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Cultivating Creativity through Digital Art

Submitted by

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Declaration

I, Yuen Pui Han , declare that this research report (Cultivating Creativity through Digital Art) represents my own work under the supervision of Dr. Wong So Lan and that it has not been submitted previously for examination to any tertiary institution.

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18 April 2022

Abstract

The Hong Kong Education Bureau has encouraged the use of tablets and technology in education to promote the creativity of children (Hong Kong Education Bureau, 2015). Digital art applications have become the prevalent technologies utilized by Visual Arts teachers for cultivating the creativity of students (McQuiggan et al., 2015; Ainsworth, Prain, & Tytler, 2011; Subramanian, 2012; Wang, 2015; Wang, 2018; Yang, 2013). However, it is shown that teachers lack technological pedagogical and content knowledge for designing creativity-facilitating lessons and teaching strategies (Black, & Browning, 2011). There is also a lack of concrete guidelines to assist teachers to design digital art units (Ontario Ministry of Education and Training, 2009). To provide more guidance on using digital art apps in Visual Arts education to cultivate the creativity of children, the researcher aims to investigate how to design the lessons to cultivate students' creativity and how to implement pedagogies to enhance children's creativity.

Qualitative research methods are used to explore the views of teachers. Through interviewing Visual Arts teachers experienced in teaching digital art in primary schools, the results of the findings show that the technological pedagogical and content knowledge (TPACK) of teachers is the key to effective teaching for cultivating student creativity. TPACK provides a reference for teachers to design favorable digital art unit plans, apply useful pedagogies, create a creativity-supporting learning environment, and design assessments for learning. A concrete way for designing digital art units and specific pedagogies are summarized in this research. It is hoped that the summarized strategy for designing digital art units and pedagogies can be a reference for the pre-service and in-service Visual Arts teachers to assist them to design digital art units for developing the creativity of children.

Keywords: Visual Arts Education, Digital Art, Creativity, Technological Pedagogical and Content Knowledge, Hong Kong Primary School Students

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Chapter 1 Introduction

1.1 Background

All-in-one mobile devices that support mobile networks have fascinated the general public, and the devices have become essential for Millennials and Generation Z (Chiu and Churchill, 2016; Keator, 2021; Wu et al., 2012). Taylor (2007) described these generations as 'screenagers', the leaders of digital new media in this advanced technology world, which implies the dominance of mobile technologies and the pervasive mobile devices in everyday life of the digital era today.

To Art education, digital art applications have become the prevalent technologies utilized by schools (McQuiggan et al., 2015). Since the 2015/16 school year, the Education Bureau has launched the Fourth Strategy on Information Technology in Education, which aims to “unleash the learning power of all our students to learn-to-learn and to excel through realizing the potential of IT in enhancing interactive learning and teaching experiences” (Hong Kong Education Bureau, 2015). In 2017/18, HKEDB pushed the development of mobile learning by implementing “Bring Your Device (BYOD)” in primary and secondary schools (Hong Kong Education Bureau, 2021).

Integrating technology in education has been trendy for the last decade (Hagood, 2011). Tablets and digital painting applications have become popular tools in art education as they are advantageous to creative development (Ainsworth, Prain, & Tytler, 2011; Subramanian, 2012; Wang, 2015; Wang, 2018; Yang, 2013). Students' creativity enhances through rethinking the layers of a painting and using unlimited virtual materials in art applications to create imaginary artworks (Wang, 2015). Sakr (2015) shared a

similar view by pointing out that wireless technology and the shared platforms of applications can facilitate collaborative creativity by encouraging students to exchange ideas and work together. The apps also fulfill children's curiosity and allow them to dive deeper into knowledge at their own pace (McQuiggan et al., 2015).

The advantages of digital art application in creativity enhancement have attracted Visual Arts teachers eager to apply digital art applications in teaching (Wang, 2018; Wilks et al., 2012). However, it seems they are not ready to do so (Black & Browning, 2011). The study of 羅小燕（2015）pointed out that teachers focus on training students with skills in using digital tools rather than cultivating their creativity when applying art applications. The study also found that teachers had given strict instructions and limited time for experimenting. It inhibits the creative ideas and divergent thinking of students. Ontario Ministry of Education and Training (2009) pointed out that there are no concrete guidelines guiding teachers to integrate technology into classrooms and what technology to use. Teachers lack sufficient technical and pedagogical knowledge to integrate technology into teaching (Black & Browning, 2011; Maddux, 2003).

Black and browning (2011) stated that teachers lack pedagogies, related knowledge, and experiences when applying digital art applications in Visual Arts education. Visual Arts educators report that they find it hard to translate Information and Communication Technology and the associated techniques into meaningful and accomplished learning activities (Phelps & Maddison, 2008).

The above examples indicate that Visual Arts teachers need to have the knowledge and skills of applied technology to design creative teaching activities to develop children's creativity.

1.2 Objective

Hong Kong had launched the Fourth Strategy on Information technology in schools for releasing the learning power of students through realizing the power of technology (Hong Kong Education Bureau, 2015). It indicates the emphasis on emerging technologies in teachings and their potential in cultivating the creativity of students. However, more guidance on how to use technology in teaching and what pedagogies and strategies for enhancing creativity are required.

This research aims to explore how teachers design digital art units to cultivate students' creativity and how teachers implement digital art teaching to enhance students' creativity. Hong Kong lacks research on Visual Arts curriculum design and digital art teaching methods that explore the application of technology. This research hopes to provide research references for pre-service and in-service teachers through the teaching design of digital art and the teaching methods of cultivating children's creativity.

1.3 Research Question

In response to the above research purposes, this research will focus on the application of technology in Visual Art subject. The research questions are as follows:

1. How do Visual Arts teachers design digital art units to cultivate students' creativity?

2. How do Visual Arts teachers implement digital art teaching to enhance students' creativity?

1.4 Significance and Contributions

This study can be a reference for teachers to design lessons using digital art applications as a teaching and learning tool. Also, it can provide suggestions in pedagogy and teaching strategy for better enhancing students' creativity.

1.5 Term Definition

1. Mobile devices: Mobile devices are integrated with services in the cloud and application and it advances in mobile access technologies that allow connectivity everywhere and at very high speeds (Guelzim, Obaidat, & Sadoun, 2016).

2. Application: Its abbreviation is "app". It is designed for a specific purpose and can be downloaded to mobile phones or other mobile devices, such as Sketchbook Pro, Procreate, and Brushes (Wang, 2018). Other examples include Paper App, Adobe Comp, Photoshop Fix and Lightroom, uMake, and iMovie.

Digital Art can be created by using apps that includes digital drawing and painting, photo collage, graphic design, drawn animation, stop motion animation, movie-making, photography, and time-lapse video (Wang, 2018).

Chapter 2 Literature Review

To understand how teachers enhance students' creativity through pedagogies and teaching activities, it is first necessary to understand what professional knowledge is required as a teacher, and how it will affect the cultivation of creativity of students. It is also essential to the concept of creativity.

2.1 Technological Pedagogical And Content Knowledge of Teachers

To design creative-facilitating lessons, teachers must master technological and pedagogical content knowledge.

To find out how to design lessons that can foster the development of creativity of students through digital art applications, it is necessary to discuss the issues of instructional design and implementation. It helps understand what elements could affect the teaching and learning results.

Acknowledging the trend of integrating technology in education, Mishra and Koehler (2006) have proposed a conceptual framework called Technological Pedagogical Content Knowledge (TPCK), which focuses on what knowledge teachers should manage when integrating technology in teaching. The framework empathizes with the essence of content (C), pedagogy (P), and technology (T) knowledge of teachers. Content knowledge means the subject knowledge to be taught (Mishra & Koehler, 2006). Pedagogy knowledge concerns students learning, classroom management, lesson design and implementation, and evaluation (Mishra & Koehler,

2006). Technology knowledge is about the ability to use software and to learn and manage new technologies (Mishra & Koehler, 2006).

Rather than looking at these components separately, the framework interplay and pair them up as shown in figure 1. It introduces the ideas of pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK) (Mishra & Koehler, 2006), which is named technological pedagogical and content knowledge (TPACK) later (Thompson & Mishra, 2007).

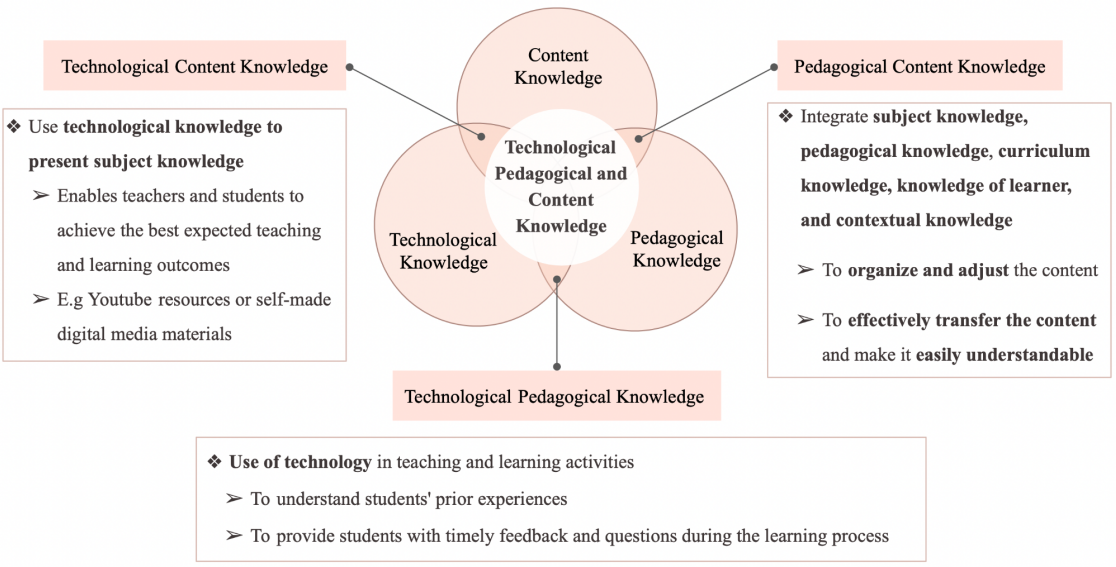

Figure 2-1 TPACK Diagram (Mishra & Koehler, 2006; 陳國泰, 2018)

Pedagogical content knowledge (PCK) focuses on the pedagogical knowledge to teach specific content. It emphasizes the suitability of teaching strategy and how to make the content easily understood and learned by students (Mishra & Koehler, 2006). PCK includes subject knowledge, pedagogical knowledge, curriculum knowledge, knowledge

of learners, and contextual knowledge（陳國泰, 2018）. Teachers manage and integrate all this knowledge to organize and adjust the teaching content, effectively transfer the content and make it easily understandable to students（陳國泰, 2018）.

Technological content knowledge (TCK) refers to the way that the technology and content relate reciprocally (Mishra & Koehler, 2006).

Two concepts were mentioned above, and the concept here is more closely related to this study. Technological pedagogical knowledge (TPK) is the knowledge and skills of technological tools used in teaching and how to apply technologies in teaching content (Mishra & Koehler, 2006). Teachers use technological knowledge to present subject knowledge, such as using Youtube resources and self-made digital media materials, aiming to enable both teachers and students to achieve the best-expected teaching and learning outcomes（陳國泰, 2018）.

Technological pedagogical and content knowledge (TPACK) interweaves the three components (content, pedagogy, and technology). It is an integration of pedagogical content knowledge, technological content knowledge, and technological pedagogical knowledge. Once teachers master TPACK, they know concepts or content that students do not easily understand and understand how technology has the power to simplify or transform content, and then use it to teach in a constructive way (李佳蓉, 2007）. To effectively teach a specific subject matter to students, and to enable students to easily understand the subject matter and enhance learning effectiveness, teachers integrate content knowledge (CK), pedagogical knowledge (PK), technological knowledge (TK), pedagogical content knowledge (PCK), technological content

knowledge (TCK), technological pedagogical knowledge (TPK), to organize and adapt the specific subject matter, and through the assistance of technology to effectively explain, demonstrate, analogize, and exemplify the representation of the subject matter. It is a kind of pedagogical knowledge to be presented to students for learning（陳國泰, 2018）.

Some scholars shared similar views with Mishra & Koehler (2006), suggesting that teachers need to have intimate domain-relevant knowledge (Amabile, 1996; Beghetto & Kaufman, 2014; Joo & Lim, 2018; Kaufman, Beghetto, & Dilley, 2016; Runco, 2014; McQuiggan et al., 2015; 羅小燕, 2015). Joo and Lim (2018) and McQuiggan et al. (2015) stated that teachers should own technological pedagogies and content knowledge, and this knowledge should be up-to-date (Runco, 2014). Amabile (1996) shared a similar view mentioning that knowledge, expertise, technical skills, and intelligence are necessary for teachers.

2.2 Factors that influence the cultivation of creativity

The TPACK framework suggests the importance and influence of the three components, content, pedagogy, and technology to effective teaching. Some scholars particularly focus on content, pedagogical, and technological knowledge teachers need in digital art teaching to enhance students' creativity.

Once teachers master the technological pedagogical and content knowledge, they apply it and manage to cultivate the creativity of students through planning lessons, creating a learning environment, and designing tasks and assignments that are beneficial to the cultivating of creativity.

Some scholars have identified some criteria in aspects of qualities of teachers, lesson design, learning environment, tasks, and assignment design that are more favorable to nurture creativity. They also stated the qualities that favorable students to develop their creativity. All these aspects have their influence on the cultivation of creativity. Thus, in other words, these five aspects can be interpreted as the five factors that influence the cultivation of creativity. The relationship between the TPACK of teachers and the factors influencing the cultivation of creativity in a school context is shown below (see Figure2-2).

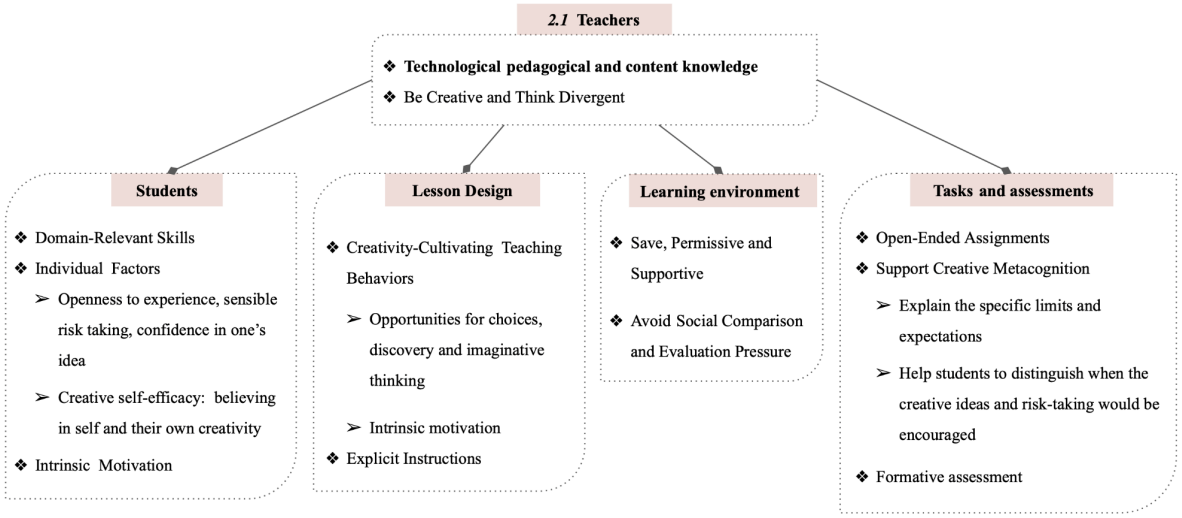

Figure 2-2 TPACK of Teachers and Five Factors that Influence the Cultivation of Creativity

As mentioned earlier in Chapter 2.1, teachers are required to have technological pedagogical and content knowledge (TPACK) at first. McQuiggan et al. (2015) stated that teachers need to manage their Visual Arts knowledge, skills to incorporate mobile devices and technologies, and senses to determine and choose creativity-enhancing applications. Teachers' creativity-friendly teaching behaviors and explicit instructions are also

prominent as they can raise the creativity of students (Beghetto & Kaufman, 2014; Black & Browning, 2011; Kaufman, Beghetto, & Dilley, 2016; McQuiggan et al., 2015; Runco, 2014; Sternberg, 2007; 羅小燕, 2015). Runco (2014) further elaborated that educators have to be innovative, think divergently, keep an open mind, and encourage experimenting. They need to do demonstrations and show different styles of good works to students as inspirations (羅小燕, 2015). From the selection and mastering of digital art applications to designing and delivering lessons conducive to the cultivation of creativity, all require the TPACK of teachers.

Qualities of teachers are of fundamental importance to the cultivation of creativity as it is the determinant of how lessons will be designed, the learning environment will be created, and tasks and assignments will be designed so that the creativity of students can be successfully cultivated.

Technological content knowledge (TCK) of teachers is highly crucial when come to lesson design. McQuiggan et al. (2015) stated that teachers need to manage their Visual Arts knowledge, skills to incorporate mobile devices and technologies, and senses to determine and choose creativity-enhancing applications. Pedagogical content knowledge (PCK) is also essential for designing creative-enhancing lessons. Beghetto and Kaufman (2014) stated that teachers better stress improvement-focused learning goals and intrinsic values of tasks when implementing lesson plans.

Teachers also need to have clear concepts of creativity as it helps them design lessons and pedagogies to be used (羅小燕, 2015; Kaufman, Beghetto, & Dilley, 2016). Creativity is a process that requires content knowledge, background information, critical

thinking skills, and motivation (McQuiggan et al., 2015). Students need to manage subject knowledge and domain-relevant skills before creating something innovative as content knowledge, skills in using digital art apps, and intelligence are building blocks of creative acts and work (Amabile, 1996; Beghetto & Kaufman, 2014; Black & Browning, 2011; Kaufman, Beghetto, & Dilley, 2016; McQuiggan et al., 2015; Runco, 2014). Thus, teachers need to first help students develop domain-relevant skills before urging them to create something creative. Apart from giving lectures and demonstrating skills to students in class, McQuiggan et al. (2015) suggested that teachers can encourage students to make good use of digital devices as a learning tool which allows students to compensate for the lack of content knowledge according to their interest and needs.

The design of the teaching theme and content is also one important component to consider. McQuiggan et al. (2015) explained people are more creative when working in their area of expertise or interest due to their occurring intrinsic motivation and higher certainty in mastering such content knowledge and skills. If teachers can design a teaching theme and content that can attract students and stimulate their intrinsic motivation, students will more likely generate passion directing them to dig deeper in knowledge on their own, think critically, take risks, practice, and improve skills, which provide support for creative acts (McQuiggan et al., 2015). Considering that there may be diverse interests of students, as well as the learning difference between students, McQuiggan et al. (2015) further suggest teachers provide students with individualized instruction assisting them to present their creative ideas. Again, to make this happen requires the pedagogical knowledge of teachers, which involves the understanding of the nature of students (Mishra and Koehler, 2006).

