Improving Secondary School Students Critical Thinking Skills in The Production of Visual Artworks through the Ard Critical Thinking Taxonomy

Ardiana Aziz

Institut Pendidikan Guru Malaysia Kampus Ilmu Khas,

ABSTRACT

Critical thinking skills are important to students' creativity in the production of visual artworks. Past studies have not delved deep into the role of these skills among students. Past findings also revealed that the level of critical thinking skills among the Visual Art Education (VAE) teachers are far from satisfactory. In fact, there is no specific guide for adopting the critical production process that can be referred to by VAE teachers and curriculum designers. Therefore, this study aims to identify the influence of critical thinking on students' creativity in the process of producing visual artworks. This study also aims to evaluate the ARD Critical Thinking Taxonomy (or known as Taksonomi Pemikiran Kritis ARD) that has been developed for teacher to use as a guide by VAE teachers. The Design and Development method has been employed with the inclusion of the Requirements Analysis, Design and Development, and Evaluation phases. Findings reveal that all ARD TPK constructs reach expert consensus in addition to successfully determining the ranking of critical thinking according to priority, starting with Routine Thinking, Advanced Thinking, Conceptual Thinking and Strategic Thinking. The findings of this study also display that ARD TPK is capable of increasing students critical thinking especially creativity. The findings also suggest that the ARD TPK is very vital to all parties, especially the Malaysian Ministry of Education (MOE) in emphasising the development of the individual's potential in an integrated and comprehensive manner in line with the Malaysian Philosophy of Education.

Keywords: Taxonomy, Routine Thinking, Advanced Thinking, Conceptual Thinking, Strategic Thinking

INTRODUCTION

The Malaysian Qualification Framework (MQF) emphasises eight generic skills of learning outcomes that are important for Malaysia, namely, (1) knowledge of the field, (2) practical skills, (3) social skills and responsibility, (4) ethical, moral and professional, (5) communication skills, leadership and teamwork, (6) critical thinking skills, problem solving and scientific skills, (7) information management and lifelong learning skills, and (8) management and entrepreneurial skills. Realising this, MOE has taken various initiatives in enhancing the education industry to produce human capital equipped with these generic skills. In response to the above, Malaysia Education Blueprint 2013-2025 has targeted six main attributes (Knowledge, Thinking Skills, Leadership, Bilingual Profiency, Ethics and National Identity) in the process of achieving this goal. The education system in Malaysia emphasises aspects of Thinking Skills, namely critical thinking and problem solving skills. Critical Thinking is a mandatory in the field of education to emphasise the inculcation of High Order Thinking Skills (HOTS) among teachers and students (Nor Azzian Bashah and Alizah Lambri, 2024). Therefore, these critical thinking skills also need to be adopted and implemented by the VAE teacher as well. The VAE teachers not only act as a conveyer of knowledge but are also responsible for students' social life, academic achievement,

life skills as well as enhancing diverse skills of students (Sumarni and Kadarwati, 2022). Meaningful teaching and learning processes, will be able to equip students to analyse facts to understand in depth a problem or topic (Herrity, 2024), especially for subjects that are more oriented to the psychomotor domain - a domain that is most relevant for VAE. The idea generation process, the use of a variety of media, techniques, fields and crafts with the wisdom of VAE teachers can help students to solve complex problems they face during the production of visual artworks.

Problem Statement

Based on the report from the Education Policy Planning and Research Division, MOE (2020), the implementation of VAE subjects is important as VAE teachers play a vital role in producing students who are imaginative and innovative as well as students who think critically and creatively. In line with the main goals of the VAE curriculum, VAE learning indeed requires students to be involved in the understanding of the processes behind the creation of visual artworks because this is where the task of seeing, analysing and interpreting the entire production of a visual artworks begins. However, there is no guide or special psychomotor taxonomy that VAE teachers can refer to for this purpose. In fact, VAE teachers have only been referring to Bloom's Cognitive Taxonomy (revised, 2002) which is deemed less relevant in the assessment of the level of achievement of the production of visual artworks. This is because Bloom's Cognitive Taxonomy (revised, 2002) is more geared towards determining the achievement level of cognitive knowledge only. In addition, Rui and Wei (2023) found that many VAE teachers admitted that the concept of critical thinking, using Bloom's Cognitive Taxonomy (revised, 2002) difficult to apply in the production of visual artworks and as such assessed their level of critical thinking as only being at an average level. This shows that the awareness and mastery of critical thinking among VAE educators also needs serious attention so that they are able to apply these skills effectively and accurately in teaching while also improving students' abilities to adopt HOTS. The practice of referring to Bloom's Cognitive Taxonomy (revised, 2002) has actually caused a lot of conflict among VAE reviewers and VAE exam questions setters as well as VAE curriculum designers because Bloom's Cognitive Taxonomy (revised, 2002), clearly emphasises the definition of the cognitive domain only and neglects the specific HOTS skills needed for VAE, which lies more in the psychomotor domain. Bloom's Cognitive Taxonomy (revised, 2002) is thus not suitable to be used with art theories because VAE tends to involve more of the psychomotor domain with high 'motor skills' compared to the cognitive domain.

