The Development of Project-Based Learning Activities Using Digital Storytelling to Enhance Creativity in Primary School Art Courses

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Abstract

The study aimed to assess the feasibility and effectiveness of using Project-Based Learning (PBL) activities with digital storytelling to nurture artistic creativity in primary school students. This research had two primary objectives 1) to develop PBL activities using digital storytelling and 2) to evaluate the achievement and final products of students participating in these activities. This study used the Consensus Assessment Technique (CAT) to evaluate the creativity of artworks across seven dimensions. To validate the credibility of the lesson plan and the final results and receive high-quality evaluations from five experts. Statistical evaluations include dependent t-tests, mean, standard deviation, and results. The results were as follows: 1) the mean score for the lesson plan was 4.80, and 2) the students in the posttest had better creativity levels than those in the pretest. 3) The posttest artworks had better creativity than the pretest artworks.

Keywords: Project-Based Learning; Digital Storytelling; Artistic Creativity; Art Courses

1. The introduction and important problems

In April 2022, the "Compulsory Education Art Curriculum Standards (2022 Edition)" was officially promulgated, and China's emphasis on art education was unprecedentedly high. It encourages students to engage in self-directed, collaborative, and inquiry-based learning, all of which contribute to cultivating students' creative thinking skills. Creative thinking will bring creativity and give students many ways to solve problems with different perceptions and concepts (Kutlu, 2015; Risnawati & Saadi, 2016).

For a long time, schools usually attach importance to the intellectual development of primary school students but neglect the cultivation of artistic potential and creativity. Developing science, technology, and information impacts educational goals, emphasizing teaching attitudes and thinking skills such as critical, systematic, creative, and practical collaboration with others (Asy'ari, Ikhsan, et al., 2019). Therefore, how to consciously cultivate students' creative potential in art courses and promote the development of pupils' artistic creativity is of practical significance. Creativity, one of the advanced cognitive abilities reflecting human wisdom, is embodied in many fields, such as artistic creation, technological

innovation, scientific invention, and so on (Radel et al.,2015). As an essential field of creativity, artistic creativity is integral to art curriculum training, representing the world of artistic sensibility and scientific rationality in human life. Artistic creativity refers to the ability to produce new and valuable visual forms, such as painting, by producing new and useful mental visual images (Aziz-Zadeh et al., 2013).

The cultivation of artistic creativity relies on innovative teaching methods, and exploring instructional models conducive to students' healthy growth is a core aspect of art education. In art courses, using PBL activities using digital storytelling creates a blended learning approach, integrating traditional classroom instruction with technology-driven learning endeavors. In the realm of PBL, teachers initially design driving tasks, students proactively select topics, and then engage in collaborative, practical exploration within groups. Ultimately, they design artworks, and the practical results are displayed by digital technology. The results can be in various forms, such as physical objects, reports, performances, posters, and pictures. (Hu & Cheng, 2003).In the digital age, digital narrative is increasingly used in teaching. Smeda et al. (2014) described digital storytelling as an innovative pedagogical approach that leads to deep and meaningful learning among students.

This study aims to guide students through project-based learning to approach the artist, become an artist, share the artist, and create art in the style of artists. It involves generating new artworks in this artistic genre and demonstrating an understanding of the group's artworks through digital storytelling. The study encourages students to actively explore, reflect, and create, fostering their problem-solving abilities. It seeks to break away from passive and singular traditional teaching methods, utilizing collaboration, inspiration, and reimagining classics to harness students' enthusiasm and creativity fully.

2. The Objectives

1) To develop PBL activities using digital storytelling in primary school art courses.

2) To evaluate students' achievement and final products participating in PBL activities using digital storytelling with artistic creativity.

3. Research Question

Based on these research objectives, this study explores the following issues in depth:

RQ1: How to integrate PBL activity using digital storytelling in art courses?

RQ2: What are the achievements and final products of PBL activity using digital storytelling in an art course, and will it enhance student's artistic creativity?

4. Literature Reviews and Research Frameworks

Project-Based Learning

Project-Based Learning (PBL) is an instructional approach wherein the core lies in actively engaging students in meaningful real-world projects to acquire knowledge and skills. It is a student-centered,

inquiry-driven method that underscores practical learning and collaboration. The benefit of PBL is to improve students' activity so they understand the content more deeply after they complete a project (Thomas, 2000). The PBL approach is a cooperative and research-based learning technique characterized by active student engagement and comparative learning (Loyens et al., 2015). Students who learn through the PBL method usually work together to solve a specific problem, develop a product for a specific audience, and then evaluate the project and development process (Kokotsaki et al., 2016).