Thinking and doing are vital sessions of creative processes. Teachers need to provide opportunities for choices, discovery, and imaginative thinking (Beghetto & Kaufman, 2014; Kaufman, Beghetto, & Dilley, 2016; 羅小燕, 2015), as well as freedom for experiments and time for exploring. (Black & Browning, 2011; 羅小燕，2015). Teachers also need to provide sufficient time and opportunities to think, imagine, generate, and dig deeper into ideas (Treffinger et al., 2002). Their support to students to sense, feel, develop ideas, and solve problems should not be absent. (Creely, Henriksen, & Henderson, 2021). In the end, teachers can assist students to develop personal thoughts, insights, or products (Isaksen et al., 2000; Treffinger, 1988; Treffinger, 1991). Therefore, teachers need to be sure to master technological knowledge and skills, pedagogies, and subject knowledge, then interweave and apply them when designing lessons and planning teaching processes.

To be more specific in pedagogies used during lessons, Runco (2014) suggested that teachers should prepare the right amount of information for students for independent thought. Teachers can give directions to students and guide them but better not instruct them strictly (Runco, 2014). Kaufman, Beghetto, and Dilley (2016) suggest that teachers need to give honest and supportive feedback focusing on the creative strengths of students. Besides, setting a good example to students is also influential to the creative development of students. In addition, it is recommended for teachers to use intrinsic motivation and reward (Amabile, 1996; Runco, 2014; McQuiggan et al., 2015) and avoid extrinsic motivation (Beghetto & Kaufman, 2014; Runco, 2014; McQuiggan et al., 2015).

The personal qualities of students are also a considerate factor affecting their ability to act creatively. As same as teachers, subject knowledge and technological skills

are indispensable in the creative process as they are the building blocks of creative outputs (Amabile, 1995). Apart from knowledge, some scholars have proposed some individual qualities beneficial to the raise of creativity. Kaufman, Beghetto, and Dilley (2016), and Runco (2004) pointed out that being open to experience and ideation is one of the factors that are good for creativity to grow. Taking sensible risks and believing in self and being confident in their ideas are also helpful (Kaufman, Beghetto, & Dilley, 2016; Runco, 2014). From this, it shows that teachers not only apply technological pedagogical and content knowledge (TPACK) to effectively and systematically impart subject knowledge and skills to students but are also have a responsibility to carefully decide and apply pedagogies, and create a learning atmosphere conducive to creative development and nurture them with these creative-stimulating qualities. This makes the TPACK of teachers and the lesson design become significant impacts on the cultivation of creativity of students.

In addition to the TPACK of teachers, the lesson design, and the potential for the creativity of students, a learning environment is another influential element that impacts the development of the creative potential of students (Beghetto & Kaufman, 2014). Runco (2014) pointed out that a safe and permissive learning environment can facilitate students' creativity development. Teachers need to respect and appreciate students with sincerity, giving students the courage to be original and creative (Runco, 2014). Also, allowing trials for and errors of students (Beghetto & Kaufman, 2014; McQuiggan et al., 2015) and setting punishments and public embarrassment free when students make mistakes during explorations are also good for the enhancement of creativity (McQuiggan et al., 2015). Besides, Runco (2014) suggested that teachers are better avoid social comparison among children on grades and give them evaluation pressure for the

consideration of their creative development. Beghetto and Kaufman (2014) added that teachers can use indoor and outdoor areas imaginatively to support the creative acts of students (Sternberg, 2007).

Furthermore, Nurturing students with different interests and developing them with satisfying levels of prior knowledge can facilitate their creative development (Beghetto & Kaufman, 2014; Runco, 2014). Therefore, teachers have to consider the individual factors of students and apply teaching tactics that suit students.

The design of tasks and assignments for the sake of creativity is discussed as well. Runco (2014) suggests teachers take an approach of a balanced curriculum as it can encourage divergent thinking and innovative ideas. The curriculum better consists of closed, open-ended, and problem-discovery tasks so that students have room for creative ideas (Beghetto & Kaufman, 2014; Kaufman, Beghetto, & Dilley, 2016; McQuiggan et al., 2015; Runco, 2014; Sternberg, 2007). When explaining the tasks to students, teachers should support the creative metacognition of students (Kaufman, Beghetto, & Dilley, 2016). Creative metacognition is about knowing when and when not to be creative, it can be a starting point that assists students in developing their creativity in the right place and track (Kaufman, Beghetto, & Dilley, 2016). Kaufman & Beghetto (2013) suggested teachers explain to students task requirements and help them to distinguish when to take risks.

Apart from considering the design of tasks, formative assessments are also a highlight in the creative process (Sternberg, 2007; McQuiggan et al., 2015; Beghetto & Kaufman, 2014). The terms assessment for learning and formative assessment are often

used interchangeably as they shared a similar purpose. However, there are differences between them.

Assessment for learning is an assessment designed to serve the purpose of encouraging students' learning (William, 2011). It is different from formative assessment in that it mainly focuses on the role of teachers to give students feedback for improvement and to promote student learning, but not mention the role of students and peers (Berry, 2008). Besides, compare with the formative assessment which particularly emphasizes using the results of the assessment as feedback to improve instruction, assessment for learning cares more about whether students are motivated to study and get improved in their learning at last.

Formative assessment is an intentional assessment that requires the collaboration of teachers and students to elicit evidence of learning progress continuously to raise student achievement and improve teaching effectiveness (Chappuis, 2015; OECD & CERI, 2008; Moss & Brookhart, 2019). Black and William (1998), and OECD and CERI (2008) elaborated that teachers interpret the data on the learning progress of students, understanding their learning needs and learning difficulties for adjusting teaching and modifying instruction appropriately, to reach the teaching and learning objectives. Black and William (1998) pointed out that after teachers interpret data and give students feedback and guidance for improvement, students need also interpret them and act on them. The active participation and responses from students are key to a successful implementation of formative assessment (Chappuis, 2015). Self-assessment skills are also significant as they play a role in interpreting and providing feedback to each peer as well (Black and William, 1998; Chappuis, 2015).

Wiliam and Thompson (2008) further proposed that formative assessment can be interpreted into three processes exercised by teachers, learners, and peers. The first process is to identify where the learner is going, the next is to identify where the learner is right now, and the last is to find out how to get there (Wiliam & Thompson, 2008; Wiliam, 2013). William (2013) further proposed that formative assessment can be considered as composing five "key strategies" structured around the three processes (see Figure 2-3).

	Teacher	**Student**	**Peer**
Where the learner is going	Clarify, share and understand learning intentions		
Where the learner is right now	Cleverly arrange effective discussions, activities and tasks for eliciting evidence of learning	Take students as learning resources for one another	
How to get there	Give feedback for moving learning forward	Motivate students to own their own learning	

Figure 2-3 The Five "Key Strategies" of Formative Assessment (William, 2013)

Formative assessment can be conducted in both formal and informal formats, examples include classroom discussions, classroom discussions, and homework (Black and William, 1998). No matter what format the assessment is, it is the actual act of making use of the collected evidence of learning progress to adapt the teaching work to meet learning needs that make the assessment become a formative assessment (Black et al., 2004; Wiliam, 2011).

Creely et al. (2021), Isaksen et al. (2000), and Walla (1926) noted that formative assessments are a tool for evaluating the progress of the creative development of students. Through formative assessments, teachers can reflect on the lesson designs and teaching (Creely et al., 2021; Isaksen et al., 2000; Wallas, 1926). They understand the learning needs and difficulties of students to modify the instruction for promoting learning and teaching effectiveness. For instance, teachers first provide specific limits and expectations for assessments and learning activities, then assist students to distinguish when the creative ideas and risk-taking would be encouraged on an assignment, helping them to explore the best way to express ideas. (Kaufman & Beghetto, 2013; Kaufman, Beghetto, & Dilley, 2016). In this process, teachers are assessing the creative strengths of students, giving them supportive and concrete feedback and advice for performing a higher level of creativity in ideas and art pieces (Kaufman, Beghetto, & Dilley, 2016).

2.2.1 General Idea of Creativity

Many scholars have interpreted creativity in correlation with curiosity, self-expression, imagination, novelty, originality, taking risks, openness, and tolerance of ambiguity (Browning, 2008; McQuiggan et al., 2015; Runco, 2014; Treffinger, 2003; Treffinger et al., 2002; Weisberg, 2015) (see Table 2-2-1).

Table 2-1 General Idea of Creativity

	Browning (2008)	Runco (2014)	McQuiggan et al. (2015)	Treffinger (2003)	Weisberg (2015)	Treffinger et al. (2002)
Intelligence		✓				
Curiosity	✓			✓		✓
Discovery	✓	✓				
Intention		✓			✓	
Intrinsic motivation		✓	✓			
Self-expression		✓			✓	✓
Imagination	✓	✓	✓	✓	✓	✓
Novelty	✓	✓	✓		✓	
Originality		✓		✓		✓
Taking Risks			✓	✓		✓
Openness		✓	✓	✓		✓
Flexibility		✓				✓
Evolution		✓				
elaboration						✓
Tolerance for ambiguity			✓	✓		✓

(Browning, 2008; McQuiggan et al., 2015; Runco, 2014; Treffinger, 2003; Treffinger et al., 2002; Weisberg, 2015)

2.2.2 Stages of Creative Process

Creativity is a process that requires content knowledge, skills, critical thinking, imagination, and fresh ideas (Azzam, 2009). These four elements can be interpreted as a creative process, as the Three Modes of Creativity by Creedy et al. (2021), the 4-Stage Creativity Process by Wallas (1926), the Characteristics, Operations, Content, and Outcomes (COCO) Model by Treffinger (1998; 1991), and the Creative Problem Solving Framework by Isaksen et al. (2000). The above four models presented a common of four essential stages in a creative process, which are 'Exploring', 'Thinking and Doing', 'Outcomes', and 'Assessment' (see Figure 2-4).

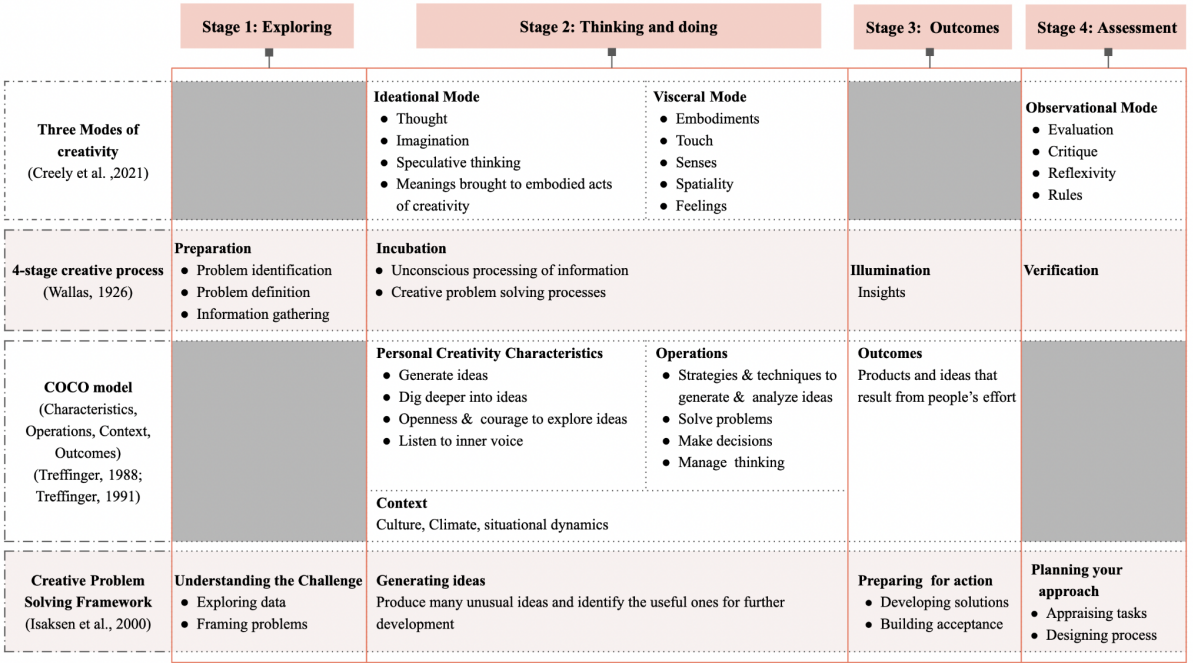

Figure 2-4 Stages of Creative Process (Creely et al., 2000; Isaksen et al., 2000; Treffinger, 1988; Treffinger, 1991; Wallas, 1926)

The first stage is exploration, in which teachers clarify the learning expectations to students, impart students with content knowledge and skills, as well as give instructions and criteria for learning activities and assessments (Isaksen et al., 2000; Wallas, 1926). All these given information are preparing students with subject knowledge and skills for creation, as well as providing them direction for exploring and collecting ideas. The second stage, thinking and doing, is when students begin generating and identifying creative ideas for further development and art-making (Creely et al., 2000; Isaksen et al., 2000; Treffinger, 1988; Treffinger, 1991; Wallas, 1926). In the outcome stage, students have developed mature ideas and finished work or art pieces, which are ready to move on to the assessment stage for conducting evaluation and reflection (Creely et al., 2000; Isaksen et al., 2000). Students will share their ideas or work, then teachers and peers will evaluate, give feedback, and suggestions to students so that students can reflect on and improve their work. This

four-stage creative process provides a reference framework for lesson planning, where teachers implement creative-enhancing pedagogies learning activities throughout the entire creative process.

2.2.3 Criteria for Assessing Creativity

According to Azzam (2009), creativity is a disciplined and creative process that requires skills, knowledge, control, critical thinking, imagination insights, and fresh ideas. In other words, the art knowledge, skills, and level of creativity in ideas are needed to be assessed during the learning process and at the end of the learning process.

Based on the mini-c creativity and the little-c creativity proposed in the Four-Cs Model (Kaufman, Beghetto, & Dilley, 2016), the concept of mini-c creativity can be used as the criteria for assessing creativity during the learning process, while the little-c creativity can be used as the criteria in tasks and assessment at the end of the learning. Mini-C creativity refers to subjective experiences of creativity that occurred during the learning process (Kaufman, Beghetto, & Dilley, 2016). It emphasizes the new insights and meaningful self-discovery, and intrinsic motivation of students. Little-c creativity refers to the daily creative activities and combination of originality and appropriateness in the learning tasks (Kaufman, Beghetto, & Dilley, 2016). It emphasizes new and meaningful ideas, intrinsic motivation, and willingness to take risks and seed out new experiences.

Based on the above concepts, the Criteria for assessing creativity are summarized as follows (see Figure 2-5).

Criteria for assessing creativity	
Learning activities	**Tasks and assignments**

• Art knowledge
• Fresh ideas
• Mini-c Creativity (Kaufman, Beghetto, & Dilley, 2016)
  • New insights
  • Meaningful self-discovery
  • Willing to explore and seed out new experiences
  • Show intrinsic motivation: Desire to express personal feelings
	• Art knowledge
	• Skills
	• Fresh ideas
	• Little-c Creativity (Kaufman, Beghetto, & Dilley, 2016)
	  • Personally new and meaningful ideas
	  • Intrinsic motivation
	  • Willing to take appropriate risks
	  • Eager to seed out new experiences

Figure 2-5 Criteria for Assessing Creativity

2.3 Conclusion

To summarize, the researcher develops the following research framework (see Figure 2-6) that helps examine and analyze what knowledge and skills teachers should have when teaching digital art, and what factors teachers have and have not considered when using digital painting applications for the creativity cultivation of students. Based on the response of the interviewed teachers, some suggestions and reminders will be drawn as a reference to the pre-service teachers and in-service teachers.

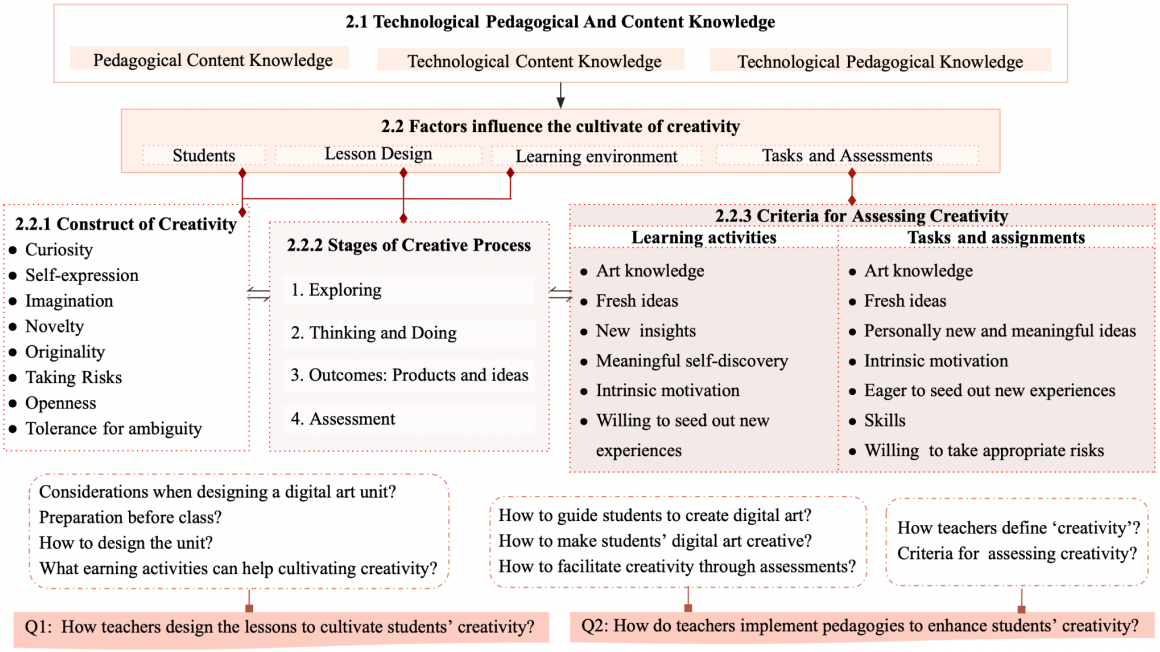

Figure 2-6 Research Framework

Chapter 3 Methodology

The study aims to explore how local Visual Arts teachers plan digital art lessons, and how they apply pedagogies in teaching for the cultivation of the creativity of students. The researcher will use semi-structured interviews and documents in qualitative research to explore the experiences and understandings of interviewees who have experience in teaching digital art (Kumar, 2011). The researcher can design interview questions regarding the research questions that help explore in-depth information from the interviewees. Documents relating to the responses of the interviewees help support their words.

3.1 Research Method

Semi-structured interviews and documents will be used for this research. Through interviews, the researcher can explore how teachers prepare, plan, and apply

pedagogies in digital art lessons, so that teachers can enhance the creativity of students. “Semi-structured interviews incorporate both open-ended and more theoretically driven questions, eliciting data grounded in the experience of the participant” (Galletta & Cross, 2013, p.45). It is well structured for responding to the research questions while giving space for the researcher and interviewees to discuss more over the research topic. Documents act as supplementary materials supporting the responses of the interviewees. It can also increase the reliability of their words and the research.

3.1.1 Semi-structured Interview

As interviewers design questions, they can control the content of an interview (Cohen et al., 2018), which allows the researcher to collect information for interpreting and answering research questions. The interviewer can also formulate questions concerning the view of the interviewees for more in-depth information (Kumar, 2013). Unconsidered opinions might show during the semi-structured interviews (Wisker, 2009).

