

# The Effectiveness of Schoology on Student's Creative Thinking Skills in Visual Art Subject

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## Abstract

This study examined the effectiveness of Schoology on students' art achievement and creative thinking skills in learning Visual Art at Independent Chinese High School (ICHS) in Penang. A quasi-experimental research design was chosen for this study where pre-test and post-test was imposed on the students. A total of 80 junior middle level two students from ICHS were the samples of this study. The findings showed that the students' using Schoology scored higher in their art achievement and creative thinking skills compared to the control group. Meanwhile, Pearson correlation results revealed that there was a significant positive correlation between the students' art achievement and creative thinking skills in learning Visual art ( $r=0.302$ ). The findings exhibited that using Schoology has a positive effect on the student's creative thinking skill in Visual Art learning in Independent Chinese High Schools (ICHS). Therefore, the researcher highly believed that using Schoology in Visual Art learning should attract teachers, students, and other researchers' attention to implement the use of Schoology in learning Visual Art.

**Keywords:** Schoology, creative thinking skills, online learning, visual art

## INTRODUCTION

Education always stays front in line with the world's development of Science and Technology. Technology in Education is a process of supportive and improving education to enable students to hold the key to access the door of the educational digital nature. Hence, technology tools play an important role in response to support the changes in education. Technology tools based on educational field are referred to Learning Management System (LMS).

LMS is an online platform like web-based applications. Currently, LMS is widely used in the market (Kember et. al., 2010) and even extended to secondary schools (De Smet & Schellens, 2009; Pynoo et al., 2011). According to Sangra (2011), LMS has become the main driver of e-learning in the territory of education and the best LMS in 2019 were Docebo, Blackboard, Talent LMS, Schoology, Quizlet, Mind flash, The Academy LMS, and Moodle. While the most popular LMS in secondary education are Schoology, Moodle, and Edmodo

(Lonchner, Conrad & Graham, 2015). Based on the user experiences, the use of LMS have many features that could be of benefit to students and teachers to strengthen the teaching and learning process.

Schoology has been presented as a supporting tool in learning Visual Art that helps teachers to enhance their teaching skills and improve students' learning experiences (Köse, 2010). Schoology offers a substantial opportunity to Visual Art teachers to promote a dynamic learning in art classrooms. Unfortunately, a few studies have been carried out on the implementation of Schoology in teaching Visual Art (Dool, 2019). Moreover, Schoology may help students in constructing their visual memory (Mayer, 2014) in learning Visual Art (DeWitt et al., 2013). So far, there are researchers who discuss how technology devices bring effects on teaching Visual Art (Phelps & Maddison, 2008; Polifroni Lobo & Beltrán Sánchez, 2018; Rahmat & Au, 2013; Samah, Hussin, & Putih, 2016), however, there has been little discussion about the effects of

technology devices, especially Schoology on students' art achievement.

The primary element is the coordination of educational Visual Art in Malaysia as a second-class subject for students, parents, and the society (Ramli, Bakar, & Khan, 2017). Besides this, some of the schools' administrators give less focus on the needs and requirements of Visual Art, which makes it a less favorable and marginalized subject. This situation not only happens in primary and secondary public schools, but also Independent Chinese High Schools.

The Visual Art scene in Malaysian is a phenomenon of insufficient intellectualism values and diversity of problems (Mat & Baharuddin, 2016). Malaysia has created a phenomenon of insufficient art knowledge in the community. Malaysians seemed to be unconvinced enough about the advantages of art on the community. Most young artists in Malaysia do not expose themselves with intellectual values and there is a lack of thinkers in art with art theories (Sulaiman, 2004). The Malaysian society seems unable to acknowledge the benefits of art knowledge and intellectualism. This issue is probably causing parents and students to attentively refuse visual art learning. On the contrary, Visual Art is important in education to help students think creatively, as well as improve their mental and imagination skills. Therefore, art institutions and high schools need to consider fostering the art curriculum for the enrichment of art epistemology and creative thinking in the students. Thus, the education system of Malaysia needs to become diversified where students' need to improve their creative thinking skills to interpret the functionalized knowledge that they need. Therefore, our hope from involving technology tools such as Schoology in teaching art is to enhance art's subject value and improve student's achievement and creative thinking skills.