The PBL approach effectively develops 21st-century capabilities by promoting critical thinking, problem-solving, interpersonal communication, information and media literacy, cooperation, leadership and teamwork, innovation, and creativity (Häkkinen et al., 2017). PBL provides a solid platform for nurturing students' creativity by involving them in artistic activities. (Wahyu R., 2016; and Kristanti et al., 2016) have applied the PBL model in learning and concluded that the application of the PBL model can improve student learning outcomes. It ignites students' creative and innovative thinking through participation in art-related endeavors, fostering their artistic creativity. PBL in primary schools can help students master the concept, increase their motivation to learn, and develop a positive attitude in social interaction (Kaldi et al., 2011).

PBL can help students explore the driving problems related to disciplines for a long time and mobilize all knowledge, abilities, and qualities to solve new problems creatively to embody the understanding of core knowledge and skills in public results (Xia, 2022). Integrating PBL into art courses is an effective and engaging approach to fostering students' artistic creativity and skill development. PBL enables students to delve deeply into artistic concepts, explore various mediums, and apply their knowledge and skills to create meaningful original artworks. The explanation above shows that project-based learning can facilitate the students to develop themselves, particularly creative thinking skills. This argument is supported by Al-Tabany (2014), who says that project-based learning is a practical learning approach focusing on thinking creatively. To achieve the teaching objectives, clarify the key points, and break through the difficulties, according to the teaching steps of project learning, the project teaching procedure is designed into three phases and five links, as shown in the following figure.
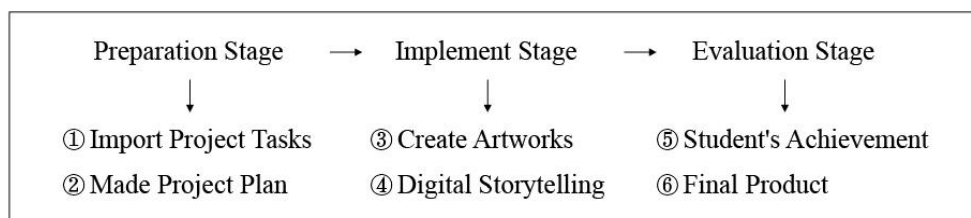

Fig 1. Teaching procedure

In this procedure, students no longer passively accept the teacher's instructions but independently formulate learning goals and cooperate to explore problems, and teachers become partners in equal communication with students.

Digital Storytelling

        Digital storytelling is a form of storytelling that utilizes digital media and technology to convey a narrative or message. Although there are many terms, digital storytelling (DS or DST) has the most comprehensive range and highest frequency of use.DS can be used for various purposes, including education, marketing, advocacy, entertainment, and personal expression.

        DS is one of the educational methods formed with the development of technologies.DS is based on the employment of computer-based tools to tell a story.DS writes stories and adds multimedia elements such as words, images, sounds, and music to create visual stories in teaching activities (Li, 2012). DS is a strategy that facilitates high-quality reflections, as it allows children and teachers to connect to the content of the task in a more personal way (Hamilton et al., 2019). The multimodal nature of the DS educational technology has the potential to be used to create an authentic learning context for all students, regardless of their background (Chubko, 2020). DS enables learners to complete their assignments more creatively and actively (Castillo-Cuesta et al., 2021). DS has broad application and research prospects. In education, using digital technology to tell stories "creates a hybrid context that opens space for students and teachers to act and create meaning beyond traditional classroom boundaries" (Korhonen & Vivitsou, 2019). DS is a powerful tool to promote the deep integration of modern information technology and education and teaching, which aligns with the development trend of the new form of "Internet + education" and is an effective way to implement network, digital, intelligent, and personalized education. One of the technologies that has proved to be very beneficial in enhancing the efficiency of education is DS (Yilmaz & Siğirtmaç, 2020).

        In the post-industrial information society, students who live in a technology-driven information age are expected to adopt DS quickly. Furthermore, DS displays learning outcomes that allow students to reflect on their characteristics, perspectives, imagination, and developmental processes.