Through interviewing local Visual Arts teachers experienced in teaching digital art, the researcher can understand how teachers design digital art lessons and how teachers teach to reach the goal of cultivating the creativity of students. The interview questions are as follows:

1. What will you consider when designing a visual arts unit to cultivate students’ creativity in digital art learning? (Research Question 1)

2. How will you design teaching activities to enable students to master digital art creation? (Research Question 1)

3. How will you assess the level of creativity of students? (Research Question 1)
4. How to guide students to create digital art, what does the teacher need to prepare before class? (Research Question 2)
5. How do you make students' digital art creative? (Research Question 2)
6. What is the biggest challenge in using digital art applications to cultivate students' creativity? How can you overcome them? (Research Question 2)
7. How do you think the use of digital art creation can best cultivate students' creativity? (Research Question 2)

3.1.2 Document

Tasks and work of students mentioned by the interviewees will be collected. The researcher interprets the view of interviewees on creativity, teaching objectives, and assessment design. The collected data allow the researcher to analyze the interview contents further. Documents can increase the reliability of the interviewees as well as the research.

3.2 Research Subjects

Investigating how teachers cultivate creativity through strategic lesson planning and the implementation of pedagogies, the research invited two Visual Arts teachers from different primary schools. The interviewees have experience in teaching digital art. The interviews were in a face-to-face mode through Zoom meetings. (see Table 3-1).

Table 3-1 Research Subject Data

Respondent	Code	Gender	Years of Teaching Visual Arts	Title	Interview Date and Time
Teacher 1	T1	F	4	➢ Panel Head of Visual Art ➢ General Studies Teacher	08 Feb 2022 (10:00 -11:04)
Teacher 2	T2	F	7	➢ Panel Head of Visual Art	18 Feb 2022 (15:50-16:37)

3.3 Research Schedule

The research began in May 2021. The researcher completed the literature review and revised the research proposal in mid-November 2021. The researcher conducted interviews and data analysis from January to March 2022. In April 2022, the researcher will finish the data analysis and the research report (see Table 3-2 for details).

Table 3-2 Research Schedule

Date	Implementation Matters
May 2021	➢ Submission of project proposal
Sep to mid-Nov 2021	➢ Meet with the supervisors for discussion
15 Nov 2021	➢ Submit the ethical review application with full research proposal
Nov to Dec 2021	➢ Design research questions
Jan to Feb 2022	➢ Interview with the interviewee
Mar 2022	➢ Data analysis
14 Mar 2022	➢ Honours project presentation
18 Mar to 18 Apr 2022	➢ Refine Project Report

18 Apr 2022	➢ Submit Honours Project Report

3.4 Research Limitation

Due to the limitation of time, only two teachers from different primary school took part in the interview. Their views cannot represent all other Visual Arts teachers in the academic community. The opinions and perspectives of the two interviewed teachers might not be fully comprehensive.

Besides, since schools were suspended during the research period, class observation could not be arranged for further and deeper exploration of the teaching and learning environments, application of pedagogies, and learning attitude and performance of students in class. The learning atmosphere, teaching and learning processes, and the reactions of students described by the interviewed teachers could not be proved. As teachers describe teaching and learning from their personal perceptions, it is possible that their responses might not entirely objective and neutral in describing the situation. Therefore, the result of the research can only be a reference.

Chapter 4 Findings and Analysis

The study explores how teachers plan digital art units and implement pedagogies to cultivate student creativity through interviews with two Visual Arts teachers experienced in digital art teaching from primary schools. The analysis results integrate into four sections based on the instructional design and implementation process. The four sections include the

preparatory and teaching planning stage, lesson planning stage, teaching practice stage, and assessment stage. The former two mainly correspond to research question 1, and the latter two correspond to research question 2. Analysis in each section is tightly linked back to the technological pedagogical and content knowledge and the research framework. The analysis result is as below.

4.1 Preparatory Stage: Teachers Manage and Apply Technological Pedagogical and Content Knowledge Well

Both interviewees highlight the technological pedagogical and content knowledge when discussing factors they will consider when teaching digital art. Technological content knowledge, pedagogical content knowledge, and technological pedagogical knowledge of teachers are essential for designing teaching content, teaching and learning activities, and pedagogies to help students manage teaching content and digital art app functions and eventually enhance their creativity effectively.

4.1.1 Technological Content Knowledge: Manage Digital Art Apps Before Teaching

T2 will consider the ability of colleagues when teaching digital art. It indicates the technological content knowledge of teachers is influential in the design of teaching content and plans. Teachers have to manage the functions of apps so that teachers can effectively teach students the subject knowledge through digital art exercises and creation. Transferring the subject knowledge and skills of using the app to students successfully is vital because this knowledge is the foundation for creativity to develop. T2 said,

"I will consider the ability of the teachers because there are three other visual arts teachers besides me, but I am in charge of half of the visual arts classes in the school by myself. Therefore, I also need to accommodate whether other colleagues are familiar enough with the application." (Interview, Teacher 2, A1)

Besides, concerning the teaching experiences in digital art, T2 pointed out that rather than designing new units, they rather modify the pre-exist units and make them digital art units. T2 explained,

"We will combine some of our previous modules to create digital art. Therefore, it is relatively easy for teachers to bridge the gap between traditional art media and digital art because they are not working on a new topic or creation but rather adding digital art elements to old units, so it is easier for teachers to accept." (Interview, Teacher 2, A11)

T1 further stated that mastering digital art applications is not enough. It is more about cooperating technological knowledge and skills with pedagogical knowledge, that is, the mastery of technological pedagogical knowledge. T1 mentioned that teachers need to learn to be flexible in using pedagogies and teaching methods. Teachers are encouraged to adjust the pedagogies according to their ability so that teachers can reach the learning objectives effectively in their way. T1 stated,

"As for the teacher's ability, of course, that's the most important part. Even if the teacher is familiar with the application and can use it well, if he or she doesn't know how to deliver the class, it will still cause problems and it will be easy to get into trouble…… In short, visual teachers should help their colleagues…… allowing them to use the simplest and straightforward methods to teach students to do the classroom exercises." (Interview, Teacher 1, A4)

T1 admitted that some colleagues are not in the Visual Arts major. They have limits of knowledge in Visual Arts and digital art applications. At that moment, shared and well-prepared teaching materials would be helpful to them. It underlines that well-designed lesson plans and fully prepared teaching and learning materials can facilitate the delivery of lessons. T1 shared,

> *"Of course, there are some colleagues who are more resistant because visual arts is not their major and they have their work, so it's hard to request them to devote time and resources to learning digital arts. But it doesn't matter, because as long as we have the teaching videos and presentations ready, they will be fine (laughs). But of course, they have to understand a little bit, at least they won't resist."* (Interview, Teacher 1, A4)

T1 students' digital artworks (see Figure 4-1, 4-2, 4-3) and T2 students ' digital artworks (see Figure 4-4, 4-5, 4-6) show the use of media. It illustrates that teachers need broad technological content knowledge to teach different kinds of digital art. Again, teachers' familiarity with the functions and applications of digital art applications is essential.

Figure 4-1 Digital Art Drawing with Use of Projection by T1's student

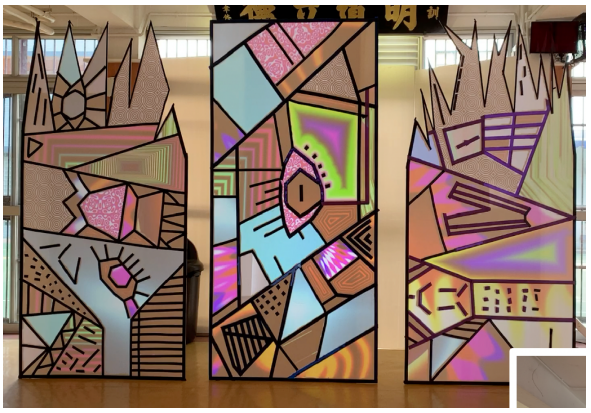

Figure 4-2 Digital Art Drawing with Use of Projection by T1's student

Figure 4-3 Animation with Use of Projection by T1's student

Figure 4-4 AR creation using EyeJack by T2's student

Figure 4-5 Photoshop creation using Photoshop Mix

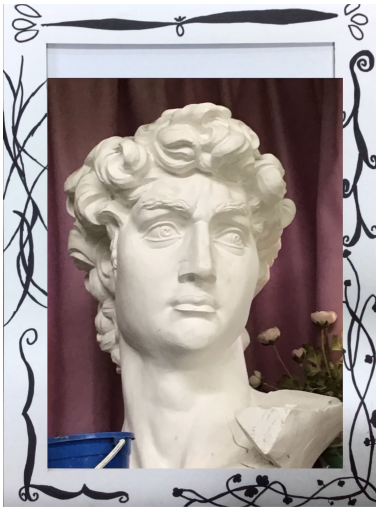

Figure 4-6 Digital Drawing Animation using Adobe Fresco

by T2's student

The technological content knowledge (TCK) of teachers is highlighted in the preparatory stage for a digital art unit. Teachers need to master (TCK) for preparing the teaching content. When it comes to the lesson planning stage, what factors would teachers consider when designing digital art units for the good of creativity cultivation of students?

4.1.2 Pedagogical Content Knowledge: Progressively Construct Students' Art Knowledge, Skills, And Ability To Create Digital Art

Knowledge of students is part of the pedagogical content knowledge teachers need to know. T2 shared that she would try the creative exercises first before implementing them. It allows her to fine-tune her teaching and figure out solutions for helping students to reach the teaching objectives. It shows that teachers are applying pedagogical content knowledge when doing instruction design. Teachers integrate art knowledge, pedagogical knowledge, and knowledge of learners to organize and adapt the content so that students can easily manage it. T2 stated,

> *"I will also do the creative work and find out the difficulties that students may encounter in the creative process, and then I will fine-tune my teaching to address these difficulties, either by giving students more help in these difficulties, or by giving them more time, or by thinking of ways to help them."* (Interview, Teacher 2, A20)

T2 also pointed out that taking the first time to try is necessary as you will never know what is new to students and what is not if you do not try. It shows the

spirit of experimentation of teachers. Understanding the prior knowledge and learning difficulties of students is also necessary. T2 would adjust the teaching plan according to the data of the performance of students, which is an implementation of formative assessment. T2 illustrated,

> *"When I first started teaching digital art, I would encounter situations where I would say, 'What? Students don't know anything about this.?'. If I hadn't taught, I wouldn't have known. So I will adjust my teaching plan for the next time."* (Interview, Teacher 2, A7)

Meanwhile, T1 shared her way of applying pedagogical content knowledge in teaching. T1 stated that constructing students' art knowledge and physical art-making skills through art appreciation, experiments, and art-making exercises should come before teaching digital art. The established art knowledge and creation skills help students in digital art creation. When learning digital art, teachers need to design exercises for students to practice the functions of the apps. It indicates the consideration of the learning ability of students as well as the pedagogies when designing units. T1 elaborated,

> *"In this course, students will draw on the application eventually, but I will not give students an avatar appearance right from the beginning and then let them draw in digital form. There is still a part of teaching art knowledge, such as introducing Picasso, letting students appreciate his different self-portraits, doing some physical drawing exercises, etc. All these learning stages are necessary… In the learning process, even though the students'*

final artwork is in digital form, they do some exercises and experiments first, like some experiments with different portraits, and some experiments with colors. All of these exercises will be done in sketchbooks, that is, they do it in some physical form." (InterviewT1, Teacher 1, A6)

In the lesson planning stage, the interviewed teachers underline the application of pedagogical content knowledge in designing learning-facilitating teachings. Designing digital art units is one thing. Cultivating student creativity through creating digital arts is another matter. How do teachers cultivate the creativity of students through digital art?

4.1.3 Pedagogical Content Knowledge: Use the Strengths of Digital Art to Complement the Weaknesses of the Students

T2 has integrated the knowledge of learners and digital art knowledge to organize teaching content that suits the learning needs of students. T2 has made good use of the functions of digital art applications to complement the weak physical creation skills of students, assisting students to express their ideas and creativity. T2 commented,

"Some students may be really weak in drawing or handwriting, while others may like to draw with iPads and are comfortable with them. Then we should not stifle some of the students' abilities in digital art." (Interview, Teacher 2, A24)

"As for the students themselves, some of them have different ideas, but they can't express them through painting or traditional media. Students can then use digital art to express their ideas. This may help students who are not good at practical work so that they can make use of a tablet …… some students with special learning needs may not be able to write at all, so they can type on a tablet, or they can use a screenshot, or they can insert pictures from others, or some existing materials to help them……in a digital art application, students can easily draw the pattern they want with a single click or a few keystrokes. When students are not limited in such a way, they can express their ideas through digital art." (Interview, Teacher 2, A24)

T2 students' digital artworks (see Figure 4-7) show that students could do digital art creations similar to derivative works, in which they can borrow and insert digital images from the internet into their digital artwork to creatively present ideas. Students have also typed words and placed them on their work. It allows students to develop their creative work free from the limitations of their actual creation skills, leaving them with more space and freedom to express their creativity.

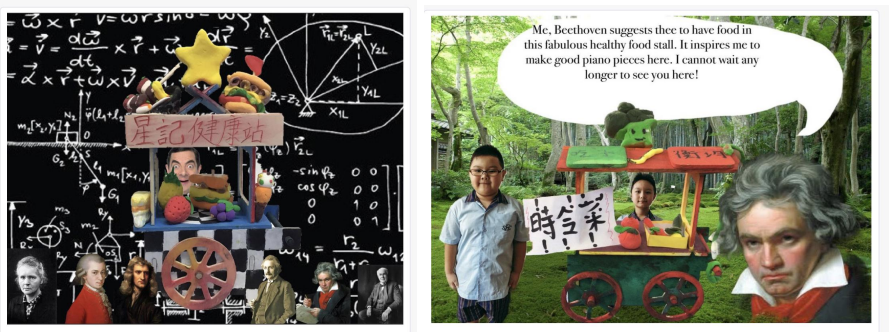

Figure 4-7 (a) (b) Digital Artwork by T2's Students

In the preparatory and lesson planning stage, more focus is on applying technological content knowledge and pedagogical content knowledge. While at the teaching practice stage, what knowledge do teachers need? And what do teachers do to make the creativity cultivation of students more likely to occur?

4.1.4 Technological Pedagogical Knowledge: Provide Online Learning Resources to Students for Preparation and Self-learning

T1 emphasized that self-learning and diverse types of references (see Figure 4-8) would be helpful for students to have further inspiration for facilitating their creativity. T1 said,

> *"In the Digital Arts unit, in addition to classroom lectures, we require a lot from students in terms of self-learning. During class time, we will give students some inspiration, but in fact, I think that a time when students can learn and get more ideas on their own is at home. Because students have more time for self-learning at home. Knowledge needs to be discovered, learned, and understood in person to learn more. So, students are learning in this way and they have to get used to it"* (Interview, Teacher 1, A8)

"The types of examples given must be diverse enough. For example, when you teach portraits, you give examples of portraits, or when you teach landscape painting, you give examples of landscapes, and this is a regular practice. But when it comes to digital art, I think the examples given could be more diverse and richer." (Interview, Teacher 1, A8)

Figure 4-8 (a) (b) Examples of Diverse Types of References by T1

4.2 Lesson Planning Stage: Teachers Include Each Stage of Creative Process in Lesson Plans

From the literature review, the creative process consists of four main stages as concluded. They are the exploring stage, thinking and doing stage, stage of outcomes, and assessment stage. T1 and T2 have shared their teaching strategies designed in each stage to cultivate the creativity of students.

4.2.1 Provide Space and Time for Students to Explore the Digital Art Apps with Guidance

T1 elaborated on the teaching and learning activities planned in the exploring stage and thinking and doing stage. T1 would leave sufficient time and space for students to explore and practice the functions of digital art applications and master them. T1 shared,

> *"After I have explained the drawing application to the students, the students need to explore it. The students can't learn e-painting straight away, so some exercises should be designed, such as letting the students practice selecting colors to draw lines, erasing lines, unlocking objects, returning to the previous step, submitting works, etc. All these basic functions need to be mastered by the students before they start the genuine creation."*(Interview, Teacher 1, A6)

T2 shared a similar view T1 on providing sufficient time for exploration. After students finished exploring, T2 would invite students to share their discoveries, and then she would sum up some useful functions mentioned in class to direct students back to the teaching objectives. T2 responded,

> *"I also have prepared content to teach, and then the students have a period to do exploration, and then I will talk about what they have discovered in their exploration. That is, I won't just leave the students to their own devices and open up the whole class to them to do only explorations since the students will be doing something else, so I have to pull the students back to the point and go back to*

discussing what they have explored and make a summary to them, including what they have learned or what other students have learned in some discoveries. (Interview, Teacher 2, A14)

From the sharing of T1 and T2, after teaching prepared content and functions of applications, teachers are suggested to leave students with enough time and space to explore it with some guidance from teachers. Students will be generating ideas and managing the app functions, which are the highlighted activity of the exploration stage and the stage of thinking and doing. At last, teachers need to summarize the key learning points for students to help them clarify the learning objectives.

4.2.2 Provide References to Inspire Students and Engage Them to Explore More On Their Own

For the interest of students in exploration and collecting information, T1 would provide more inspiring references in class and after class to get students interested in exploring more on their own. T1 added,

> *"First, I will explain the theme, idea, and content of the artwork to the students, then I will give them some videos to watch so that they can learn about different artists and artworks. I will show students the artworks during the class and provide more examples and materials to students after the class, but these materials must be able to attract students' interest and then they will find more."* (Interview, Teacher 1, A8)

To give students more stimulation in ideas development, T2 would demonstrate unusual and creative demonstrations to students to direct them to develop innovative and intriguing ideas and creations. T2 stated,

> *"I will show the students a lot of interesting reference pictures on the Internet, and when I do the demonstration, I will make some creative demonstrations that the students probably did not think of."* (Interview, Teacher 2, A16)

Providing diverse and rich references, such as artworks from different artists and interesting reference pictures, during class and after school, help engage students to explore more in person. Apart from this, formative assessment and feedback are influential factors influencing the cultivation of creativity. How would teachers make use of them to enhance student creativity?

4.2.3 Continuous Peer Reviews and Assessments for Learning

T1 would conduct assessments for learning guided with assessing criteria continuously throughout the learning process as it can provide ongoing feedback to students to develop further and modify ideas and creations, making them more creative. T1 highlighted that both the teachers, students, and peers would assess the ideas or artworks. T1 clarified,

> *"The assessment of students' creativity is not made only at the end of the work, but continuously in the middle of the exercise, during the different explorations of the students, because their creativity comes from the earlier*

exercises, so it is impossible to tell the students what is right or wrong at the last moment, and it is essential to have clear guidance all the way through. In the final assessment, there are criteria to follow, and I am not the only one who does the assessment, the students have to do it too." (Interview, Teacher 1, A10)

T2 shared a similar view on the participation of students in self-evaluation and peer assessments (see Figure 4-9). However, T2 particularly stresses the role of teachers in giving feedback to students for improvement. T2 said,

"Then, of course, besides the students' self-evaluation and how they see their work, the teacher should also give supplementary feedback. As I am a professional, I need to guide students in the right direction, that is, the skills taught by the teacher, whether the students have done it or not. Teachers need to guide students on what they have learned. In addition, for students to explore, teachers' guidance is very important. Teachers comment and then students make modifications, I believe this is a relatively complete learning experience." (Interview, Teacher 2, A10)

Figure 4-9 (a) (b) Peer Reviews on Creations by Students of T2

Formative assessments are essential in the students' creativity cultivation as discussed in the literature review. Despite that T2 had mentioned the use of formative assessments once in chapter 4.1.2, both the T1 and T2 stress using assessment for learning to enhance the performance of students more by giving feedback to students.