## LITERATURE REVIEW

Creativity refers to the ability of producing novel and practical ideas or products and has been known as the most important 21<sup>st</sup> century skills in education (Zhang et. al., 2020). Many studies have highlighted that creative thinking skills is the major goal of education and has strong effects on personal, social,

technological, and economic world (Zhang et. al., 2020; Diawati, 2016). It emphasizes more on the process rather than the end result, where teachers play a big role in teaching students on how to make claims, follow, or create logical arguments, figure out answers, eliminate incorrect paths, and focus on the correct answers (Abdullah & Elizabeth, 2005). Thus, the Malaysian education system is encouraged to emphasize more on students' creative thinking skills, especially in primary schools (Abdullah & Osman, 2010; Sulaiman, 2013).

Guilford (1975) considered creativity to be the result of a combination of two types of cognitive operations or thinking abilities: convergent and divergent thinking. Convergent thinking is some analytical processes in which the information is organized in a specific logical way to give an unequivocal solution to a problem. Instead, divergent thinking is used for open problems in which the previous knowledge is activated to generate alternative and logical responses (Marcos et. al., 2014). However, to develop creative thinking skills among students requires teachers to emphasize more on divergent questions that will provide opportunities to students to give more than one correct answer. Many studies indicated that divergent thinking has shown to be a reliable predictor of a child's potential in creative thinking (Diawati, Liliyasi, Setiabudi, & Buchari, 2017; Hong, Peng, O'Neil, & Wu, 2013).

Collaborative learning is described as a pedagogical practice that allows for positive social interaction, in respect to the diversity of individual needs and learning patterns of the students (Johnson & Johnson, 2009). Collaborative learning refers to a group learning method that involves two or more students in a group (Adesope & Nesbit, 2010). Collaborative learning is a method of constructivist learning that refers to learning which occurs when students learn actively. The benefits of constructivist learning may be valuable to develop complex skills, such as critical thinking skills or creative thinking skills (Wickersham & Dooley, 2006). According to an analysis by Tam (2000), there are four basic characteristics of constructivist learning that need to be considered when implementing constructivist instructional strategies: knowledge is shared between teachers and

students, teachers and students share authority, teachers only act as facilitators, and learning is conducted in small groups.

Therefore, collaborative learning requires students to learn in groups in order to transfer knowledge from one student to another in the same group (Ben-Zvi, 2007). Therefore, in order to achieve the concept of effective collaborative learning, each group member must play an active role in gaining a positive balance between individual abilities and interdependence among fellow group members (Caballé, 2011). Therefore, group members should adopt a positive attitude of dependence on each other involving work-related aspects, as well as socio-emotional aspects (Coll, Rochera, & de Gispert, 2014).

This is because in collaborative learning, knowledge is transferred from one student to another through discussions and information sharing (Gan, Menkhoff, & Smith, 2015). Thus, designed learning activities should also be emphasized in order to further involve the participation of each group member during the learning process (Royal and Rossi, 1993; Huber and Huber, 2008). Therefore, each group member should also support and help each other in effort to achieve learning goals (Gillies, 2006). Therefore, each student should interact transparently and respect the opinions given by other students (Johnson and Johnson, 1996). Among the important features emphasized by Johnson and Johnson (1994) for collaborative learning are students should learn in small groups and work together to help each other to achieve common goals.

The above skills that are gained during the collaborative teaching and learning process lead to the increase of creative thinking skills among students (Sompong, 2018). However, to further increase creative thinking skills among students in the current technology-savvy classrooms requires more than effective teaching strategies in the conventional classrooms (Siew et. al., 2014).

Therefore, a great number of educators have been doing research to find out the learning strategies in order to enhance learners' creativity (Moeller, Cutler, Fiedler, & Weier, 2013; Zhu, 2010). Some studies has shown that collaborative learning strategy can help to

develop creative thinking skills among students due to its nature that encourages students to find solutions to problems and generate novel ideas using reasoning strategies (Hattie, 2009; Laisema & Wannapiroon, 2014). In a study by Laisema and Wannapiroon (2014), they found that collaborative learning environment could provide strong support for developing undergraduate students' creative thinking skills because students can share knowledge and interact with their friends.