        Berkeley's Center for Digital Storytelling (CDS), known for developing and disseminating the Seven Elements of Digital Storytelling, has added some new elements to prepare students for digital storytelling creation, as follows:

Table 1.The Components of Storytelling

Ten Elements			
1	The purpose of storytelling	6	The rhythm of storytelling
2	The perspectives of unique	7	The audio of meaningful
3	The questions of dramatic	8	The economy of storytelling
4	The content of high quality	9	The images, video, and other multimedia elements of quality
5	The sound of clear	10	The grammar of excellent

Artistic Creativity

In the 21st century, creativity is one of the four essential skills. Creativity is the ability to create something new, provide new ideas that can be applied in problem-solving, or see new relationships between pre-existing elements (Nurlela, 2018). Art is a kind of creation that summarizes humans' social and cultural life and is inherently consistent. A creative child can relate one thing to another in his mind and create a new image based on the original image (Tian,2016).

Artistic creativity has played a significant role in human history and culture. It can inspire, challenge, and provoke thought, enriching our lives and broadening our perspectives. Many artists have made lasting contributions to society through their creative expressions. Compared with scientific creativity, artistic creativity is more ambiguous and less involved in logical reasoning (Zeki,2001). Artistic creativity refers to the ability to produce new and valuable visual forms, such as painting, by producing new and useful mental visual imagery (Aziz-Zadeh et al.,2013). Artistic creativity is the concrete manifestation of creativity in the field of art, which has the generality of creativity and the particularity of creativity, such as the unique elements in the field of art- art aesthetics emotions (Li & Liu, 2015). Artistic creativity is an individual's ability and comprehensive psychological quality to form creative works of art (Li & Guo,2018). In many countries, art education is seen as a source of creativity. Adding appropriate digital technology or art forms to art courses can enrich the curriculum content of art education, and diversified interactive teaching can stimulate students' endless creativity.

In this study, the author defines artistic creativity as creative activities based on specific purposes and tasks, creating novel, unique works with social or personal value, and utilizing modern technological means to showcase learning outcomes.
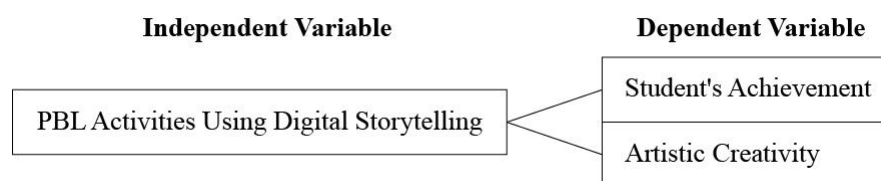
Research Frameworks

Independent Variable   **Dependent Variable**

PBL Activities Using Digital Storytelling

Student's Achievement
Artistic Creativity

Fig 2. Research Framework

5. Methodology

Population and Sample

This study comes from the population and samples of 49 students of the Experimental School of Shenzhen Educational Sciences Institute, a public school in China. The Random sampling grade is Class 304 (49 students), including 18 girls and 31 boys.

Research Instruments

   1. Experts Validated: Five experts validated the quality of the Lesson Plan and Rating Scale. In line with the feedback from experts, the measurement tool was edited and finalized.

   2. Pretest and Posttest Evaluations: The primary data-gathering strategy involves giving participants pretest and posttest evaluations. These tests will examine students' creativity before and after participating in PBL activities using digital storytelling.

   3. Rating Scale of Artistic Creativity: This study used the Consensus Assessment Technique (CAT); experts in the same field have a basic consensus on the same work(Amiable,1996).CAT has been widely used in the field of artistic creativity evaluation. This scale references the artistic creativity evaluation model by Li Jipin(Li,2018). The details are shown in Table 2.

Table 2. Rating Scale of Artistic Creativity

Dimensions	Specific connotation
Suitability	The degree of agreement between the work and the theme
Novelty	The degree to which the work is distinctive
Technical	The painting level of the work
Aesthetics	The artistic and aesthetic value of the work
Imagination	The imaginative richness of the work
Ideological	The level of the theme conveyed by the work
Overall Impression	The level of artistic creativity of the work

Data Analysis

   Data obtained in the tests were processed using the IBM Statistics SPSS27 software package for system analysis.

   The data analysis method of paired samples T-test was used in this study to verify whether the pretest and posttest of artistic creativity are significant Differences by calculating the mean and standard deviation (S.D.).