4.3 Teaching Practice Stage: Teachers' Acts for Cultivating Students' Creativity

In addition to the assessment for learning, the pedagogies and teaching behaviors have a direct and great impact on the creativity cultivation of students. T1 and T2 show emphasize the use of compliments and creative demonstrations to encourage the creativity of students during the thinking and doing stage and art-making stage.

4.3.1 Compliment Students Generously and Publicly

T1 shared that doing some acting when giving compliments in class publicly is her strategy to motivate students to think more and create creative work as peers' do. T1 illustrated,

> *"For example, I have to do some little tricks, such as picking extreme examples. For example, a student worked with shapes, and (said excitedly) I would point it out and then praise it! ... I need to use these few standout examples to give the other students an impression: 'Oh! So all my classmates have been thinking of different ideas! Okay, I'll think of something special then!'. Teaching children is about encouraging them through these little acts and compliments, to encourage them to go one step further and think a little bigger."* (Interview, Teacher 1, A9)

When asked about the behavior of copying works from others, T1 pointed out that that is because of the lack of confidence in creating creative work. Encouragement of teachers would be essential at these moments. T1 said,

> *"Even students with high ability may copy from others. It's not a question of the ability level. Once students don't have the confidence to create creative work, they will easily choose to imitate. I think it is natural. I wouldn't blame them. Although it is natural for students to copy, I believe the visual arts teacher should make students break out of this barrier and encourage them to take one more step to think about their creations. Therefore, I*

always encourage students to think more during the learning process." (Interview, Teacher 1, A9)

T1 indicates that raising the student's work on what is worthy of appreciation in terms of art knowledge, skills, and creativity is a spur to better performance in creating creative ideas and creations in the future. Compliments are useful to foster students' progress as praising can give students recognition and confidence to keep creating something creative.

T2 agreed that expressing admiration for student effort and encouraging them is essential. T2 suggested that the bright attitude of teachers can motivate students to produce innovative ideas and creations. T2 pointed out that there are rarely criticisms but more likely suggestions. T2 explained,

"I like to be more open, I'll stick to the framework of the classroom and let the students express themselves, I rarely criticize what the students have done, I rarely say no to the students, I rather advise on what they are doing. In addition, I will praise students, some students do well, or they use certain methods. I will bring it up to the class, that makes ... that is to encourage them ... and also to give students recognition. Every student has different things that they do well, but ... (laughs) it's just the difference between 1 point of doing well and 10 points of doing well. Students who did 1 point of good work are not that good, but if they get the teacher's approval or encouragement, the students will want to do better or be more involved in the visual arts." (Interview, Teacher 2, A13)

Generous support and encouragement from teachers mean a lot to students as it helps them build up their confidence and belief in themselves. Students will believe they have the potential to do better and produce fresh ideas and creative works.

Both T1 and T2 have stressed the role of teachers but did not mention the role of students or how they should respond to or cooperate with teachers to cultivate personal creativity. The factor of teachers is highly indicated here.

Verbal compliment limits give psychological support and motivation to act. What practical acts do teachers do to support the creative development of students?

4.3.2 Demonstrate Some Unusual Work to Encourage Students' Imagination

T2 thinks doing unusual demonstrations to students can help them be open to new ideas and creativity. It is encouraging the students to think out of the box and be imaginative. T2 elaborated,

> *"... when I do the demonstration, I will make some creative demonstrations that the students probably did not think of. If the teacher does something that the students would normally think of, such as designing a food truck that is set up on the street, which the students can think, then I will not do it. ... I will do something different so that when the students see it, they will think, "Oh! That's how you can do it!" Then ... the students will know that it's not just about being placed on the street, so they can think of other*

ideas. So I will do some special demonstrations for the students." (Interview, Teacher 2, A16)

Some digital artwork on the same topic created by T2's students (see Figure 4-10) does show their strong, diverse, and intriguing ideas. The unusual demonstrations of teachers have given positive encouragement to students to create something surprising.

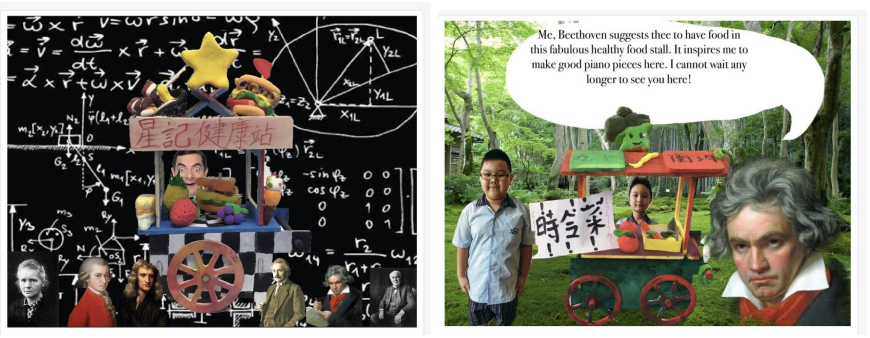

Figure 4-10 (a) (b) Digital Artworks by T2's Student

Figure 4-10 (c) Digital Artwork by T2's Student

The artworks above prove the unusual demonstration of teachers has inspired the students in creation. While teaching students to create innovative artwork, the attitude of teachers to unexpected works also matters.

4.3.3 Be Open to Students' Unusual Ideas and Creations

T2 pointed out that teachers should first be sufficiently open to weird and intriguing artwork before teaching and encouraging students to create in this way. Teachers should be able to accept these works (see Figure 4-11) without criticism but provide some advice. T2 said,

> *"The teachers themselves should be open, in terms of psychological adjustment, for example, some students have some outstanding ideas, or the work they create is really special, at this moment I need to open my mind and raise my level of acceptance towards the work."* (Interview, Teacher 2, A7)

> *"I like to be more open, I'll stick to the framework of the classroom and let the students express themselves, I rarely criticize what the students have done, I rarely say no to the students, I rather advise on what they are doing.* (Interview, Teacher 2, A13)

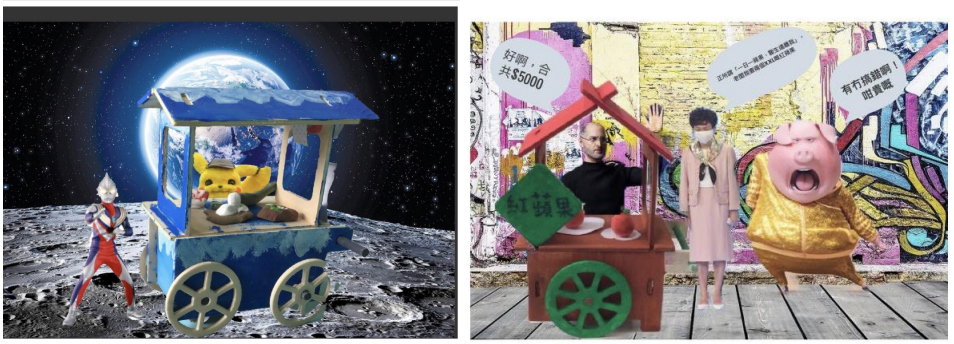

Figure 4-11 (a) (b) Digital Artwork by T2's Students

Figure 4-11 (c) Digital Artwork by T2's Student

An open attitude to unusual ideas and works of students is necessary. It indicates a welcoming attitude towards self-expression, unlimited imagination, and originality of work, which are part of the essential elements of creativity.

Art-making requires not only creative ideas but also skills for creating artwork. How do teachers establish every student with skills for creating?

4.3.4 Provide Online Self-learning Materials for Students to Catch Up and Revise

T1 acknowledged that there are learning differences between students. Students vary in their learning progress. T2 shared that teachers will post their self-produced teaching videos on the learning platform in advance for students to review. T1 said,

> *"Because some students are really weak learners, I usually include a self-learning video which I make myself ... If the student really can't keep up in class, then... (smile) ... right ... "If the student really can't keep up, then you can go back and watch this video, it's the same! That is, to comfort them."* (Interview, Teacher 1, A3)

T1 underlines that teachers need to mind the learning progress of students. They need to find solutions to help students keep up with the teaching progress under a fixed teaching schedule.

When asked about the after-school self-learning activities, T2 stated that there is not much preparatory work or homework for students due to the concern of stressing students. T2 said,

> *"There is not much prep homework... if we do have any pre-assignments, they will probably be a sharing after students have seen the artworks. For instance, students may need to find some of the Impressionist artists or their works when learning Impressionism. Then the student would share them on the learning platform Seesaw. Right... it's helpful if the student builds the concept before the class."* (Interview, Teacher 2, A25)

> *"I don't want to stress the students with the visual arts homework, so I rarely give visual arts homework, if there is any, it's just a simple task."* (Interview, Teacher 2, A33)

T2 showed a different view from T1 in terms of after-school learning activities. However, both are showing their concern about their interest in learning. T1 tried to avoid students reducing their interests in Visual Arts due to additional work out of the class, while T2 encouraged students to self-learning by motivating them through attractive online references.

T1 and T2 have shared their concrete teaching strategies used for cultivating the creativity of students in class. The next step is to assess the level of creativity of students after effort has been made. What criteria will teachers use to assess the creativity of students through their creative work? How do teachers define creativity?

4.4 Assessment Stage: Teachers' Criteria for Assessing Creativity

How teachers define creativity reflect their teaching objectives and the requirement for students, which affect the performance of creativity of students. The following will show an investigation of how teachers set criteria for assessing the creativity level of students and their definition of creativity.

4.4.1 Art knowledge and Skills

T1 clarified that aesthetics is not the only criterion to assess artworks. The use of skills is also the criteria for assessment. T1 said,

> *"In digital art, creativity is not only determined by the aesthetics of the picture itself, for example, when doing animation, I also demand whether the animation is smooth enough, or whether the use of tools in digital applications is mastered. With these criteria, only then can students understand how to evaluate."* (Interview, Teacher 1, A10)

T2 thought that it is impossible to only assess the creativity of artworks as the skills of creating and the ideas of the artworks are concrete elements that construct the creative work. T2 stated,

"I think it's hard to tell whether a student scores 100 or 0 in terms of creativity because each student's creativity ... is his or her very own creativity. In such open topics, I often do not give marks. Instead, what I give marks for is probably the marks given to the car design, that is, how well the student has designed it, or the texture, or whether the student has mastered the skills, these are what I can give marks for. But for creativity, I would ask the student, 'Whose work do you think is interesting, creative, and relevant to the theme?' If students make their work unique, or if all of the 100 students can tell their own stories, then I will adjust their marks, not that the mark for creativity takes up 100% of the work, but only about 30% of the mark." (Interview, Teacher 2, A17)

Both T1 and T2 mentioned that the art knowledge applied in artwork, including the taught art knowledge and skills, would be the criteria for assessing creations as they are the building blocks for creativity. In addition to subject and technological knowledge, how do teachers define and rate creativity in focus?

4.4.2 Originality

T2 proposed that she will assess the skills and creativity together. When assessing the creativity of students' artwork, she would consider whether the artwork is interesting, original, relevant to the theme, and shows ideas meaningful to themselves. T2 said,

"I think creativity is uniqueness, the work should be unique, using their word to express their own story, which can sometimes make the audience

smile and resonate with them ... for creativity, I would ask the students, "Whose work do you think is interesting, creative, and relevant to the theme?" If students make their work unique, or if all of the 100 students can tell their own stories, then I will adjust their marks, not that the mark for creativity takes up 100% of the work, but only about 30% of the mark." (Interview, Teacher 2, A17)

T2 commented that creativity will be assessed at last as a whole. It is only a part of the assessing items in the evaluation. The assessment criteria will strike a balance for assessing both the art knowledge, skills, and creativity.

4.5 Conclusion

The results of the finding illustrate the knowledge teachers require in each stage of the creative process and favorable pedagogies to cultivate student creativity (see Figure 4-12).

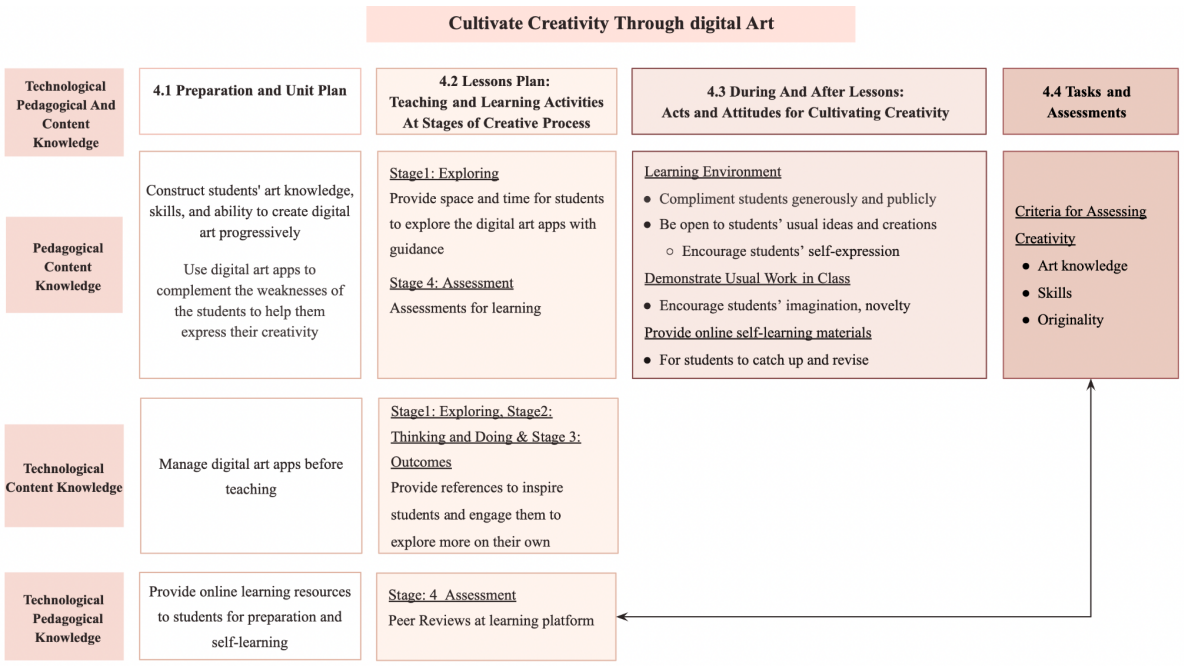

Figure 4-12 Knowledge Teachers Require in Each Stage of the Creative Process and Favorable Pedagogies to Cultivate Student Creativity

In response to Figure4-8, researchers found that teachers require technological pedagogical and content knowledge throughout the teaching design and implementation process. Both T1 and T2 indicate the importance of teachers for mastering and applying the technological pedagogical and content knowledge for planning lessons, applying pedagogies, and designing tasks and assessments that are favorable to the creativity cultivation of students.

Ch 5 Conclusion and Implications

Conclusion and implementation will be made in this chapter based on the literature review research analysis, and the researcher's insights into response to the research objectives and questions, which is to find out how teachers design lessons to cultivate students'

creativity and how teachers implement pedagogies to enhance students' creativity. The researcher gives suggestions and concludes with a discussion based on the research analysis and insights.

5.1 Research Insights

The research results show that the mastery of technological and pedagogical content knowledge (TPACK) of teachers and application is the key to cultivating the creativity of children. Teachers would have to apply TPACK throughout the teaching planning and implementing process. The TPACK allows teachers to better design unit and units plans, effective pedagogies, tasks, and assessments that facilitate the creativity cultivation of children.

5.1.1 Technological Pedagogical and Content Knowledge of Teachers

From the research findings, the researcher summarized the responses of the interviewees and find that they are applying technological pedagogical and content knowledge in every teaching and learning process.

Teachers need to first master digital art apps. Then, teachers need to apply their art knowledge with the knowledge and skills of using the apps to design creative units with the understanding of learners' prior knowledge and learning ability, which relates to the technological pedagogical and content knowledge.

In the beginning stage of teaching digital art, teachers can start with editing the pre-exist units into digital art units, or combining digital art elements into the

physical art creation units for trial. The combined media creation units allow both the teachers and students to adjust to using apps to create art and manage the skills progressively.

Teachers are also suggested to utilize the functions of the app to complement the weak drawing skills or other creative techniques of the students, assisting them to create and express their creative ideas.

5.1.2 Units Planning

In the lessons plannings, more is focused on the use of pedagogical and content knowledge, in which teachers apply pedagogies in transferring knowledge and skills to students as well as enhance their creativity effectively. According to the result findings, teachers need to provide sufficient time and space for students to explore and get familiarized with the functions of apps. Besides, teachers need to provide diverse references to inspire them for generating ideas and engaging them to explore more on their own. This is one of the essential stages of the creative process (Treffinger, 1988, 1991; Isaksen et al., 2000). After the exploration, teachers need to summarize the key learning points to students so that students can be clear about the learning objectives.

5.1.3 Pedagogies

During teaching practice, teachers need to create a bright and supportive learning environment for students, providing them a safe space for expressing their weird and creative ideas and artwork as part of an assessment. To inspire students to produce interesting ideas, teachers need to demonstrate creative ideas to students

first, show them the method, and motivate them to create something original and funny. Moreover, teachers need also to take care of the learning ability and progress of learners. As there may be learning differences between students, teachers may need to make use of online learning platforms to support students' learning after class. For example, teachers can self-produce instructional videos for students to revise and manage their skills in using apps and provide more references for inspiration and creative ideas.

Teachers are suggested to show admiration for the effort of students paid and compliment on what they have done well generously, publicly, and in a bit dramatic and supporting tone. The compliment from teachers can give students a sense of achievement and motivation to keep going. Students can also learn from their peers and create as creatively as they, which is favorable to the enhancement of their creativity.

5.1.4 Assessments For Learning

Assessment for learning is one of the effective ways to track the learning progress of students and improve their performance of students through giving feedback from teachers and peers. Assessment for learning should conduct continuously during the learning process, allowing students to improve from time to time.