Studies have shown that the implementation of collaborative strategies can have a significantly positive effect on students' performance in tests of creative thinking (Catarino, Vasco, Lopes, Silva, & Morais, 2019; Marashi & Khatami, 2017) and often with longer information retention than those working individually (Susantini et al., 2018). Due to the diversity of thinking styles of the group members promoted by collaborative learning, it enhances creative outcomes among them (Kim & Song, 2012). Critical thinking - as a major skill required in the '21st century workforce' - can be expertly facilitated by collaboration. The series of interactions, knowledge sharing, and questions that take place during collaborative learning leads to new ideas, approaches, and discoveries in groups rather than as individuals (Tang & Vezzani, 2017). The diversity of thinking styles by the group members in collaborative learning can boost creative outcomes among students (Kim & Song, 2012). Furthermore, the collaborative environment helps individual students to be more socially sensitive, which can prevent tendencies towards restricted judgments, reduced awareness of complexity, or inability to consider alternative and creative perspectives (Carnevale & Probst, 1998).

The above leads the present researchers to the hypothesis that a collaborative learning strategy is an appropriate context to study the development of creative thinking, and it is likely to show more significant improvements in creative thinking when compared to a more traditional classroom approach. Although many studies have argued the importance of collaboration as part of teaching and learning, small group interdisciplinary teamwork is not always implemented effectively in education (Head, 2003).

In Visual Art subject, it is essential to emphasize on creative thinking skills as arts represents people through their expression of individuality via exercises and development of imaginative capacities (Parker, 2008). Therefore, creative thinking skills is essential to be applied in learning Visual Art and students' achievement in learning Visual Art proves that creative thinking skills can be measured with several available tests (Parker, 2008). Runco (2014) stated in his study that Visual Art is always related to creativity, thus making creative thinking skills an important skill to be highlighted among students in learning Visual Art.

In Visual Art, teachers do not directly teach students to think creatively, but creativity is a learning process which happens during the lessons. The term creativity in visual learning refers to the way teacher captivates students and inspires them to learn. Thus, to encourage creativity in Visual Art classroom, teachers need to build a repertoire of strategies and designs to spark new ideas and bring out the spirit of creativity in students. Aksoy (2005) suggested that technology support as tools and devices which can be used for improving creative thinking talent of the students. Creative thinking skills requires the exploration of experiences to create artwork among students and this is perceived when they have to be able to draw the images in their mind by drawing and painting (Carabine, 2013; Pavlou, 2013). Thus, this situation is important at indicating that the students are using their creative thinking skills while they draw. Related to this point, Guilford states that process increases student's flexibility in thinking which leads them to construct more new and creative ideas. Hence, findings have shown that creative thinking plays an essential role in Visual Art learning (Carabine, 2013; Moga, Burger, Hetland, & Winner, 2000; Pavlou, 2013; Zimmerman, 2009).

The use of new technologies in education has resulted in the emergence of numerous trends such as Schoology to aid teachers to deliver course content effectively. The technology has made it possible to disseminate knowledge to any places in the world and become an essential tool for schools (Hanham, 2021). Schoology also provides numerous interactive features, deliver content,

and enable students' assessments through online. As a result, students no longer have to live within their educational institution in order to benefit from its services. There are many studies that focus on the benefits of Schoology and its usability in facilitating learning. Being known as one of the most positive factors in student achievement, the use of Schoology encourages and accelerates the learning process by facilitating access to many online learning resources. In line with the 21<sup>st</sup> century education, learning and innovation skills are vital. The important skills comprise the 4Cs: Critical Thinking, Communication, Collaboration, and Creativity.

Schoology amalgamates the main features of the well-known social networking site with that of moodle-based learning management system. Principally, Schoology consists two main contexts 1) interactive communication and 2) academic information exchange (Manning et al., 2011). The facility for interactive communication permits teachers to create discussion questions, as well as collaborative groups for assignments that allow some kind of dynamic interactions among the in-service teachers and their teachers. As for the second aspect of academic information exchange, Schoology provides students the opportunity to access their grades, attendance records, and teacher feedback on electronically-submitted assignments. The Schoology allows students the chances to develop the skills needed. Schoology provides an avenue that may combine all applications and learning materials which are easily accessible by students. Brown (2002) expressed that using technology tools may support and improve students' learning in Visual Art.