   The interpretation of the score of the creativity level was as follows:

Table 3. Scales for Interpreting quantitative data from artistic creativity.

Range	Artistic Creativity
7–15	Lower
15–20	Low
20–25	Normal

Range	Artistic Creativity
25–30	High
30–35	Highest

6. Results

Five experts evaluated Lesson Plans by the learning activities, and The experts are familiar with the field; the scoring work of each expert is completed independently. The data statistics and analysis are shown in Table 4.

Table 4. The Experts Score of Lesson Plan and Measurement Tool

Items	Mean	S.D.	Level
Artistic creativity is essential for primary school students.	5.00	0.00	highest
The development of PBL activities using digital storytelling in primary school art courses.	4.80	0.45	highest
The three-week art course is reasonable.	4.60	0.55	highest
It enhances students' understanding of artists and art knowledge.	4.60	0.55	highest
It improves students' perception and appreciation of famous paintings.	4.40	0.89	high
The teaching content is suitable for art courses.	5.00	0.00	highest
Digital tools are appropriate for students.	4.80	0.45	highest
Improve students' motivation and creative thinking.	4.80	0.45	highest
Enhance the artistic creativity of students.	4.80	0.45	highest
The new learning activities are better than traditional learning.	5.00	0.00	highest
Measurement tools are effective and fair.	5.00	0.00	highest
Overall	**4.80**	**0.20**	**highest**

As seen in Table 4, The mean value of the lesson plan was 4.80 (Highest).To ensure that the learning activities of the experiment have an excellent level of content reliability and conform to the knowledge level and ability characteristics in primary school, to meet the current cognitive level of primary school students and pass the consistency test conducted by experts.

The students' artistic creativity scores were compared between the pretest and posttest using paired samples t-test. The result of the calculation will be presented in Table 5,6 below.

Table 5. Results of Paired t-test based on student pretest-posttest score.

（N=49）

	T-Test	N	Mean	S.D.	T	DF	P
Artistic Creativity	Pretest	49	21.00	2.57	-25.843	48	0.000
	Posttest	49	30.82	1.39			

In Table 5, We can learn from data analysis that the average scores of pretest and posttest results are 21.00±2.57 and 30.82±1.39. There is a significant difference between pretest and posttest scores (p <α,0,00< 0,05). It means that artistic creativity between pretest and posttest is not at the same level. The mean scores show that the posttest has a better mean score than the pretest. Based on the results obtained, we can conclude that the PBL activities using digital storytelling of work in art courses have caused a significant improvement in student performance in creativity.

Table 6. The artistic creativity scores of students' artworks in the final product.

（N=49）

Artistic Creativity			
About Final Product	Mean	S.D.	Level
The Suitability for creative theme.	4.47	0.32	Highest
The Novelty for distinctive.	4.52	0.54	Highest
The Technical for painting level.	4.09	0.32	High
The Aesthetics for aesthetic value.	4.62	0.36	Highest
The Imagination for richness.	4.52	0.38	Highest
The Ideological for Ideological level.	4.43	0.46	High
The Overall Impression for creativity.	4.47	0.32	Highest
Overall	4.45	0.17	Highest

In Table 6, based on the artwork scores of all dimensions of artistic creativity, it can be observed that there is a significant difference between the artwork scores of the pretest and the posttest (p < α, 0,00 < 0,05). As seen in the table shows that there is a significant difference in Suitability ($\bar{x}$ = 4.47), Novelty ($\bar{x}$ = 4.09), Technical ($\bar{x}$ = 4.09), Aesthetics ($\bar{x}$ = 4.62), Imagination ($\bar{x}$ = 4.52), Overall Impression ($\bar{x}$ = 4.43), and Overall Impression ($\bar{x}$ = 4.47), the mean score for each dimension associated with artistic creativity was above

4. Therefore, the level of artistic creativity reflected by students through their works has been significantly improved.

To sum up, the PBL activities using the digital storytelling method improve students' artistic creativity in a good and measurable way. The students' artistic creativity improved significantly after engaging in PBL activities using digital storytelling.

7. Discussion

The Findings indicated that in PBL activities using digital storytelling, students learn about artists and art knowledge, organize and analyze plans to complete the project, and Complete learning tasks together in a group. When the paired t-test results obtained from the artistic creativity scores of the study group were analyzed as a whole, it was observed that there was a significant increase in the scores of the students.