5.1.5 Necessity for every Visual Arts Teacher to Manage Digital Art Apps

Technological pedagogical and content knowledge is shown as the basis and the core for designing digital art unit plans, implementing creativity-facilitating pedagogies, and design of tasks and assessments. According to T1,

> *"As for the teacher's ability, of course, that's the most important part. Even if the teacher is familiar with the application and can use it well, if he or she doesn't know how to deliver the class, it will still cause problems and it will be easy to get into trouble…"* (Interview, Teacher1, A4)

However, some teachers who teach Visual Arts lessons may not be in Visual Arts major and may not have the interests and time to master different digital art apps. According to T2,

> *"Of course, there are some colleagues who are more resistant because visual arts is not their major and they have their own work, so it's hard to request them to devote time and resources to learning digital arts."* (Interview, Teacher 1, A4)

T2 said it is understandable that it is hard for teachers to devote time to mastering digital art as it really takes quite a long time to manage an app that you have never used before, especially when there is already a huge workload. T2 shared,

"One time my school worked with a technology company. They have released Blender, a free and famous application used for 3D animation. We worked with this company and then designed a program for the students to try out and learn using the application on computers. Wow (sigh), I think I have been familiar with digital art and very comfortable with these applications. But the difficulty and challenge are that sometimes it does take time to learn something new to you. It leads to another issue, which is the heavy workload of teachers. Before learning the application, I have to finish my work, such as marking homework, dealing with student issues, and managing administrative work. It causes learning new apps to become an extra time-consuming, mentally and physically demanding task." (Interview, Teacher1, A11)

Therefore, the short-term solution is that teachers who are familiar with the digital art apps will be responsible for designing the digital art units and share with colleagues. According to T1 and T2,

"... there are some colleagues who are more resistant because visual arts is not their major and they have their work, so it's hard to request them to devote time and resources to learning digital arts. But it doesn't matter, because as long as we have the teaching videos and presentations ready, they will be fine (laughs). But of course, they have to understand a little bit..." (Interview, Teacher 1, A4)

"There are only four visual arts teachers in our school, and I am responsible for half of the visual arts classes in the school. So basically, I am responsible for all the development and teaching in the Visual Arts department. So I probably teach three classes in one grade, while another teacher may teach only the left one... I would prepare to teach PowerPoints for them so that they know how to practice and how to teach." (Interview, Teacher 2, A23)

As other colleagues may directly implement the designed lesson plan without much participation in the designing part, they have not as familiar with the teaching process as the one who designed the lesson, which may affect the teaching effectiveness and learning outcomes. For question, T2 shows her confidence in the ability of her colleagues. T2 said,

"Three of our Visual Arts teachers major in Visual Arts, and one is a minor, so we have enough professional knowledge to achieve the teaching objectives." (Interview, Teacher 2, A28)

Although T2 showed confidence in colleagues, the teaching outcome cannot actually be proved with actual evidence. whether the designed lesson plans can be implemented effectively by other colleagues is still uncertain. Moreover, relying on experienced teachers to design digital lessons is still a short-term solution. It is would be ideal if all Visual Art teachers have managed the digital art apps and experienced in designing and delivering digital art units to cultivate students' creativity. As T2 said,

"Teachers with sufficient knowledge of digital arts and applications will be favorable to digital art teaching development in school." (Interview, Teacher 2, A29)

If all Visual Arts teachers have managed knowledge related to digital art and apps, they could discuss and plan the digital art units together and make the unit plans and teaching more satisfying.

5.1.6 Lack of Using Formative Assessments

From the research findings, both T1 and T2 have emphasized the use of assessment for learning during the teaching and learning process but less mentioned formative assessments. According to Berry (2008), assessment for learning mainly focuses on the role of teachers to give students feedback for improvement and to promote student learning. Both T1 and T2 mentioned that they will give feedback and suggestions to students on the exercises and artworks throughout the learning process for improving their performance of them. However, they seldom mention formative assessments.

According to Black and William (1998), formative assessment refers that teachers interpreting the data on the learning progress of students, and understanding their learning needs and difficulties so that they can adjust the instruction. Formative assessment is more about adjusting and refining the teaching design, but not simply giving feedback to students for improvement.

5.2 Discussion

In this research, some questions are raised which need further investigation in the future.

5.2.1 Further Investigation Through Class Observation

According to the research findings, both T1 and T2 mentioned that they are responsible for designing the digital art units as the Visual Arts panel who are familiar with digital art. They will share with their colleagues and the colleagues will implement the teaching. It is questionable whether teaching effectiveness and the learning outcomes of students will be affected when they implement the lesson designed by others.

Further investigation in investigating the effects on teaching outcomes between implementing the teaching plans designed by other teachers and the one designed by themselves is required in the future. The teaching professionals of teachers are needed to investigate simultaneously.

5.2.2 Further Investigation on the Implementation of Assignment for Creativity Cultivation

According to the research findings, T1 mentioned that self-learning is important in enhancing learners' creativity as they can get more inspiration on their own for creative ideas. Therefore, T1 would provide extra references for students after school to motivate and stimulate them to explore more on their own. T2, in contrast, is concerned that the extra work after school may stress the students out, causing them to lose interest in Visual Arts and art-making.

Based on the above contrasting views, some questions are raised and could be further explored in the future. The questions are as follows:

1. How pre-assessments can help the cultivation of creativity?
2. What kinds of pre-assessments will benefit the cultivation of creativity?
3. How much workload will be suitable ?

Interviews with students and teachers for understanding their views on pre-assignments and homework for Visual Arts could be a way to find out the answer in future research.

5.3 Conclusion

In summary, to cultivate the creativity of students through digital art, teachers have to manage their technological pedagogical and content knowledge (TPACK) first. TPACK allows teachers to design effective units plan, creative tasks, creativity-facilitating pedagogies, and assessments. With the fast development of digital art apps, it is essential to keep their TPACK up-to-date. This study shows some ways of planning digital art units and effective pedagogies used for cultivating creativity by two experienced teachers. It is hoped that the pre-service and in-service teachers can borrow some ideas here to help them design digital art lessons.

References

Ainsworth, S., Prain, V., & Tytler, R. (2011). Drawing to learn in science. *Science*, *333*, 1096-1097.

Azzam, A. M. (2009). Why creativity now?: a conversation with Sir Ken Robinson. *Educational Leadership*, *67*(1), 22.

Berry, R. (2008). *Assessment for Learning*. Hong Kong University Press.

Browning, K. (2008). Art as transformation. In M. Gardner & U. Kelly (Eds.), *Narrating transformative learning in education* (pp. 211-221). New York, NY: Palgrave Macmillan.

Black, P., & Wiliam, D. (1998). Inside the Black Box: Raising Standards through Classroom Assessment. *The Phi Delta Kappan*, *80*(2), 139–148.

Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability, 21*(1), 5–31.

Black, J., & Browning, K. (2011). Creativity in Digital Art Education Teaching Practices. *Art Education (Reston), 64*(5), 19–34. Retrieved from https://doi.org/10.1080/00043125.2011.11519140

Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2004). Working Inside the Black Box: Assessment for Learning in the Classroom. *Phi Delta Kappan, 86*(1), 8–21.

Chappuis, J. (2015). *Seven strategies of assessment for learning (Second edition.)*. Boston: Pearson.

Creely, Henriksen, D., & Henderson, M. (2021). Three Modes of Creativity. *The Journal of Creative Behavior, 55*(2), 306–318.

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (Eighth edition.). New York: Routledge.

Colley, K. M., & University of Denver. Curriculum Instruction. (2015). *Cultivating creativity : the practice of teaching for creativity in the elementary classroom.* Ann Arbor ProQuest Dissertations & Theses.

Galletta, A., & Cross, W. E. (2013). *Mastering the Semi-Structured Interview and Beyond*. New York: NYU Press.

Guelzim, T., Obaidat, M. ., & Sadoun, B. (2016). Chapter 1 - Introduction and overview of key enabling technologies for smart cities and homes. *In Smart Cities and Homes* (pp. 1–16). Elsevier Inc.

Hagood, M. C. (2011). Media literacy education: On the move. *Journal of Media Literacy Education, 3*(1), 11–13.

Hong Kong Education Bureau. (August 2015). Report on the Fourth Strategy on Information Technology in Education. Retrieved from https://www.edb.gov.hk/attachment/en/edu-system/primary-secondary/applicable-to-primary-secondary/it-in-edu/ITE4_report_ENG.pdf

Hong Kong Education Bureau. (4 October 2021). Implementing “Bring Your Own Device (BYOD)” in Primary and Secondary Schools. Retrieved from https://www.edb.gov.hk/en/edu-system/primary-secondary/applicable-to-primary-secondary/it-in-edu/byod/byod_index.html

Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (2000). *Creative approaches to problem solving: A framework for change*. Buffalo, NY: Creative Problem-Solving Group.

Jennings, T., Robinson, R., & Northern Illinois University. (2005). *Investigating creativity Understanding the perspectives of teachers and students.*

Joo, Y. J., Park, S.Y., & Lim, E. (2018). Factors Influencing Preservice Teachers' Intention to Use Technology. *Educational Technology & Society, 21*(3), 48–59.

Kaufman, J. C., & Beghetto, R. A. (2013). In praise of Clark Kent: Creative metacognition and the importance of teaching kids when (not) to be creative. *Roeper Review, 35*,155–165.

Kaufman, J. C., Beghetto, R. A., & Dilley, A. (2016). Understanding Creativity in the Schools. *In Psychosocial Skills and School Systems in the 21st Century* (pp. 133–153). Cham: Springer International Publishing. Retrieved from https://doi.org/10.1007/978-3-319-28606-8_6

Kumar, R. (2011). *Research Methodology: A-Step-by-Step Guide for Beginners (3rd ed.)*. New Delhi: SAGE.

Maddux, C. (2003). Twenty years of research in information technology in education: Assessing our progress. *Computers in Schools, 20*(112), 35-48.

McQuiggan, S., Kosturko, L., McQuiggan, J., & Sabourin, J. (2015). *Mobile learning : a handbook for developers, educators, and learners.* Hoboken, New Jersey: Wiley.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A new framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Moss, C. M., & Brookhart, S. M. (2019). *Advancing formative assessment in every classroom : a guide for instructional leaders (2nd Edition.)*. Alexandria, Virginia: ASCD.

Ontario Ministry of Education and Training. (2009). *The Ontario curriculum: The arts, Grades 1 -8: The arts*. Toronto: Author.

OECD & CERI. (2008). Assessment for Learning Formative -The Case for Formative Assessment. *OECD/CERI International Conference, Learning in the 21st Century: Research, Innovation and Policy*. Paris: OECD.

Parslow, G. R. (2010). Commentary: Tablet PCs—Lightweights with a teaching punch. *Biochemistry and Molecular Biology Education, 38*(5), 339–340. Retrieved from https://doi.org/10.1002/bmb.20428

Phelps, R., & Maddison, C. (2008). ICT in the secondary visual arts classroom : a study of teachers' values, attitudes and beliefs. *Australasian Journal of Educational Technology*, *24*(1), 1–14. Retrieved from https://doi.org/10.14742/ajet.1226

Pickard, E. (1990). Toward A Theory Of Creative Potential. *The Journal of Creative Behavior, 24*(1), 1–9. Retrieved from https://doi.org/10.1002/j.2162-6057.1990.tb00524.x

Rhodes, M. (1961). An Analysis of Creativity. *The Phi Delta Kappan*, *42*(7), 305–310. Retrieved from http://www.jstor.org/stable/20342603

Runco, M. A. (2014). Creativity. *San Diego: Elsevier Science & Technology*. Retrieved from https://doi.org/10.1016/C2012-0-06920-7

Sakr, Mo. (2018). Multimodal participation frameworks during young children's collaborative drawing on paper and on the iPad. *Thinking Skills and Creativity, 29*, 1–11. Retrieved from https://doi.org/10.1016/j.tsc.2018.05.004

Sternberg, R. J. (2007). Creativity as a habit. In A.-G. Tan (Ed.), *Creativity: A handbook*

for teachers (pp. 3–25). Singapore: World Scientific Publishing Company.

Stuyck, T., Hadapy, S., & Dutre, P. (2016). Digital painting classroom: Learning oil painting using a tablet: *ACM SIGGRAPH 2016 Talks, 1–2. ACM*. Retrieved from https://doi.org/10.1145/2897839.2927393

Subramanian, C. (2012). New Studies Find iPads in the Classroom Boost Test Scores. New York, NY: Time, Inc. Retrieved from http://techland.time.com/2012/02/22/new-study-finds-ipads-in-the-classroom-boost-test-scores/

Thompson, A., & Mishra, P. (2007). Breaking news: TPCK becomes TPACK! Journal of Computing in Teacher Education, 24(2), 38-64.

Treffinger, D. J. (1988). Components of creativity: Another look. *Creative Learning Today, 2*(5), 1-4.

Treffinger, D. J. (1991). Creative productivity: Understanding its sources and nurture. *Illinois Council for Gifted Journal, 10,* 6-8.

Treffinger, D. J., Young, G. C., Selby, E. C., & Shepardson, C. (2002). *Assessing creativity: A guide for education.* Sarasota, FL: The National Research Center on the gifted and talented.

Treffinger, D. J. (2003). Assessment and measurement in creativity and creative problem solving. In J. C. Houtz (Ed.), *The educational psychology of creativity* (pp. 59-93)

Torrance, E. P. (1962). *Guiding Creative Talent*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Wang, T. W. (2015). Does iPad technology bolster art teaching and learning? *Visual Inquiry*, *4*(3), 153–167. Retrieved from https://doi.org/10.1386/vi.4.3.153_1

Wang, T. W. (2018). Empowering Art Teaching and Learning With iPads. *Art Education*, *71*(3), 51–55. Retrieved from https://doi-org.ezproxy.eduhk.hk/10.1080/00043125.2018.1436353

Weisberg, R. W. (2015). On the usefulness of "value" in the definition of creativity. *Creativity Research Journal*, *27*(2), 111–124.

Wilks, J., Cutcher, A., & Wilks, S. (2012). Digital Technology in the Visual Arts Classroom: An [Un]Easy Partnership. *Studies in Art Education,* *54*(1), 54–65. Retrieved from https://doi.org/10.1080/00393541.2012.11518879

Wiliam, D. (2011). What is assessment for learning?. *Studies in Educational Evaluation,* *37*(1), 3–14.

Wiliam, D. (2013). Assessment: The Bridge between Teaching and Learning. *Voices from the Middle*, *21*(2), 15-20.

Wiliam, D. & Thompson, M. (2008). Integrating Assessment with Learning: What Will It Take to Make It Work? *The Future of Assessment: Shaping Teaching and Learning.* New York: Routledge.

Wisker, G. (2009). *The undergraduate research handbook*. London: Palgrave Macmillan.

Yang, G. (2013). The iPad stop motion green screen studio. *NAEA News, 55*(3), 14.

鄭婉玲、胡馨允和葉志禧 (2013):平板電腦與幼兒教育課程:香港的經驗,《香港幼 兒學報》12 (1), 頁 29-36。

羅小燕(2015)。應用電腦科技提升高小學生繪畫創造力的探究

陳國泰(2018)。提升中小學教師的 TPACK 之有效策略。《臺灣教育評論月刊》, 7 (1), 頁227-235。

李佳蓉(2017)。從知識移轉觀論TPACK 之不足。《臺灣教育評論月刊》, 6(1), 頁141-148
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Appendix 1: Interview scripts Teacher 1 in Chinese

Interview Date: 2022.02.08

Interview Time: 10:00 a.m. - 11:04 a.m.

Interview Venue: Zoom Meeting Room

No: T1

00:00:55

問	為了培養學生的創造力，在設計數位藝術的教學單元時，您會有甚麼考量？	Q1
T1	我會將「數位藝術教學」演釋為應用於教學中。因為我是教小學的，我先介紹一下我在職的學校的背景吧。因為我所在的小學有推行BYOD（iPad一人一機電子學習）的。目前直到小四級的學生基本都是「一人一機」的，即是他們每人都有一部iPad。所以其實除了小一級的學生外，對於學生來說，硬件（iPad）的操作，並不是太難。學生對iPad的操作其實已經十分熟釋（笑），因為他們每天於不同的科目的課堂都會運用到iPad，所以學生在學習使用方面是較容易駕馭的。例如在介紹一些新的功能給學生時，他們能較快地接受和投入，因為一來他們年紀較小，二來他們有使用iPad的習慣，因此他們對數位藝術的接受能力較高。 雖然是這樣，但是傳統藝術和數位藝術之間始終是有分別的。因為我們只是將數位藝術滲入了視藝課程的一部分，而並不是整個課程都應用數位藝術。而且，學生初時都是做最基礎的實體創作，例如運用油粉彩、木顏色、廣告彩等媒介繪畫，做手工等。若突然跟學生介紹一個的單元，或者一個電子繪畫的單元就…（思考）我做的方式不能偏離得太厲害。意思是，我不會一開始便教學生剪片，我的做法會是讓學生去融合不同的創作媒介，我希望學生不	A1

是完全只在應用程式裏做創作的。例如學生在某個實作裏已經完成了一些創作，比如已完成一個手工創作，當他們已有一個實體作品時，那我教他們的，就是用一個來令他們的實體作品有變化，例如用一個於作品上進行AR 掃瞄，類似這樣。

換句話說，不能讓學生直接、一下子就完全進入數位藝術的世界，因為我希望學生明白媒材之間是能互相關聯的。

另一個考量就是，因為有很多應用程式，所以我需要考量學生對其的接受程度，也就是說我開始時需是循序漸進的，考慮學生的能力，逐步教授學生應用難易程度不同的應用程式。

我亦需考量自己的能力。因為小朋友在運用應用程式時，會突然碰到很多不會用的功能，或者遇到未遇過的問題。若連我自己對該應用程式亦不熟悉的話，是不可能引導學生完成創作的。以SketchBook為例，即使我只是教授學生運用繪畫功能，純粹在繪畫圖層上繪畫，但學生在探索時，也會誤打誤撞的按走了一些工具列。故此，我需要令學生能用最短的時間，清楚明白我需要他們完成甚麼。

這亦因為我需要將教學做到流暢。假如我在設計教學時沒有思考教與學的過程和細節的話，其實會浪費了很多課堂時間。因為若我沒有計劃定一個最好的方式引導學生如何去學，又或者給予學生的練習活動的指示不清晰的話，可能會令學生花費了很多時間做了別的事情。結果我又要再花更多時間去作解釋。所以，在這些課堂設計方面，我亦需考慮。

至於創造力…嗯…我很久沒有聽到這個術語了(笑)…嗯（思考）創造力…我希望的是學生能夠看到藝術品的更多的呈現方式，即是不要局限於例如電子畫就真的只是電子畫，其實電子畫也可以很有趣的嘛。或者可能是…嗯…畫完

	電子畫後，我可能會將它投影在某個位置，我可能稍後給你看一些影片或相片。例如我們做過一些電子畫就是，即使學生是畫電子畫，但最終那些電子畫會製作成一個很有趣的動畫，然後那個動畫可以投影在一個實物上。你能幻想到嗎？即是學生完成那段影片後，再用投影機投影那影片上去實物上。這樣一來，學生的創作便並不只是限於電子的創作本身，而是他看到自己:「哦，雖然我用這個工具，但其實這個工具能令我在藝術表現上有更多的可能性。」 所以我認為是要考量這些，即是不可以太死板說我只是拿iPad來畫畫，純粹用來填顏色囉，點選「填充」工具填了顏色便算了，並不是這樣。	

問	在數位藝術的課堂中，學生最常面對或者最大的困難是甚麼？	追問
T1	學生會在中按了一些很奇怪的東西出來。有數個例子，例如在SketchBook中，小朋友在工具列裏有那麼多畫筆，他們不會真的那麼乖去用教師指定的那些畫筆，他們會去用很多不同的畫筆，而且他們有時候按了某一些按鈕，某一些工具就會不見了。比如SketchBook上有個「紅綠燈」，一個可以選顏色的工具，若它突然不見了，學生便會驚慌失措。在這些節眼點，這些的狀況，是學生最常見的問題。 又或者可能，例如有些事是需要一步跟一跟做的，以一個用作教動畫的，FlipaClip為例。在教導學生用FlipaClip時，大部分都是需逐個步驗教的。學生一跟不上步驟，跟不到周圍同學的進度，他們又會驚慌了，學生會覺得:「我跟不上啊。」這時，其實教師亦會感到尷尬，為甚麼呢？因為教師自己已教到某個部分，有部分學生已經緊貼教學進度了，若教師此時重新回到先前的部分(遲疑)…因為通常我們在課堂上只有一位教師，若有一個助教在旁會	A2