## RESEARCH OBJECTIVE

However, far too little attention has been paid to investigate the influence of Schoology on students' creative thinking skill in Visual Art to improve art performance in learning the subject (Koszalka & Ganesan, 2004). Although there were some research on the use of Schoology in teaching and learning activities, but there is still insufficient empirical research on how Schoology affects student's learning in Visual Art. Students could use Schoology for active learning and foster creativity in learning Visual Art. Hence, the present study provided a

situation for students in ICHS regarding the effectiveness of Schoology in the art performance and creative thinking skills of learning Visual Art. Thus the objective of this study is to investigate the effectiveness of Schoology on students’ creative thinking skills in learning Visual Art by determining the significant difference of post-test mean scores between control group and treatment group.

**METHODOLOGY**

The study employed a quasi-experimental design. According to Gay et. al. (2009), an experimental design is so unique as it can create a cause and effect relationship. According to Cresswell (2014), this design includes a pre-test measure followed by a treatment and a post-test for a two groups; treatment and control. Therefore, the sample of the population of this study consisted of two groups of junior middle level two students from ICHS. Where, one group represented the control group and the other represented the treatment group. A minimum sample size of 30 is noted to be appropriate for an experimental research (Gay & Airasian, 2000). Thus, for this study, the sample size for control group from School A is 40 students and the sample size for

treatment group from School B is 40. Sampling method for this study was purposive sampling.

**DATA COLLECTION**

To ensure the validity and reliability of this study, a pre-test and a post-test were used as data collection methods. Before commencing the data collection, permission to conduct the study was obtained from the head master of the schools. A pre-test for the control group and the treatment group were conducted. After the pre-test, the teachers conducted teaching and learning activities for the control group using Microsoft Power Point for nine weeks and then for the treatment group using Schoology for another nine weeks. After nine weeks of activities, a post-test was conducting on both groups. For the control group, which is School A, the teaching topics included individualized instruction model without using Schoology for nine weeks. A total of three topics included teaching for nine weeks; each topic required three weeks to complete. These three topics were word art design, illustration figure, and composition design. Table 1 gives a detailed description of the activities for the control group as mentioned for School A.

Table 1: Research Procedure for Control Group – School A

WEEK	GROUP	DESCRIPTIONS
<b>Pre-test</b>	Treatment Group and Nonequivalent Control Group	Torrance Test of Creative Thinking – Figural & Art Performance Test - Card Design Drawing.
Treatment Activities only	1	Topic: <i>Words Art - Font Construction.</i>
	2	Topic: <i>Words Art - Font Completion.</i>
	3	Topic: <i>Words Art - Repeated Figures.</i>
	4	Topic: <i>Illustration – Construction of Illustration.</i>
	5	Topic: <i>Illustration – Completion of Illustration.</i>
	6	Topic: <i>Illustration – Repeated Figures.</i>
	7	Topic: <i>Composition, Color Matching and Painting – Construction of Composition.</i>
	8	Topic: <i>Composition, Color Matching and Painting – Completion of color matching.</i>
	9	Topic: <i>Composition, Color Matching and Painting – Repeated Figures – Composition paint with color matching.</i>

<b>Post-test</b>	Treatment Group and Nonequivalent Control Group	Torrance Test of Creative Thinking – Figural & Art Performance Test - Card Design Drawing.
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About the treatment group, which is School B, the instructions included teaching according to individualized instructional model and the topics applied Schoology for the Visual Art lessons. The topics for the learning materials were designed according to Mayer's Cognitive Theory and uploaded onto

Schoology. The learning materials were designed following the guidelines of the 12 principles of Mayer's multimedia instruction. For every lesson for the nine weeks' activities, students used school computers at the lab to log into Schoology. Table 2 shows the detailed illustration of the activities for the treatment group.