METHODOLOGY

This study employ a quantitative design specifically the Design and Development Research (DDR) by Richey and Klein (2014). According to Richey and Klein (2014), Design and Development Research is a 'systematic research method for the design, development and evaluation processes that targets new products or methods that can be accepted and adopted by the fields'. Richey and Klein (2014), have identified two types of studies in the design and development studies, namely; studies about the development of a specific product or programme that is designed, developed and evaluated. The second type of study, is a study on the process of designing, developing or evaluating the equipment and models. For this study, the researchers have used the first type of study which is the development study that consists of three stages, namely the Needs Analysis Phase, the Design and Development Phase, and the Evaluation Phase in their intervention model.

FINDINGS

The findings of the analysis reveal that the independent variables (Routine Thinking, Extended Thinking, Conceptual Thinking and Strategic Thinking) have potential to and display significance in influencing VAE teachers' processes of producing visual artworks. In addition to this, other critical factors such as Critical Level, Critical Skills and Critical Evaluation also show a significant level of

influence on the processes of producing visual artworks. The analysis also show that the independent variable of Conceptual Thinking is the best variable in the context of this study with a value of ß = -36.263, t = 34.281, p = 0.000. Therefore, the findings are consistent and supports the opinions of (Shibi et al. 2023) that Conceptual Thinking is important. Conceptual learning is a method that can increase the success of a lesson more easily because it involves discussion or learning interaction between teachers and students. Corresponding to the processes of producing visual artworks, Conceptual Thinking is important because it is able to make visible the relationships and concepts from various perspectives, analyse hypotheses and at the same time create something new. In summary, the results of this study answers significantly the four research hypotheses. The findings supports the recommendation that it is necessary to review and design a VAE curriculum to be in line with the requirements of the era of globalisation. In fact, the development of the ARD TPK model on the creativity of secondary school students in the process of producing visual artworks gives a new perspective to teachers and students, even to artists and art connoisseurs in applying and improving the practice of critical thinking in the psychomotor domain. Additionally, the development of the ARD TPK model is also expected to help teachers and students in achieving a higher level of creative thinking.
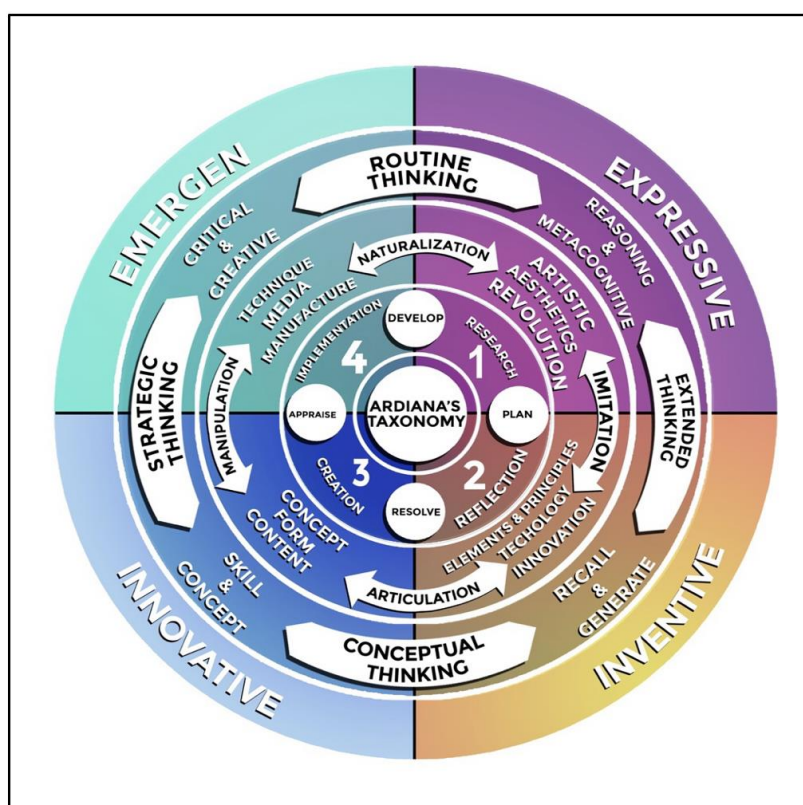
ARD TPK MODEL