	比較好。有時候我在某些年份都會能跟一些老師一齊教的，但多年來只有一年試過這樣。所以，基本上只有自己一個教的時候，若要重回先前的課堂內容，重新講解一次步驟，便浪費了時間。因此，教師又要去想辦法，若真的有這些情況出現時，應該如何處理。	
問	您通常會如何處理剛提及的情況？	追問
T1	嗯…處理的方法有數個。第一，就是一開始去做課堂設計的時候，必需計劃得十分清晰，不可太長，所有教學活動都要分拆開，一節節的，那學生便會較容易跟上。這能解決到根本的問題：學生跟不上學習內容。假如真的行不通，因為有些學生的學習能力的確是較弱一點的，那我通常在電子的單元裏，都會附上一個自學的片，是自己製作的。 若學生在課堂上真的未能跟上進度，那就…(微笑)…對啦…「(鼓勵語氣及笑容)如果你[學生]真的跟不上，你便回去看一看這段片喇，也一樣啦！」即是去安慰一下他們。這是沒有辦法的，趁學生真的動手做時，例如，我現在說的全是面授課堂，學生需要做創作的，我便可於這些時候抽出空檔時間，趕快地去協助那些較弱的學生。 不過事實上，大致上的學生都能跟上進度的，有些學生甚至突然做了一些創作令你覺得：「噢！你能想到這樣做啊」，又或者「你可以發展成這樣呢！」的。	A3

00:12:19

問	在學生能力、教師能力以及學校政策中，您認為那個於培養創造力中擔當着最重要的角色？	追問

T1	我會覺得學校政策和教師能力較為重要。因為學生能力就是，教師就是為了去幫助學生，所以不論他學生的能力如何，我都應該要幫他們，對，我是這樣理解的。 學校政策方面，我比較幸運的，因為我所教的學校很開放。比如說，當老師們知道我們要做數位藝術教學，都很願意去試。或者我的一位搭擋，即我們的科主任，其實今年他是最後一年任教，準備退休了，他差不多六十歲了。但是，他仍很緊密地尋找一些新的創作，數位藝術亦會，即是他會自己去學。他會去學習畫3D動畫，用3D繪畫。當有這些積極的同事時，便會有這樣的紛圍了。 當然，也有一些同事會比較抗拒的，因為視藝並不是他們的本科，他們有自己的工作，因此很難要求他們去投放時間和資源去學習數位藝術。但不要緊，因為只要準備好教學影片，簡報，便好了(笑)。但當然，他們也要懂一點啦，至少他們不會抗拒，不會說：「啊，要這樣啊（無奈）」。只要他們已準備好了教材，他們便會去做。 至於老師能力，那當然重要了。即使老師熟釋那個應用程式，能運用得出神入化，但若果不懂如何去提供課堂，這仍然會造成了問題，會很容易碰釘子。有時候有些位置需要取巧一點，總而言之視覺老師要幫協助同事，例如不用要求同事完全跟從整套教學，務求能讓同事用最簡單直接的方法來教導學生做到課堂練習。	A4

00:14:41

問	您在教學前需作甚麼準備？您會如何引導學生創作數位藝術？	Q2

T1	先說硬件吧，如果要用的話，就是必須把iPads充滿電啊（笑）。因為即部分學生有iPad, 但部分高年級學生有時候沒有, 我便需要預約學校的iPads了。上課前, 我需要在一個系統上預約一批iPads, 並確保iPads的電源充足。我亦要把我需要的配套準備好, 例如課堂上若要做串流直播, 我便要提前下載Apple TV;若有些創作需要用Apple Pencil, 我便要確保每枝Apple Pencil都有足夠的電源。這些的準備功夫亦需花時間的。 幸好的是, 學校有良好的支援系統, 有一個支援小組會負責確定iPads和配備齊全和充滿電, 而不需教師親自去檢查。當然，若教師亦親自確定準備功夫做好, 那上課時又會較流暢。 至於軟件方面, 那一定是教師必需熟悉的操作。如我先前所提及, 學生先完成一件實體的創作練習, 然後過渡去運用應用程式的部分, 在開展了應用程式的課題後, 才向學生說明最終的藝術創作的主題。例如在單元的第一個分題裏, 我先讓學生將個人的想法寫下, 或做草圖。 當延伸至下一個分題, 教學的重點放於運用應用程式時, 一旦我派發iPads進行教學, 我和學生便會集中在應用程式的創作上。我不會再重教上一分課, 或於兩個分題之間跳來跳去, 因為這樣會十分耗時。因為運用應用程式教授藝術, 我個人感覺只是按數個按鈕, 便可完成。 但是, 對小朋友而言, 這可是比基礎的實體創作更花時間, 也許小朋拿出油粉彩、繪畫完再收拾好, 比這還快呢。運用應用程式教學, (語氣強調)真需要很多時間的(笑)。所以若果一堂的教學所設計的內容太多太長的話，最後只會是浪費自己的時間, 也浪費了課堂時間。 我覺得數位藝術的教學裏有很多部分都是很程序式的, 因為的運用的確是跟着步驟, 例如按圖層按鈕, 然後貼上物件, 逐步做的。若學生未能掌握	A5

	如何運用應用程式的工具，他們根本便無法發揮創意。例如學生若連如何分開使用兩個圖層也不會，那他們根本無法順利完成創作。 而且，當我一開始教授數位藝術，我第一時間一定跟學生表明，特別對高年級的學生，我要他們明白：不要將「用應用程式做創作」或「數位藝術」，當作是「將實體繪畫轉移在iPad的應用程式上進行」。學生要很清楚明白一個訊息，就是用數位藝術確實能於某些方面便利了我們創作以及分享。我認為學生要能夠分辨到媒材的分別，即是學生將來進行藝術創作時，他們要懂得去揀選適當的媒材。例如當要展示一些基本的手工的元素或是繪畫的質感時，學生懂得選取進行一些實體的創作。若學生想做攝影上的二次創作或動畫，學生亦能選合適的媒材，明白當面對着這類的藝術時，他們便需採用數位藝術了。意思是，學生要明白媒材之間的分別，比如當一個創作上需要做多次的複製，又或是需要試色時，學生能意識到自己需通過應用程式處理，令創作更便利；又或是當考慮到分享的方式時，亦如是。 學生完成創作後，亦需要分享。我會教學生就是，數位藝術創作的分別是與單純拿着一幅畫展示出來是不同的。當把作品數位化後，我會教學生其實這些都是一些格式檔案，是可以分享和上載，可以複製的。我認為這些是學生需要的知識，否則，當中的概念就只會演變成將一個藝術創作放進了iPad就完了，變得沒有分別。因此，我要學生先明白數位藝術和實體藝術的分別，才讓學生繼續進行數位藝術創作。	

00:21:13

問	您會如何設計教與學活動來令學生掌握數位藝術創作？	Q3

T1	不同的課題會有不同的做法。以畢卡索自畫像為例，這課題是必定有的，是一個很基本很基本的單元，每間學校的視藝課都總有的。雖然是畫這個風格，學習同一個主題，但將繪畫投影上大型展板，而繪畫是以動畫形式呈變，一路有變化的，小朋友圍着觀看作品，這便使創作的形式不同。 在這課題上，學生在應用程式上進行繪畫，但我並不會一開始便給學生一個頭像的外型，然後讓學生進行電子繪畫。基本上其實前面教授藝術知識的部分仍然是有的，例如是介紹畢加索，讓學生欣賞他不同的自畫像啊，做一些實體繪畫練習等，這些學習階段都是要齊全的。不可以因為做數位藝術，因為數位藝術令創作方便了，而跳過了這些藝術知識和實體試驗的部分，因為這些也是小朋友應該要學的。例如畫一些圖紋，學生並不是一拿起iPad，就懂得畫，所以前面一定是有這些輔排的。 在學習的過程中，即使學生最後的藝術作品是用數位的形式，但前面做一些練習和試驗，一些不同的肖像畫的試驗、顏色的試驗，全部都是在速寫簿，即是採用一些實體的形式做。 創作裏的概念是分開來學的:做肖像畫還肖像畫;學畢加索的風格還學畢加索的風格。但中間如何過渡，讓數位藝術跟畢於索的人像畫有關聯呢？就是去到繪畫的部分了。例如學生正在學畢卡索的藝術風格時，不會突然轉去學習剪片，而是中間透過學習電子繪畫，然後再過渡去學習用動畫影片形式來呈現電子繪畫。 我們向來用Rainbow　One。這不是一個坊間的應用程式，是學校的一個電子學習平台，而這個電子板並非像SketchBook般的專業，但並不要緊，學生能於此作初嘗試，試用電子筆和平板去繪畫。即是當學生完成了實體的繪畫探索，來到電子繪畫的課題上，學生再進行在繪畫應用程式上的探索。當教師向	A6

	學生講解完繪畫應用程式後，學生是需要進行探索的，學生不可能直接便學會電子繪畫的，所以可能當中又需設計一些練習，例如讓學生練習揀選顏色畫線、擦走線條、解鎖物件、回到上一步、遞交作品等，這些基礎的操作都是學生需要在進行真正的創作前便掌握好的。有了這些練習的鋪排後，學生才來到最後的創作。 例如在這個創作，很多時候在教數位藝術時，我們說要方便學生、幫助學生，例如好像這三個頭形的投影板，若要求小朋友自行畫出頭的外形，小朋友真的會畫到天亮也未能完成，他們亦不能夠畫得漂亮。而且，當小朋友畫完自畫像，然後投影在投影板上的。如果小朋友把帽子畫錯位了，那自畫像投影便不能完整地蓋於頭形投影板上了。因此，在學生的電子練習裏，我們需要一開始便框好一個與人頭投影板外形一樣的框架以及設黑色背景予學生。這如何幫助到學生和老師呢？例如當將繪畫背景預設為黑色，由於投影機不能投影黑色的，那背景的部分便會自動退地。這些位置就是我剛才所說，利用數位藝術的特點去方便創作。 試想像，如果用掃瞄器去掃瞄一個實體繪畫，也是可以的，但這個方法是很愚笨！即使我提供一個外形給學生，學生完成一幅實體畫後拿去掃瞄，然後不單止要找同事做退地，且要逐個儲檔，又不能紀錄繪畫的過程作為展示的部分。反觀運用應用程式則能錄下學生繪畫的過程，製成影片，然後於投影板上播出來，讓大家一起觀賞，整件事是十分開心的！	

00:29:10

問	你還會設計甚麼教學活動以協助學生掌握學習重點以及培養學生的創造力？	追問
T1	每個單元不同。例如有時候可能畫肖像畫也好，有時候可能是畫動畫	A7

都好，會因應主題，在教學過程中給予學生不同的探索活動。每次的數位藝術創作主題，跟實體創作的教學一模一樣，都要先有相應探索活動的。

至於後面的部分是重要的，中途會持續做評賞，於練習活動中所作的評賞，已經能啟發學生進發去下一步了。又或是像剛才的例子，學生真切地圍着去觀賞藝術作品，他們並不只是單純地站着觀看，而是我會跟他們一起做評賞的。其實學生是應該要知道自己的問題。學生做得好的，當然要點出，但這些評賞的要點是，學生需要知道自己的問題在哪。不論是在應用程式的繪畫上，又或是在單元知識上，也可以作評論的。

以畢於索的自畫像創作作例子，在評論學生的自畫像創作時有甚麼方面可提醒學生呢？例如見到學生畫的眼、耳、口、鼻很多是位置調亂了，但是抽象的肖像畫並不是這樣理解嘛。「抽象」是指可以從很多的角度看到眼耳口鼻，但並不是在說將人像變成了一隻怪獸嘛，即並不是說將眼調去下巴的位置。在此部分上，已經可以跟學生修正在學習畢卡索肖像畫上的誤解了。

有時需要跟學生修正的，是應用應用程式上的問題了。例如如何可以將繪畫做得整體美觀一點呢？比如右手邊的人像畫上的線條，黑色線和黃色色塊的部分上，黑線的邊是凹凸的，不平滑的。從中可見，其實學生並不明白先後次序的問題，即是學生當了那個繪畫應用程式是好像平日畫實體繪畫的方式般。平日畫畫，小朋友是怎樣的呢？首先畫一個線框，然後在上面油顏色。但填顏色沒問題的，因為有時候小朋友喜歡用箱頭筆先畫一個線框框了一個範圍，再在裏面填顏色，他們直接當成這樣的方式。

但是如果在電子繪畫上就不可行了，因為首先填色時顏色不能蓋於那條線上，這會令那條線的邊變得凹凹凸凸。第二是學生要明白先後次序。那其實應該是怎樣呢？其實學生應該是要先填顏色，然後再用第二個圖層去勾線

	，或者先勾線，然後用第二個圖層去填色。但其實這個應用程式是較蠢的，沒有圖層的功能，但學生仍然是要明白先後次序，掌握應該怎樣做才令畫面能更細緻點。這些方面都是可評論和提點的。 我們亦有其他的電子展示形式的，有數個方法可以做的。例如，因為是數位藝術，iPad有一個好處，就是連接Apple TV，可以隨時將一個螢幕鏡像輸出去另一個螢幕上面。例如學生在學SketchBook，開了版面，當學生有時候遇到問題，我去學生的裝置，然後將學生的iPad的螢幕直接鏡像輸出上去，讓學生與同儕分享自己遇到的問題，他遇到的問題，同儕也會遇到，這讓同學能幫忙解決，會教他，我亦能同時知道當下學生遇到這個問題，讓我能即時作補充和解釋，去修正，這提問和指導的部分可於整個教學的中間做。 至於後期，例如Padlet，我都會定時開很多個Padlet予每一班的，跟班別整理的。Padlet有很多個欄目的，可能是每個欄目處理。不過現在變了，我以往真的是一個主題設一個Padlet的，例如Padlet都是可以去做到的。 這是最近的主題《In the middle of the city》及《Landscape Mountain》。其實有些主題我都會想教學生用應用程式做創作的，但因為最近是網課，有些小朋友家中未必有iPad或Apple Pencil，他們可能只有用電腦上課。但不過也不要緊，不論是在應用程式還是在畫紙上繪畫，教學的模式都是一樣:學生需要在Padlet上載和分享練習，然後我給學生評語，學生其後回到頁面看評語。以上都是一些可以幫助學生學習的例子。	

00:36:41

問	您如何讓學生創作出具創意的數位藝術創作？	Q4

T1	我們會準備很多例子給學生看。因為一來到數位藝術，學生能找到的資料會多了很多，因為數位藝術容易在網上找到，所以學生找到的參考作品會增加。這時教師需要引導學生多一點，教師要讓學生見到創作並非一式一樣的，並非只朝單一形式地做的，而是慢慢在變的，是能夠有更多的變化。 舉一個實質的例子吧。在數位藝術的單元裏，除了在課堂的講解外，我們在學生的自學上都要求很多。不論是在課堂前、課堂裏、課堂後，學生自己都要有投入。在課堂的時間裏，我們一定會給學生一些啟發，但其實我個人認為，一個真正能令學生自己學習到和得到更多想法的時間，是在家中。因為學生在家中有更多的時間去自學。知識都是需要親自發掘、學習和了解，才能學得更多。所以，學生亦都是以這樣的學習模式學習的，他們亦習慣了。 所以除了課堂外，我舉小組Art Ranger分享一下吧。他們是一班在視藝上較優越的小朋友，但基本上教學的做法都是大同小異的。現時於普遍的學校都會用Google Classroom，教師可以在裏面分派一些課業給學生完成。Art Ranger的其中這個Stone Project，是一個以投影作表現形式的創作。學生會學習運用FlipaClip去製作一個動畫，學生要思考在一個石上面如何令其內容變得很豐富，他們要令石上面有動畫出現，但該動畫同時要能呼應到石頭的形狀，呼應到那種變化，例如線和線之間的變化，又或者形狀和形狀之間的變化。 首先我需要跟學生說明創作的主題、想法和內容，然後給學生一些影片觀看，讓學生認識不同的藝術家及學習不同的藝術作品。我會於上課時給學生觀賞藝術作品，也會在課後提供更多的例子和資料給學生，但這些資料必須是能吸引到學生產生興趣，然後自發地去找更多的。 而且，給予的例子的類型一定要夠多元。想像一下，當你去教授一個藝術單元時，很多時候會很容易集中了去找一些直接相關的參考作品，例如教肖	A8

	像畫時就不斷給予肖像畫的例子，又或是教畫風景畫時就不斷找風景畫的作品給學生，這是恆常的做法。但來到數位藝術，我反而認為所給予的例子是可以再多元化些、再豐富些的。 以這個Stone Project為例，學生要製作一個動畫，於石頭上作一些演變，例如是形狀的演變。其實我是可以給學生看一個音樂視頻，一個Beatles很久之前的音樂視頻，但這個音樂視頻是非常值得觀賞和參考的。這音樂視頻中，加入了一些動畫的線的元素，這些線演變成人的形態。這個作品例子並不是一個石頭的藝術作品，但當中其實一樣是採取了動畫的形式去創作，一樣是運用到投影，一樣是運用到線的演變。意思是，需要給學生更多不同的例子，「更多不同的例子」不是指重覆的石頭創作的例子，而是給一些不同地方如何應用這件事的例子，讓學生再從更多個的角度去明白這個創作形式的發揮空間。而且有時候有多元的例子也挺好的啊，學生又可以在音樂視頻中邊觀賞動畫創作，同時又可以聽聽音樂(笑)，所以，對啊，以此方式去增加學生的創造力。	

問	學生會否出現臨摹網上的作品的情況？您會如何從中協助學生培養個人的創造力？	追問
T1	會，一定會的。就算是能力高的學生，也很容易有這樣的情況。這並非關係到能力高與低的問題，而是一旦學生對作品沒有信心，沒信心去做創作時，便很容易選擇去臨摹了。我認為這是一件很自然的事，所以我都不會去怪學生。然而，我會認為的是，雖然這是他們的一件很自然會去做的事，但是視藝老師就是要令學生跳出這個障礙，令學生去多想一步，去想到自己的創作。	A9

所以，當中我都會去鼓勵學生去思考多一點。

例如，我要做一些小動作的，例如在挑例子的時候，要挑得很極端的。例如有位學生用形狀來創作，（興奮地說）我會點出然後讚得天花龍鳳！到下一個例子，這次學生不是用形狀來做，反而是用線條來創作，是個完全不同的例子，（興奮地說）我又會讚到天花龍鳳！好！再找多一個例子吧！這次學生不是運用線條和形狀了，而是用顏色來做，嘩！這樣又不一同了！也就是說，我會去找一些很不同的例子。

可是，是否全班學生的創作都有與眾不同的地方呢？其實不是的（笑）。每班應該只有數個學生的創作與別不同，而其他學生都是去臨摹。但我就是需要利用這數個突出的學生，去令其他學生有一個錯覺，就是：「（興奮地說）噢！原來不同的同學都在想不同的主意啊！那我也要想得特別點！」。教小朋友就是要通過這些小動作和讚賞來去鼓勵他們，鼓勵他們去多一點，想多一步。