Table 2: Research Procedure for Treatment Group – School B

<b>WEEK</b>	<b>GROUP</b>	<b>DESCRIPTIONS</b>
<b>Pre-test</b>	Treatment Group and Nonequivalent Control Group	Torrance Test of Creative Thinking – Figural & Art Performance Test - Card Design Drawing.
using Schoology	1	Topic: <i>Words Art - Font Construction.</i>
	2	Topic: <i>Words Art - Font Completion.</i>
	3	Topic: <i>Words Art - Repeated Figures.</i>
	4	Topic: <i>Illustration – Construction of Illustration.</i>
	5	Topic: <i>Illustration – Completion of Illustration.</i>
	6	Topic: <i>Illustration – Repeated Figures.</i>
	7	Topic: <i>Composition, Color Matching and Painting – Construction of Composition.</i>
	8	Topic: <i>Composition, Color Matching and Painting – Completion of color matching.</i>
	9	Topic: <i>Composition, Color Matching and Painting – Repeated Figures – Composition paint with color matching.</i>
<b>Post-test</b>	Treatment Group and Nonequivalent Control Group	Torrance Test of Creative Thinking – Figural & Art Performance Test - Card Design Drawing.

During the lessons, the researcher conducted the individual instruction model for every instructional lesson. At the same time students, were allowed to access Schoology through computers. Moreover, students might access Schoology after school or continue learning if they were not able to attend school.

After nine weeks of activities, the post-test was carried out on both groups. There were a total of two tests for the post-test as well as for the pre-test, but the questions for the art performance test were slightly different from the pre-test that has been administered to the students.

**FINDINGS**

**The effectiveness of Schoology on student’s creative thinking skills in Visual Art for the post-test mean scores between the control group and the treatment group**

Table 4: Group statistics of Schoology Effects on Student’s Creative Thinking Skills for the Pre-test Mean Scores between the Control Group and the Treatment Group in Learning Visual Art

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-Test	Control Group	40	<b>202.4000</b>	66.89326	10.57675
	Treatment Group	40	<b>155.8250</b>	66.26168	10.47689

Table 5: Independent t-test of Schoology Effects on Student’s Creative Thinking Skills for the Post-test Mean Scores between the Control Group and the Treatment Group in Learning Visual Art

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-Test	Equal variances assumed	1.471	.229	<b>3.12</b>	<b>78</b>	<b>.002</b>	46.57500	14.88734	16.9365	76.2134
	Equal variances not assumed			3.12	77.9	.002	46.57500	14.88734	16.9365	76.2134
				8	93				8	2
									4	6

Table 4 and Table 5 present the effects of using Schoology on the students’ creative thinking skill analysis of group statistics and independent samples test for pre-test mean scores between the control group and the treatment group in learning Visual Art. The results suggested that there were significant difference in the pre-test mean scores between

the control group (M=202.40, SD=66.89) and the treatment group (M=155.83, SD=66.26) conditions;  $t(78)=3.13$ ,  $p=0.002$  ( $p < .05$ ).

Table 6: Descriptive statistics was conducted to determine a statistically significant difference of using Schoology on students’ creative thinking skills in Learning Visual Art.

**Descriptive Statistics**

Dependent Variable: Post

Group	Mean	Std. Deviation	N
1.00	172.0000	31.71023	40
2.00	191.7750	32.03403	40
Total	181.8875	33.19638	80

Table 7: Levene’s Test of Equality of Error Variances was conducted to determine a statistically significant difference of using

Schoology on students’ creative thinking skills in Learning Visual Art.

### Levene's Test of Equality of Error Variances<sup>a</sup>

Dependent Variable: Post

F	df1	df2	Sig.
.835	1	78	.364

Tested the null hypothesis that the error variance of the dependent variable between subjects effects was equal across groups.

a. Design: Intercept + Pre + Group

Table 8. An ANOVA was conducted to determine a statistically significant difference of using Schoology on students' creative thinking skills in Learning Visual Art.

### Tests of Between-Subjects Effects

Dependent Variable: Post

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7878.212 <sup>a</sup>	2	3939.106	3.831	.026	.090
Intercept	300814.709	1	300814.709	292.533	.000	.792
Pre	57.200	1	57.200	.056	.814	.001
Group	6595.229	1	6595.229	6.414	.013	.077
Error	79179.775	77	1028.309			
Total	2733703.000	80				
Corrected Total	87057.987	79				

a. R Squared = .090 (Adjusted R Squared = .067)

A one-way between-groups analysis of covariance was conducted to compare the effectiveness of the pre-test and the post-test of using Schoology on students' creative thinking skills in learning Visual Art. The independent variable was the control group and the treatment group, while the dependent variable consisted of the post-test scores after the treatment activities. The participants' scores on the Torrance of Test of Creative Thinking (TTCT) were used as the covariate in this analysis.