Figure 1. ARD TPK Model

Based on the finding of priority 'ranking' through the 'Fuzzy Delphi Method' (FDM) method that was implemented, the process of producing visual artworks needs to start with the Develop (Building Thoughts) domain. This is because the indicators analyse, evaluate and create which helps individuals to collect various information for comparison, in-depth evaluation and production of something that can solve the problem (Nyoman Bagus Pramarth et al. 2023). Noradzimah Abdul Majid et al. (2020), also stated that the Develop (Building Thoughts) domain can increase the clarity of using information effectively in addition to generating creative activities because the breadth of thinking will avoid a person from becoming stereotype in his actions and practices. In order to master the Develop (Building Thoughts) domain, the skill of Research study needs to be used. The skill of Research study is important in VAE subjects because it involves the process of 'inquiry-based study' and the production of visual

artworks (Art Fundamental, 2004). In addition, Research studies 'can increase students' self-esteem by ensuring students are responsible for their own learning' (Inquiry Learning Model, 2007).

The psychomotor level of Develop (Building Thoughts) domain is Naturalisation skill. Naturalisation is 'the ability to take action automatically and intuitively according to context'. In the design aspect, Naturalisation means 'spontaneous' which means expressing imagination quickly in the 'style' of the artist's own thinking. Naturalisation is also 'the ability to produce a new artistic flow to deal with an issue or problem that occurs in addition to improving existing skills' (Dave's Psychomotor Taxonomy, 1970). The critical assessment aspect that can be carried out by the teacher at Develop (Building Thoughts) domain is towards the Reasoning and Metacognitive power behind the scenes, which is the process of producing the visual artworks. The thinking behind 'reasoning' focuses on making decisions related to what should be believed or should be done which involves the construction process or even reasons to support the belief. Metacognition is considered an important aspect of planning, monitoring and evaluation. Teachers can evaluate Reasoning and Metacognitive (justification) actions taken by students during the production process because through the power of Reasoning and Metacognitive, students can be trained to think critically about their own thinking process and apply learning strategies for them to think for themselves through more difficult tasks. In addition, evaluations can also be made on the concepts of Artistic (understanding of written and implied meaning), Aesthetics (understanding of beauty and value) and Revolution (understanding of current technology) that are applied by students in the process of producing the visual artworks. In particular, Develop (Building Thoughts) domain is based on the process of Routine Thinking. The meaning of Routine Thinking is 'acquiring knowledge through remembering and reproducing skills which means students should think critically to combine existing knowledge and skills with the latest issues or problems in order to generate critical and new ideas in the process of producing visual artworks'.

The second result of the 'ranking' priority is the level of the Plan domain, which is the process of putting together a strategy or scheme of action to be taken. This is because 'planning is the basis for achieving the desired results' (Art Fundamental, 2004). In order to master this Planning domain, Reflection skills need to be employed. Reflection is a process of evaluating the impact of the 'outcome' or hypothesis that will be produced through the planning that has been undertaken. Reflection skill is called 'criticizing or making an assessment based on research' (Art Fundamental, 2004). According to Gamar Al Haddar and Nurul Azmi (2020), reflection is a 'skill in choosing and applying media to teach a topic'. Reflection also serves as selecting significant ideas that are imagined. The psychomotor level of Plan domain is the Imitation skill. In the design aspect, Imitation is the ability 'to observe and pattern one's own behavior after looking at the behavior of others' (Dave's Psychomotor Taxonomy, 1970). Imitation is where an artist recreates what has been studied, seen and heard. According to Hajar Pamadhi (2022), 'imitation is the copying of an object as accurately as possible' and sometimes to an existing painting and turning it into something new or further developing it. In addition, the famous 'Pop Art' artist Crimp and Warhol (2012) once stated, 'his work is to inspire other artists to get ideas outside their color box in getting new resources when creating'. It should be remembered that Imitation is not merely blindly copying, but to inspire the process of producing visual artworks as emphasized by Crimp and Warhol. The critical assessment aspect that teachers can do at Plan domain is on Recall and Generating skills. Assessment can be done on the ability of students to scan their existing knowledge and 'skills' and how to generate ideas to the next level. In addition, evaluation can also be done on the understanding of Visual Language (elements of art and design principles), the application of Technology and Innovation that has been implemented and triggered by students in the process of producing the visual artworks. In particular, this stage is based on 'Extended Thinking'.