此外，這也視乎學生所跟隨的教師的作風和要求的。如果教師認為即使每個學生畫的都一樣，也覺得他們畫得很好的，那學生便會一直跟隨沒改變。相反，若學生知道老師是有要求的，知道老師不喜歡學生的作品是一樣的，知道老師若發現學生跟自己的範例是會去責備他們的，知道老師的要求是想學生多想一步的，那學生便會多思考一點。

創作時多想一步，並不是當下就能要求學生即時做到的，我認為是需要時間去培養的，這是一個習慣來的，而非當下能達到的事情。即使是我們作為一個成年人，我們也會臨摹。當學習新的事物時，我們都是先學習別人的做法，才能學會。這是一件很正常的事，我亦不會刻意去打破這件事。但是，我會認為，在學會了知識後，下一步就是我們如何去想一些更特別的主意，此時

	就是需要我們去踏出多一步去思考了。採用這個邏輯於教小朋友上是可以的，我不反對學生於創作初時去臨摹，因為這是一件很自然的事，我反而覺得，學生正正需有這一步才能有更進一步。 我經常覺得學生是負責輸出，教師是負責投入，教師投入，學生則輸出。若果教師只投進一種知識，學生固然只會輸出一種知識，若教師投入多些知識，學生當然會輸出多些。	

00:46:55

問	您會如何評估學生的創造力？	Q5
T1	評估創造力並非在最後才一次過評的，是要中間一路分開各個學習活動來作評估，而且評估是要有一個清晰的指引才能評的。這一部分我不需要特別用數位藝術 的例子，因為創造力是適用於整個藝術範疇上的。 我舉一個例子說明一下如何將一個創作分拆。這單元是學一個單線畫，即是用一線條去畫肖像，是一個很難的課題。因為用一條線畫即代表要放棄很多的細節，是一件難事來的，需要時間來浸沉一下。所以小朋友是在挑戰這個課題的。那如何去教呢？這都是一些實體課，我在課室跟學生上的。學生要做甚麼呢？他們會有一張工作紙，完成後便即時影上Padlet，這樣同學之間及老師都能看到，而不是各人躲在自己的位置做練習和探索。我喜歡學生的探索是一齊分享的，但同時又要省時，這樣做就最好了。不論是數位藝術的課題與否與否，平日的課堂也是這樣做。 至於如何去評估呢？當然我會去評學生最後的創作，而其實一開始給學生的練習指引便要很清晰，每一個練習都要給予指引。例如讓學生畫單線，	A10

	學生其實在上一個單元已經先學習運用單線畫動物的，然後才來到運用單線畫肖像，這已經是第二個分題來的。一開始我會讓學生先運用兩條線嘗試，並給學生一個非常清晰的指引，例如要求學生在畫肖像畫的時至少要能展示到一些面部特徵，即眼耳口鼻。然後學生於家中時自拍一張，觀察清楚自己的樣子和特徵。到最後一個練習，這次的練習要求學生畫的肖像要有大同小異，要能展示到個人的面部特徵，要學生能掌握到自己的特徵，例如這位學生有戴眼鏡，那他就畫一副眼鏡，類似這樣。 評估學生的創造力，並非到最後的作品才作評估，要在中途的練習便要持續地評，在學生不同探索的期間就要評，因為他們的創造力都是來自之前的輔排的，因此不可能最後一刻才告訴學生對與錯，在中間就要說，一路說的時候都需要有很清晰的指引。到最後做的評估，亦都是要有一個準則去做，而且不是只有我作評估，學生也要評。一些評估的準則是需要的，不同課題有不同的準則，不是只評說漂不漂亮，而是例如學生能否真的做到某個探索。又例如剛才所說的畢卡索人像畫創作，我會在顏色運用上有要求，在圖案上有要求，或者如何呈現人像的五官上有要求。 數位藝術上，創造力不單是只着重於畫面的美感本身，例如學動畫時也要求動畫是否足夠流暢；或者在做電子繪畫時有沒有分明的圖層去做創作，掌握到電子工具的運用，要包含這些準則，學生才會明白如何評。否則若果就這樣叫學生去評同儕的作品夠創造力的話，學生是不會明白的。必須要運用一些很實質的指引去告訴學生才能做到互評，老師亦能夠評到，也可做自評。	

00:54:24

問	在運用數位藝術進行教學以培養學生的創造力時，您認為當中最大的困難和	Q6

	挑戰是甚麼？您如何克服？	
T1	噢…(感嘆)我覺得一定是在於教師的本身。教師在教之前一定要自己先去學，要很清楚明白那個應用程式的應用，可以輸出甚麼類型的創作，才可以想到如何設計出有創意的創作。若對那個應用程式一知半解，也許SketchBook就相對容易掌握，但一些應用程式，例如是用作畫3D動畫的應用程式就不同了。我舉一個例子吧，有一次我的學校與一間科技公司合作，他們推出了Blender，一個免費且很有名的應用程式，是用作畫3D動畫的。我們與這間公司合作，然後設計一個教學給學生，讓學生在電腦上去試用和學習這個應用程式。 嘩(感嘆)，我有教數位藝術的，認為自己已經對這些應用程式的接受程度很高了。但當中的困難和挑戰是，有時候真是面對一些自己完全不會的範疇時，就是要花時間去學習。 這又引伸另一個問題，就是教師的工作真的非常繁重。我首先要完成手上的工作、批改家課、學生的問題、行政的工作，然後才可去學習運用。因此，這變相是一件很耗時、精神和體力的事。 該如何去克服？就是我覺得小朋友學了會開心啊，對啊(肯定語氣)，同時自己也想去教他們的。而且另一點就是，我不希望小朋友問我的時候，我不會回答啊！(笑)。對的，要做老師就是要先去學習，所以有些事情就是要取捨一下。 其實我個人是很享受去教數位藝術的。有些困難我覺得我們學校會比較容易處理的，但對其他學校可能較難的是資源上的問題。對我們學校來說，這方面是不錯的，因為有很多的資源都可以投放於視藝科上。以我們學校為例	A11

	，我們有一個Lightform　Compute，是一個掃瞄器，它可以掃瞄物件的輪廓，然後讓影像準準地覆蓋及投影於在於物件的輪廓上，例如將投影的影像準確地完全覆蓋於一個水樽的表面上，這是需要買一個掃瞄器。假設這個掃瞄器需花費一萬至二萬元，可能其他學校未必會批的。但我們的學校很好的是，有充足的資源可以投放在藝術上，例如要買Apple　Pencils有Apple　Pencils，要買數個投影機也可。這筆費用是貴的，有可能一些學校的視藝角色沒那麼強時，做這件事便會有困難，他們可能要改用一些「土砲」的方式，一些成本低廉的自創形式去處理。 但對我個人而言，主要的困難都純粹就只是在於學軟件上，因為學識後不單止是要去教，而是要去思考一個很直接能讓學生足以進行探索的教學，又要可以做到一個很流暢的教學，這其實比逐個步驟教會學生更難的。如果我做一個坊間的工作坊，那當然容易了。即是我教別人首先開一個檔案，然後這樣做那樣做，十分簡單，因為只是跟着我逐個步驟做。但是如果我要想一做個教學，是學生在跟着我逐個步驟去學之餘，同時又要有自己的空間去自行探索的，這反而是難的。因為我要去思考和計劃好教學的先後次序。如果我對應用程式不熟練的話，是很難去安排得好的。所以這些應用程式的學習是需要去做的。	

00:59:24

問	您認為數位藝術創作如何能更好地培養學生的創造力？	Q7
T1	我覺得[能更好地培養學生的創造力]的，是數位藝術的展示的形式。我不希望學生的思維被創作的形體的本身死死地局限着。例如當回到實體、傳統藝術上時，認為繪畫就是繪畫，紙雕就是紙雕，版畫就是版畫。但當來到數位	A12

藝術時，我覺得學生是可以跨媒介去做的。即使是一幅繪畫，但它可變成動畫，又可以變成一個投影，或變成一個光雕，任何媒介也可以。

我想學生學習的是，當他們學通了數個不同的應用程式的基本應用後，他們懂得在裏面游走變通，自己懂得去轉變形式，或去想多些的形式去做。我覺得這是重要的。

我舉一個例子，教育大學早前有一個Stem　Project，其中小朋友做了一個創作，是一個可以轉動的圓餅裝置，圓餅裝置的背景上有三個不同的佈景，配合運用投影機將動畫投影於圓餅裝置上的佈景。當中小朋友要完成的數位藝術的創作就是動畫。至於轉動的佈景的部分其實並不是老師設計的，這個想法是小朋友自己想出來的。我覺得這就是當他們精通了所有知識之後，能創造出的創造力的地方。即是小朋友想到的並不是單單是製作一個動畫，他們能想到的是，動畫外還可以再配以不同的場景，並且場景是要能自動轉的，最終那個動畫便可以好像轉落在不同的場景上。例如投影出的動畫是一隻行走的羊，配合圓餅裝置上會轉的佈景時，最後動畫便會變成是一隻羊由河流走到去草源，由草源走到去山頂，就是因為這個裝置可以轉，這個概念是小朋友想出來的。這個例子便體現了創造力了：當小朋友知道數位藝術有一個好處就是，他們有能力令到那隻動畫的羊不停地繞圈走，他們再想到的變化就是，他們去設計一個會轉動裝置的令佈景轉動，這是小朋友想的，不是我們提供給他們的。

所以小朋友能想到更多不同創作形式的變化，這就是創造力的表現了。

Appendix 2: Interview scripts Teacher 1 in Chinese

Interview Date: 2022.02.18

Interview Time: 03:50 p.m. - 04:37 p.m.

Interview Venue: Zoom Meeting Room

No: T2

00:01:22

問	為了培養學生的創造力, 在設計數位藝術的教學單元時, 您會有甚麼考量？	Q1
T2	老師的能力我都會考慮的, 因為除了我以外, 還有三位視藝老師的, 不過我一個人負責了全校一半的視藝課。因此, 我亦需要遷就其他同事對應用程式是否足夠熟悉。 學生的能力亦是其中一個要點。學生的能力, 以及他們是否適應做數位藝術創作, 也是我考慮範圍之內。 不過我個人最主要運用數位藝術是想讓學生的作品變得更加有趣。我並不是主張直接在Procreate裏繪畫一幅畫便當作一件作品, 而是利用應用程式來輔助作品的創作, 令學生的作品更有趣味性和增加其有趣的程度。我並不會讓學生在應用程式中完成一個完整的創作, 應用程式主要是一個輔助的角色。 而且, 目前我是處於一個開發的階段, 所以並不會一起始便直接運用應用程式來創作一件作品。而且, 對於我們的學生來說，剛接觸數位藝術，學習運用應用程式來繪畫或創作作品, 是有難度的。因此, 目前在我的單元設計中, 我採取處應用程式作為一個輔助的形式。	A1

問	在應用程式作為一個輔助創作的形式下，您如何設計教學？	追問1
T2	當然我會首先教學生如何操作應用程式，先教授基本的操作技巧，然後就是學生的探索活動。當我教授完學生應用程式的基本操作後，學生會自行進行探索。就我教授的課題，學生已於先前完成了一個創作。學生探索完後，會有一個總結，學生分享他們在應用程式上發現的功能，然後再應用於已有的創作上，加以創作。 當學生在創作上結合了應用程式的應用後，我會利用一個學習平台Seesaw，讓學生上載個人作品，讓其他同學欣賞。Seesaw的學習平台是開放給全級學生的，學生並非只能看到同班同學的作品，而是可看到同級各班同學的同一課題的作品。學生能讚好同儕的作品，也能留言。學生能通過欣賞同儕的作品，從中獲得啟發。 我亦會評論學生的作品，加上同儕之間的評價，以及個人的分享，學生會修正自己的作品，然後再創作一次，接着再一次修正。若學生於第二次創作後，覺得仍有修正的地方，學生可再多做一次創作。若學生認為作品已經做得很滿意了，便可提交作品。當學生修正完作品後，可於Seesaw上上載作品，再與同儕分享。	A2

問	您會如何引導學生評賞同儕的作品？	追問2
T2	首先我會問作品的創作技巧。因為我教授了學生應用程式裏的創作技巧，我會讓學生評價同儕是否掌握所學技巧並應用於作品上。例如學生運用泥膠來	A3

	創作，當中強調質感的表現，那學生便要因應這些重點來進行評價。 另外是學生的作品是否配合創作主題，以及學生的創作中所運用的元素能否配合主題。例如學生於作品中加入了一些與主題不相關的元素，或導致作品變得不美觀的或趣味性減低等，這些都是學生之間會討論和分享的內容。	

00:06:42

問	學校如何支援數位藝術教學？	追問3
T2	我們學校…例如我需要使用一個新的應用程式，學校在執行上其實是十分方便的。因為我們學校有推行BYOD（自攜裝置計劃），教師按一個鍵即可一次過在所有學生的平板電腦上安裝軟件。學校在這點做得很理想，能方便教師與學生嘗試不同的應用程式。學生並不能自行安裝應用程式，因為學校設了程式來限制學生安裝應用程式的權限。學校在平板電腦的配套及安裝應用程式的安排，有助我發展數位藝術的單元教學。 學校支持很重要，我校一向發展推行電子學習，讓學習在不同科目運用平板電腦上課，交功課，例如常用的應用程式:KAHOOT、GOOGLE CLASSROOM，整個學校的政策有利於視藝科推行數位藝術。另外，包括校長開放讓教師嘗試不同的應用程式，不同教學方法。例如，我最近嘗試用EYEJACK，需要用錢subscribe，學校二話不說就答應了，這些都有助於視藝科推行數位藝術。 然後…學校有何支援啊…（思考）嗯…我們有一些TA（教學助理），若真是有些後期製作或者後期工作，他們都會幫忙。雖然目前為止，我們還沒有需要他們幫	A4

	忙的地方，但他們是我們的支援。	

00:08:21

問	在學生能力、教師能力以及學校政策的考量中，您認為那個最為重要？	追問4
T2	我認為三方面同樣重要。老師負責教授；學生負責學習；當需要買應用程式時學校會否批錢，這三項都是很關鍵的。例如最近我們在做與AR有關的試驗，校方亦十分慷慨地請教教師購買相關應用程式或訂購其一年期限的所需費用，表示願意去購買。因此，學校的支持十分有助於我在數位藝術教學的發展。所以，我認為三方面都十分重要。 另外，學生喜歡與否亦很重要。若學生不喜歡數位藝術的課堂，不論教師和學校再如何推行，最終數位藝術的教學亦不可能成功。所以三方面都很重要。	A5

00:09:31

問	考慮到學生喜好方面，您會如何衡量學生對那些數位藝術課題有興趣？	追問5
T2	其實我們學校的學生本身都很喜歡上視藝堂的，學生上視藝堂時都很開心，亦很期待上視藝堂。所以(笑)我都不是太清楚學生有沒有不喜歡，但我個人感覺學生是很喜歡上視藝課的。 如何去衡量學生是否喜歡課堂，可看看學生是否投入去做。不過以我的觀察，其實我們學校的學生在創作時都是很投入的。所以都…衡量就…看看學生的作品啊。若學生的創作十分馬虎的，那其實便能看出學生並不投入其中或不	A6

	喜歡。 那所以…那…回到數位藝術上，其實對部分的男同學來說，我認為是能提升到他們的興趣的。有些男同學本身其實有很多的想法的，可是他們缺乏耐性，或是他們的繪畫能力或雕塑的技巧不好，導致他們的想法未必能夠透過作品表達出來。 反而運用了數位藝術的方式，學生可以利用網上的圖片或一些網上資源，來幫助他們將有趣的想法表達出來。比如要求學生畫一個林鄭月娥出來，學生畫不到，但學生能在網上搜尋一張林鄭月娥的圖片，將其拼貼上去於創作裏便完成了。又比如說學生寫字很醜的，有些有特殊教育需要的學生可能連寫一句句子也寫不到時，他們於裝置上輸入文字，又或是將別人寫的文字圖像截圖然後貼上作品上亦可。這其實能提升到一些可能本身繪畫能力不好，或者一些手作能力不好的學生，對創作的興趣了。以我的觀察，便是有這方面的幫助了。	

00:12:01

問	您在教學前需作甚麼準備？您會如何引導學生創作數位藝術？	Q2
T2	我其實都是處於開發階段，因此也會找一些類似的作品給學生參考，可能將參考作品放於簡報內。另外，要視乎所教授的課題，例如我用Photoshop Mix來做一些拼貼效果並再加一些創於其中，那我便會找一些類似的、相關的藝術，例如是Pop Art，一些拼貼的藝術作品，讓學生作參考，讓學生看到一些著名的藝術家其實也是運用一些拼貼的技巧來創作的。即是讓學生欣賞一些坊間的有名的藝術作品是如何創作的，讓學生作參考。	A7

	此外, 我自己也會先進行一次創作, 從中發現學生在創作過程中可能會遇到的難點或困難, 那我便會針對這些難點去作微調, 或是於這些難點上給了學生多一點幫助, 或是給學生多一點時間, 或是想一些方法來幫助他們。 再者, 教師自己也要開放, 在心理調整的方面, 例如有些學生有些較突出的想法, 或是他們所們創作出來的作品真是很特別的, 這時我需開放自己的思想和接受程度。我需準備的便是以上這些了。	

00:13:39

問	就上述對課堂的準備的分享, 您有甚麼實質的例子可以分享一下嗎？	追問6
T2	例如我運用Photoshop Mix來加添背景、文字、圖片於創作, 剛才也提及到會參考Pop Art的拼貼作品, 在google 搜尋很多POP ART COLLAGE, 很多有趣的參考…但我現在很難告知實際是那些作品(笑)。看看我稍後有機會再分享給你看。對啊, 就會準備作品給學生參考了, 這些都是用作開發學生的想法以及刺激他們的想法。	A8

00:14:48

問	在豐富網上資源下, 學生或會參照網上作品, 您如何從中平衡學生創造力的培養與學生？	追問7
T2	原本的實體作品已經是由學生自己創作的, 在作品的背景上運用應用程式加以創作, 只是令學生的作品的故事更加完整。例如學生設計一架美食車, 美食車可能是賣「太空魚蛋」, 然後學生運用應用程式加上了一個太空的背景	A9

	，令作品的故事性更加完整。 我認為這樣並不損學生創作的原創性，因為學生是在講述自己的故事，利用了別人的資料來說自己的故事，因此我認為創作中並沒有臨摹別人的作品的意思。我覺得這類似於二次創作，並不是說去抄襲別人的創作，沒有了屬於自己的想法和創作，只是改成運用加入別人的作品在自己的作品用來講自己的故事，沒有侵犯到別人的作品原本的意思，亦沒有直接拿了作品中表達的意思當作自己作品的意念。	