Preliminary check was conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. Table 6, Table 7, and Table 8 present the results of this analysis. After adjusting the TTCT scores, there were significant differences between the two groups' scores on TTCT,  $F(1,77) = 6.414$ ,  $p=0.013$ , partial eta squared = 0.077. There were also significant differences in the TTCT scores for the control group and the treatment group after the treatment activities.

### DISCUSSION

The discussion of this study will cover the objective of this study that is to investigate the effectiveness of Schoology on students' creative thinking skills in learning Visual Art. In order to enhance creative thinking skills, technology-support devices and tools can be used to improve creative thinking talent of students (Aksoy, 2005; Hanham, 2021). Technology tools like Schoology has the ability to link with the improvement of creative thinking skills among students (Wynn & Harris, 2018; Dool, 2019). However, after the treatment activities, the findings of this research showed that the high post-test covariate was from the treatment group that used Schoology, indicating that it was able to improve students' creative thinking skills. Moreover, the research findings also showed that the covariate of the control group that did not use Schoology was lower than the treatment group. According to the result, the students' creative thinking skills from both groups showed improvement. However, the experimental group, after using Schoology with the treatment activities, had shown higher improvement compared to the control group that did not use Schoology with treatment activities. The finding was consistent



with the earlier discovery from Sompong (2018) that Schoology can help students in enhancing learning achievement with creative thinking skills. The data analysis of the result findings confirmed that the use of Schoology is able to enhance students' creative thinking.

Furthermore, Sompong (2018) found that using online learning tools could increase students' creative thinking skills using project-based learning and collaborative learning strategy during teaching and learning in learning arts. Hence, the findings of this research could enrich and support the studies on the effectiveness of using online learning tools to enhance creative thinking skills. The reason could be of features equipped in the online learning tools that usually consists of video lectures, file sharing, chat, feedback and private message that allows two-way communication between the members in the group (Har, Abidin & Saibon, 2019). A part from that, learning activities that has been designed in the course according to the features available in the Schoology also plays a huge role to increase students' creative thinking skills. The activities that were designed in the learning to facilitate interaction between peers were proven effective in enhancing higher creative thinking skills and engagement among students Lin et. al., (2021). Schoology has the features to facilitate engagement during learning like chat that allows students to interact with each other. Other than that, the content provided in the Schoology also plays an important role to support engagement of students and interaction between peers in learning Bragg et. al., (2021). Hence, both the medium and activities are a great combination to enhance students' engagement throughout the learning and lead to a creative thinking skill. The activities that were designed are based on real concepts of visual art and the are guided by teacher that it helped to enhance interaction between peers during learning. Hence, it enhances creative thinking among students.

## CONCLUSION

In conclusion, it is proven that Schoology can help to improve students' creative thinking skills particularly in Visual Art involving high school students. It is clearly seen that from the findings where the data show students level of

creative thinking skill improved when students are treated with this method of teaching and learning through online platform like Schoology. This conclusion is in line with the results stated by Roqobih, Yuliani & Rahayu (2019). Students seem to interact and collaborate, and think creatively while doing their drawing throughout the lesson. It means that interaction between peers is a driving factor to encourage students to actively engage while using Schoology, thus enhance their creative thinking skill. This is in line with the result of Aini, Narulita & Indrawati (2020), for an online learning platform to be effective, it needs to equipped with various interaction tools that allows communication between peers as well as student to teacher. Furthermore, it must include feedback elements that enable the teacher to deliver feedback to students in order to boost scaffolding and students' confidence while learning, particularly in visual art subjects that requires continuous teacher supervision. Therefore, the researchers highly believed that using Schoology in learning Visual Art learning would attract teachers, students, and other researchers' attention to implement the use of Schoology not only in learning arts but also other subjects in school. Furthermore, it is recommended that the future research to focus on the online tools to promote interaction among students due to its effectiveness to increase students' creative thinking skill. Also, it is recommended that future research to explore the influences of peer-review as this could assist students creative thinking skill.

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