achieve maximum benefit.

Acknowledgements

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