00:16:40

問	您會如何設計教與學活動來令學生掌握數位藝術創作？	Q3
T2	我會先教應用程式的一些基本操作，讓學生首先去認識。接着，我亦會給學生進行探索的時間，因為有時候我發現到的事物跟學生所發現到的是不同的，例如學生發現到某個功能能做到某些效果。我個人的想法就只是一個人的想法， 學生們有三十多人，有三十多個想法，當大家想到不同的想法時，他們便可互相刺激，那我會有一個探索的時間給學生自行發掘。 接着便到學習的平台Seesaw，讓學生間互相評價作品，或讓學生自己觀賞自己的作品，進行一個互相學習。當學生看到同儕的創作方式，會引發他們去問:「你是如何做到的？」學生並不只是靠自己想方法，而是看到三十多位同學甚至是全級同學的一些不同做法時，那學生便會有更多不同的方法來創作自己的作品。我認為這亦是一個很重要的環節，因為一個人想到的往往不及全級學生想到的多，所以這部分就十分有助學生的創造力的發展了。 接着，那當然學生自己的評價，自己如何看待自己的作品之外，教師亦	A10

	要作補充。因為教師才是專業的，需要引導學生到正確的地方，正確的…即是教師所教的技巧，學生有沒有做到呢？那其實教師是需要引導學生回到所學的知識的。 除了學生去探索之外，教師的引導都十分重要。教師作出評價，然後學生再作出修正，那我認為這就是一個較完整的課堂了。	

00:19:09

問	您會如何在傳統藝術媒介及數位藝術之間作銜接？	追問8
T2	對啊，可能就有些學校是運用一個能應用程式來畫一幅畫。但我們並不是，我們就會結合以前的一些已有的單元來再做數位藝術的創作。 所以對於教師在銜接時都是會相對較簡單，因為教師並不是做一個全新的課題和創作，而是在舊的單元上再加入數位藝術的元素，因此對教師來說也較易接受。 不過我的團隊的教師也較年輕，因此他們對數位藝術創作的接受程度也比較高。可是有些學校其實可能有十多個、甚至二十多個視藝教師的，當中有些教師可能年紀較大，對數位藝術的接受程度比較低，那他們可能可以參考這個方法，就是用一些原有的課題，再添加的…這些數位藝術在內，那其實會令到教師更容易去接受的，我自己覺得。 不過我自己就會這樣去做，因為我想慢慢地發展，然後去可能真的只用數位藝術來創作，但我現在暫時只是剛剛開始的階段，所以我便會將數位藝術的元素加入以往的課題內再發展。即是我是以一個過渡性，現在是第一	A11

	個階段, 第二個階段可能我便會做全個作品都是數位藝術了。 因為其實我之前都有試驗過讓學生在一個作品中進行電子繪畫, 但他們做出來的作品就…因為他們之前太少接觸數位藝術, 所以作品未必是很理想, 因此需要逐步實踐。	

00:21:27

問	您可分享一下在課堂氣氛及教學活動上可如何幫助學生創造力的培養嗎？	追問9
T2	恆常的活動就是學生很習慣在平台上去分享自己的作品, 那平台其實是開放給學生自己24小時都可以上載自己的作品的。分享的作品不只限於學校的作品, 例如學生自己在家裏畫的一幅漫畫又會上載於學習平台, 學生亦很習慣去讚好同學的作品及給予評價, 例如是「你畫這個很有趣啊」, 或是「你畫得如何？」分享作品是學生已經恆常會做的了, 學生間互相觀摩。我認為這令學生可多看不同同學的作品, 再啟發自己去畫畫，亦能帶動到藝術的氛圍。我認為這恆常的活動是我們學校做得比較好的。 現在暫時我們五六年級的學生會分享得較多, 因為他們用自己的平板電腦的時間較多, 因此他們已經很習慣去分享, 在平台上亦會經常討論。一開始學生用筆來畫漫畫的, 現在他們已經慢慢發展到用iPad來畫了。可能教師提到用Procreate, 有一些同學都下載了不同的畫畫應用程式去畫一些…即是已經開始用iPad來畫畫了。這個轉變是受到同儕的影響, 學生一步一步地去進步。這個恆常的活動, 就是我們學校有的了。	A12

00:23:36

問	您平日會如何鼓勵學生？	追問 10
T2	我如何鼓勵啊…我其實就我這個人就比較開放的。那所以呢…我就…其實就不會有甚麼特別規定學生…即是當然就會有一個主題給學生…可但是…即是我會比較開放，我很多時候都不會去批評學生的。我會就著課堂學習框架，讓學生揮發，很少批評學生的做法不行，我很少對學生說不行，只會就著他們所做的東西對出建議。 此外，我會讚學生，有些學生做得好，或者他用了某些方法，我會提出，向全班學生提出，那令到…即是能鼓勵到他們，同時其他學生都能學習到同儕做得好的地方，亦給予到學生一個肯定。 其實每一個學生都不同做得好的地方，只不過…(笑)只是做得好的一分，與做得好的十分的分別。一分做得好的學生，其實他們的做得好，即是好…即是並不是真是那麼的好，可但是學生得到教師的認同或鼓勵的話，學生便會更加想去做得更好，或者是在視藝科裏更加投入。那…就是這兩項了，對，就會是對學生持開放態度。	A13

00:25:19

問	總體來說，課堂上探索的活動會較多嗎？	追問 11
T2	探索的活動…又不可以說是探索活動比較多，因為我亦有我教授的內容，我自己講授的內容，接着學生有一段時間做探索，然後我又會講述他們探索	A14

	時的發現。即是我並不會任由學生，開放給他們整個課堂都只做探索，學生一定會去做了別的事情，所以其實我都必須要拉學生回到正題，回到去講述他們探索到的內容，並做一個總結給他們，總括學習到的事物，或者是其他同學知道的一些新發現。故此，課堂並不是全部都是探索，而是其中的一個活動。	

00:26:28

問	您有一些課堂教學的實質例子可分享一下嗎？	追問12
T2	其實我就有不同的課題的，不過並不是每個課題都做得好的。可但是…往年便開始做，可過往一年就…你也知道因為疫情，都沒怎樣回校上課。而我正處於試驗的階段，即是…我也有傳送一些學生作品的例子給你看，都大概是我發送給你的那些的例子。對…都是一個分享吧我覺得，但…對，我仍在探索當中。	A15

00:27:16

問	您如何讓學生創作出具創意的數位藝術創作？	Q4
T2	我會讓學生看很多網上有趣參考圖，當做示範的時候，我可能會做一些學生未必想到得的一些的創作示範。因為學生想法比較狹窄，如果教師做一些學生平時也想到的創作，例如設計一架美食車，而美食車是設置在街上的，這是學生也能想得到的，那我便不會做。我會做一些其他的…即是做示範的時候，我會做一些較另類的，令學生看到時，會覺得:「哦！原來可以這樣做的！」那…就會令學生知道不只是局限於放置於街上，於是學生便能想到其他想法。	A16

	因此我會做些特別些的示範給學生看。 還有甚麼可令學生…我覺得創造力都是靠互相分享，這很重要，因為當自己一個想時，可能想到將自己放在車中，其他學生可能想到添上其他的元素於創作。當學生見到別人這樣做，其實是會刺激到學生的想法，他有越多想法，即證明了他有越多的創意啊。所以我覺得分享…大家同學之間分享所帶來的互相刺激很重要。 因為即使我一個人教，我自己的想法亦很少，那我獨自能教授多少不同的東西給學生呢？對吧？我教不到很多…教不到很多的示範給學生看的。但反而學生有時去到學習平台看全級學生的作品，學生便有一百多個參考了，而並不是只有教師的一兩個想法。這是對於學生的創造力發展很重要的。	

00:29:43

問	您會如何評估學生的創造力？	Q5
T2	怎樣去評估啊…我覺得要看學生作品裏加入的元素能否配合創作主題，以及學生有沒有令到其初時的創作更加有趣，又或者作品是否能令大家互相微笑、能否吸引到大家，以及跟其他同學的作品會否太相似。「嘩！有十個同學，十個相同的做法的」那這當是就是沒有創造力了，若每個人做的都一樣。若每個同學創作出的都不同的，那便證明了學生各人都有自己的想法。那即是他們能表遲到自己的創意了。這便是我如何評估學生的創意了。 其實我覺得評…即是在創意方面吧，很難告訴學生是取得100分，或者是取得0分。因為每一個人的創意…就是創意啊，那學生…如果我在這麼開放的課題，我很多時都不給分的。因為創意是很難去評的啊，而反而我真正給分的可	A17

	能是給車的分數, 即是學生做得如何, 或者是質感上, 或者學生是否掌握技巧, 這些我能實質的給予分數。 但創意分的話, 我會問學生:「你認為誰的作品有趣、有創意、有故性, 而配合主題？」若果學生真的把作品真的做得獨一無二, 或者是100個學生都能說出各自的故事, 那我便會在他們的分數些再作調整的, 而並不是說創造力的分數佔了作品分數的100%, 只是當中的30%。	

00:31:44

問	在運用數位藝術進行教學以培養學生的創造力時, 您認為當中最大的困難和挑戰是甚麼？您如何克服？	Q6
T2	挑戰我覺得…我現在在一些AR的作品, 其實是要將一段影片再加入學生的作品裏, 這後期製作的工作量其實是很大的, 令我在實施於全級的課程裏時, 就令我很…很卻步。因為工作量太大了, 學生完成創作後, 然後我再要將影片逐個地加進學生的創作裏, 學生之後才能在平板電腦觀看AR效果出來。這亦是個挑戰。 要說如何解決的話，就需訓練TA（教學助理）以及IT的同事幫忙去做。果我真的要在單元教學去實踐這件事。因為我暫時未敢挑戰於全級實行這件事, 因此我只是會在我的視藝小組裏實行, 於是我的工作量就會較少, 因為只有十多位學生, 而且他們的能力比較高, 他們自己可以做到。這是我其中一個遇到的困難吧。 接著另一個困難就是, 雖然學生現在都很經常接觸到平板電腦, 但他們真是用平板電腦來進行創作的時候很少。學生畫出的東西還不是很好, 技巧上	A18

	還未掌握得很好，可能甚至會畫得比用紙筆畫的醜，所以這亦需要在低年級慢慢開如始去培養去發展，即是一個螺旋式的學習模式，即是在全校的發展上會有這樣的教學鋪排。我自己遇到的困難和安排就是這些了。	

00:34:06

問	課堂時間有限，在數位藝術的單元課堂中，您如何掌控面授或網上教學時間和安排？	追問13
T2	我們學校沒有用Zoom來上視藝堂的。而且並不是每個課題都會運用數位藝術。我又不覺得時間不是很夠…即是每一堂的視藝堂的課時對我來說並不是一個限制，對啊。	A19
問	課時應該都是一小時左右。但教師可能遇到的問題是，有些學生的學習能力比較弱，有時候教師需要重新覆述教授的內容，又或是當課堂設計得不夠仔細和細心，令教學不流暢時，又需花一點時間。因此課時可能成為教師其中一個限制。	
T2	對了，我之前…你提到這，我就想起我之前在一班裏試做了一個，即是那個AR的那個課題，其實都真是會遇到你剛才所講的困難的。那就慢慢修正吧，因為初期都應該會遇到這樣的情況。所以，你說到這個問題，其實就應該是…對啊因為起初實施做數位藝術的教學，都會遇到這樣的情況，不論是教甚麼的科目。因為初時教時，都會遇到一些情況是:「啊？原來學生於這方面不懂的」，若我不曾去教授，便不可能會知道的嘛。所以下次便會再調整自己的教學計劃。亦因為這樣，我於初時便會先教授一些較簡單的內容。暫時在我做的課程裏，	A20

	我覺得學生夠時間。	

00:36:34

問	學生會何時進行互評？	追問14
T2	每一個課題都不同，我想學生在中途做分享的話就會讓他們在中途作分享。他們有時…不過大多數都是在單元的最後作分享的。但是，例如若我有探索的活動給學生的話，我便會讓學生在中間作分享，看一看學生的表現，讓學生參考一下同儕所做的，然後再到下個部分以及做創作。所以每一個課題的做法都不同的。 即使學生於最後觀賞完，我於下一次課堂我可能都會做回一些…會拿學生上一堂完成的創作再講述一次。	A21

00:37:51

問	回到第六題，總括而言，您認為數位藝術教學當中最主要會遇到的問題是工作量大，對嗎？	追問15
T2	要視乎…對的…如果我做例如AR的課題的話，其實工作量是很大的，這會令教師去考慮是否要去發展這個數位藝術教學，這就是我會遇到的困難。 以及學生的能力，他們比較少接觸運用平板電腦去畫畫，因此需要由低年級開始，由那個工作計劃上就要穿插一些運用平板電腦進行數位藝術的創作	A22

	, 讓學生從小於這方面[數位藝術創作]的接觸, 使數位藝術教學發展得好些。	

00:38:49

問	在教師的能力和接受程度方面上, 會出現甚麼困難嗎？	追問16
T2	我們的學校只有四位視藝科老師, 而我負責了全校一半的視藝堂。所以基本上有甚麼發展, 或是有甚麼教學, 都是我自己承擔得比較多。所以可能在一個班級中, 我都教授了三班的視藝課, 而另一位教師則可能教授一班而已, 所以有時候他們都可能無奈接受。 我的團隊的教師都比較年青的, 所以他們都很配合的。當真的運用應用程式, 如果他們不懂, 他們亦會很主動去請教我如何去做。而且, 我自己都會把教學簡報準備好給他們, 讓他們知道如何實踐及如何去教。所以, 這方面我則沒有遇到甚麼困難。	A23

00:40:00

問	您認為數位藝術創作如何能更好地培養學生的創造力？	Q7
T2	我覺得它的優勢就是…首先我剛才都提過些許。因為不同的學生都有不同的能力, 有一些學生可能真是在畫畫或手作方面是比較弱的, 有些學生可能真是很喜歡用iPad來畫畫並且得心應手。那其實我們便不應該扼殺到部分的學生在數位藝術的一些能力。所以我自己在工作計劃上其實都會涉及到不同的創	A24

作媒介，以照顧到不同能力或不同需要的學生。這是其中的一點。

而學生本身，有些學生真的有不同的想法，但是他們未能透過畫畫或傳統創作媒介來表達，此時學生便透過數位藝術創作來使他們做到或表達到自己的想法。對的，在這方面就可能幫助到一些本身於實作技巧不好的學生，使他們可以利用到平板電腦或是是用一些…剛提及若學生寫的字不美觀，或他們根本沒法寫字，他們可以在平板電腦上打字，或者透過截圖，又或者是加入別人的一些圖片，或是一些現有的元素去幫助他們。又者是可能學生想畫一個正方形，若要學生實質地畫一個正方形，他們可能畫十分鐘也未能畫出一個正方形，他們可能畫出一個不知是甚麼的圖形。或者學生畫一個圓形，畫了很久也畫不到的。但在數位藝術應用程式中，學生一框或者按數個鍵便已經能很方便地畫到自己想畫的圖案。當學生沒有這個限制時，他們便可以將自己的想法透過數位藝術的創作方式表達出來。這是其中一點。

另外，我自己都觀察到，部分的男同學…我並沒有任何的歧視，男孩子可能沒女孩子平時畫畫時那麼用心。當男同學運用平板電腦去創作時，他們會比平日創作時更加用心。例如男同學們平時在課堂上還沒完成一些普通的傳統藝術媒介的創作，他們可能就會是課堂時間夠了，便停下來並提交創作。但當在數位藝術的創作時，他們可能會是將未完成的創作帶回家繼續畫，畫完更是會主動交回給我。這一點就可能…並不是性別歧視，不過這是對部分的男同學真是可能是(笑)有些許幫助的。而且應用程式可以返回，做錯了也不用怕，可以SAVE 不同的版本，不會驚錯，利學生發展概念及想法。

00:43:02

問	除了課堂上的教學活動外，您會準備一些課後的教學活動助學生培養創造力嗎？	追問17
T2	你指功課嗎？	
問	類似吧，例如是一些的備課或是延伸活動之類的。	
T2	哦…即是一些預習…預習就比較少一些，但是就可能會吩咐學生…如果真是做預習的話，就可能是學生看完藝術作品後，再作分享。例如在教授印象派時，學生可能會自己去找一些印象派的藝術家，或者是其中一些作品。然後學生會在學習平台Seesaw分享出來，那學生便會先做這些預習。對了…那學生先學，先欣賞…即是先建立概念再上課的話，這會對該課堂有幫助的。 或者會不會有些學校是做一些工作紙的？	A25
問	應該都有，我實習時都留意到我的同學都有預備工作紙。	
T2	即是帶工作紙回家做預備？	
問	對啊，又或是課堂後會有工作紙做。	
問	我知道有些學校是會有一整本…一本叫作學習歷程的冊子，裏面會有草圖工作紙，接着有些發展的練習，我便沒有做這件事。但是我們亦有一本畫簿給學生的，學生在自己自由的時間，或者是轉堂…轉堂就比較少…即是在空閒的時間，學生就會拿畫簿出來畫畫。	A26

00:45:33

問	您會給甚麼例子讓學生參考？	追問18
T2	我會，如果真是找到一些類似的作品，我會選一些類似的。那因為若給予學生太不相關的作品欣賞，他們會不明白我在教甚麼。對啊，那所以起初若真的要給學生創作的參考，我盡量想給一些較類似的創作讓學生欣賞。 否則他們可能能力較弱…特別是能力弱的學生未必能跟上。對能力很高的學生，當然，給他們看其他一些跟這個課題不太相關的創作，當然亦會刺激到學生的想法和創意。對一些能力高的學生，可能即使我不給一些作品讓他們參考，他們自己也能找到一些參考來助他們創作。所以考慮到不同能力的學生，我會盡量找一些類近的創作給學生參考，可能間中當中有一至兩幅是其他一些較著名的藝術作品給學生參考。	A27

Interview Date: 2022.02.18

Interview Venue: Google Doc

No: T2

問	您認為教學團隊裏的教師，特別是一些非視藝本科的教師，是否成功實踐由您設計的教學？是否能達成課堂的教學目標？	追問19
T2	有4個視藝老師，3個是主修的，1個是副修，大家有足夠的專業知識，能夠達成學習目標	A28

問	您認為教學團隊裏的所有教師是否都有必要各自對數位藝術和應用程式有掌握？	追問20
T2	教師對數位藝術和應用程式有足夠的認識，一定會有助於學校推行這方面的發展。	A29

問	若所有視藝老師都各自對數位藝術和應用程式有掌握, 您認為這會否有助培養學生的創造力？	追問21
T2	我覺得除了對這些有足夠的認識，未必能推動學學生的創造力，你想想一位IT老師可能對這應用程式好熟悉, 但他們未必教到學生的作品有創造力。我認為要老師本身夠創造力，以及教師在課堂上展示甚麼和提問甚麼，才是提升學生創造力的重點。	A30

問	1. 若於初時校方的支持較少(如資金上), 數位藝術教學能繼續開展和推行嗎？	追問22
T2	當然可以, 有很多程式是免費的, 亦能推動數學藝術的教學	A31

問	2. 您如何定義創造力？　在評估學生作品的創意時, 創意分的佔整體分數多嗎？為甚麼？	追問23

T2	我認為創造力是獨一無二, 作品要有獨特性, 利用作品表達自己的故事, 有時會令到觀眾會心微笑, 有共鳴的。 創意分佔30%, 作品不能只看創意, 還要看技巧, 作品的完整度。	A32

問	為甚麼學生備課和課後延伸活動較少？您認為需要增加備課和課後延伸活動給學生嗎？	追問24
T2	有時會讓學生回家準備物料和在家找尋參考資料以準備下一個課題。 我不希望視藝科增加學生功課壓力, 因此很少會給視藝功課, 就算有只是簡單任務。	A33