Findings obtained from studies on different disciplines in the literature also overlap with the findings from this study. According to Amini et al.(2019), PBL is student-centered and based on constructivism theory. The results of this study are under the characteristics of PBL, which are student-oriented, emphasizing problem-solving through projects that are solved individually or in groups (Chen & Yang, 2019). The learning process through PBL allows educators to provide students with direct experiential learning. Sari et al. (2020) revealed that PBL-based modules effectively improve learning outcomes with a percentage of 86.7%. The results of research conducted by Lata Tomjenovic (2015) showed that the method of learning combined with visual arts activities significantly increased the student's learning outcomes. They were more active and creative, with an increased affective experience and motor activity. Furthermore, in their research, Slahova et al. found a link between the development of the creative imagination of elementary school students and creative activities when describing visual art portraits (Šļahova et al., 2017).

The stimulus of creative thinking in the phase of collecting ideas, designing, developing the project, and sharing their paintings triggers them to continuously explore, imagine, and innovate the project they are making. Similarly, A study entitled "Creating Manipulatives: Improving Students' Creativity Through Project-Based Learning" was conducted by Ummah et al. (2019). Hung et al. (2012) found that project-based learning with digital stories increased the problem-solving skills of experimental group students in their research; the study showed that project-based learning can help students improve their abilities and creativity in various ways. Remember, these activities aim to foster creativity, encourage artistic thinking, and allow students to express themselves uniquely and imaginatively. Ensure to provide guidance, resources, and access to digital tools, and allow ample room for students to experiment and showcase their creative prowess.

To summarize, PBL activities using digital storytelling facilitate learners' deep learning reflection on whatever they did and learned. Remarkably, applying PBL activities using digital storytelling in learning can enhance learning processes and outcomes, strengthen learning engagement and achievement, increase digital technology skills, and develop artistic creativity.

8. Conclusions

The study applied this instructional model to the design and implementation of the art course. Through experimentation, the study validated the model's role in fostering artistic creativity from the results of the Rating Scale of Artistic Creativity and the visual effects of the student's artwork. The students' level of artistic creativity was significantly enhanced, and the study also offered new insights into fostering students' artistic creativity.

This study investigates the impact of PBL activities using digital storytelling on enhancing artistic creativity. The research findings are as follows:

1) The present study initially reviewed the research on Project-Based Learning (PBL), digital storytelling, and artistic creativity. It analyzed the correlation between PBL and digital storytelling and the feasibility of using PBL activities with digital storytelling for teaching and fostering students' artistic creativity. Moreover, design and implement PBL activities using digital storytelling. To validate the impact of PBL activities using digital storytelling on enhancing students' artistic creativity. An analysis of the effects and outcomes of these activities followed this.

2) Through classroom observation, we can see that students are more willing to express their creativity when their views are obtained through in-depth learning and cooperative learning. Use digital storytelling to demonstrate learning outcomes, which provide a stage for students to express their views. Design-based PBL activities using digital storytelling give the students appropriate inquiry tasks and learning opportunities.PBL is an innovative learning model that facilitates students' learning with meaningful activities. As Berger (2012) explained, PBL combines different learning elements so that students' learning experience is complete and whole.

3) The artistic creativity measured by the works means that the experts the students in Suitability, Novelty, Technical, Aesthetics, Imagination, Ideological content, and overall Impression are the ability of seven dimensions, emphasizing the formation of creative works of art. overall, design-based PBL activities using digital storytelling provide students with suitable creative tasks, enhancing their creative thinking and improving their performance in the creative process. From the results of the data analysis, it is evident that elementary school students' artistic creativity has significantly improved after the class, both based on the artistic creativity assessment and the outcomes reflected in the artworks. Consequently, this enhances their creativity in art courses.

Just like any research study, this study has achieved specific results. However, due to limitations in time and personal capabilities, the research needs to be sufficiently in-depth and comprehensive. Firstly, the instructional activities only lasted for three weeks, a relatively short learning period, and nurturing creativity is a long-term process. The longer the time, the better the effect on artistic creativity. The sample size is also relatively small, limiting the research findings' applicability to a larger population. In future learning and teaching, leveraging modern technological approaches could offer new ideas for fostering

artistic creativity, providing valuable references for educational practitioners engaged in teaching practice and researchers conducting educational research.

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