The Extended Thinking process is an 'augmentation' process that 'needs to go beyond existing learning standards and it also questions how knowledge can be applied in the context of real life' (Webb's Depth of Knowledge, 1997). Brookfield (2011) explains that 'assumption' means something that is thought to be true and something that is believed to be true. It is clear here that the priority of Extended Thinking needs to be done earlier in the process of generating visual artworks towards better quality and acceptance by the community. Day and Hurwitz (2012), have listed several criteria of a 'gifted child'. Among them are: (1) showing superior ability to reason, (2) making generalizations or solving problems, (3) showing constant intellectual curiosity, (4) having broad interests, developing one or more interests to depth, (5) produce superior work or have a large vocabulary, (6) show creative ability or imaginative expression in art, (7) set high standards for oneself, (8) observe deeply and take

responsibility for new ideas, (9) show initiative, originality or flexibility in thinking, (10) enjoy intellectual challenges and (11) show a cautious and subtle sense of humor'. By referring to these criteria, the researchers are of the opinion that this 'ranking' of Extended Thinking is not coincidental because it will intentionally encourage the 'gifted child' to overcome the conflict. Extended Thinking can also encourage the 'gifted child' to act outside the box in addition to guiding them to a creation that goes beyond their existing knowledge. This opinion is significant with the study by Isbell and Raines (2012) who state, 'teachers should give freedom to students to experiment beyond the scope of existing processes'.

The third finding according to the 'ranking' priority is the level of the Resolution/Resolve domain. Resolution is a critical solution process applied to all existing problems. This is because Resolution is 'solving action such as analysing the complexity of a situation and taking action to resolve' (Art Fundamental, 2004). All problems that exist such as hypotheses determining the impact of media or materials that are more effective or which techniques are more interesting, need to be solved by making critical judgments through an exploratory or inventive process. After all the existing problems have been solved, the process of producing visual artworks continues with the process of Creation, which is creating or producing visual artworks and products as planned. The psychomotor level of this Resolution/Resolve is the Articulation skill. Articulation is 'the ability to adapt and integrate various actions to form an approach that suits various needs' (Dave's Psychomotor Taxonomy, 1970). Articulation means that the artist needs to be smart and critical in connecting all knowledge, concepts, skills, technology, innovation and so on. Muliyadi Mahamood (2014) in Rosli Zakaria (2014), has recorded a criticism of the involvement of mere follower (pak turut) artists in activities and creativity that are based on Western beliefs that support the nature of individuality, antisocial, fight for 'art only for art' and reject the elements of pure. Therefore, this confusion should be avoided by articulating the application of religion (belief), culture, society and intellectuals into each artwork (Rosli Zakaria, 2014). The critical assessment aspect that can be carried out by the teacher at Resolution/Resolve domain stage is on Skills and Concepts. This critical assessment refers to the greatness of the theme and the 'skills' that have been undertaken in solving the problems that exist in addition to the precision of craftsmanship and the technological efficiency applied by the students in producing the visual artworks. In addition, the teacher's assessments can also be made on the understanding of the Concept/Subject, Form and Content presented by the students. Ocvirk et al. (2012), have also asserted that a work exists by containing three main components called 'Organic Unity'. These three main components are the three basic structures that support practical work and dominate the existence of a work. Specifically, Resolution/Resolve domain stage is based on Conceptual Thinking which involves concepts and skills' (Webb's Depth of Knowledge, 1997). It is clear that the priority of Conceptual Thinking is to train students or artists to compare the implications of concepts, techniques, media and so on while also being able to make students think critically about all the reasons for the solution. The fourth finding of priority 'ranking' is the level of the Assessment/Appraise domain. Evaluation is the process of critically evaluating all the hypotheses of the actions implemented. According to Art Fundamental (2004), Appraise is 'an opportunity for artists and designers to discuss the development of the visual artworks in order to create an understanding of the idea of the work to be achieved'. After all the hypotheses have been evaluated and relevant results have been obtained, the Implementation process to produce the artworks is then carried out.

The psychomotor level at Assessment/Appraise domain stage is the Manipulation skill. Manipulation is 'the ability to perform certain actions through memory or obey instructions' (Dave's Psychomotor Taxonomy, 1970). Manipulation is a critical stage where an artist changes or 'twists' all ideas and imagination according to the needs, goals and 'style' in producing the visual artworks. According to Sumner, Schmid and Pauly (2007), Manipulation is a 'motor skill' to shape or process something into a work of art. The aspect of critical evaluation for Assessment/Appraise domain is on the skills and way of thinking that is comprehensive, Critical and Creative in producing the visual artworks. Evaluation can also be made on the impact of techniques, media and the manufacturing process in addition to critically and creatively evaluating the meaning of the canvas of the visual artworks. Specifically, this stage is underpinned by Strategic Thinking because 'complexity increases at this stage and involves complex strategic reasoning and justification' (Webb's Depth of Knowledge, 1997). It is clear that Strategic Thinking encourages in-depth analysis to elaborate concepts in producing works that reach the highest level of creativity. In conclusion, the ARD TPK model is circular in form

because it involves 'processes' that relate to and rely on each other. In addition, measuring the high level of creativity based on the theory of 'Multiple Creative Talent Theory' by Tyler (1970) is also included. In conclusion, the ARD TPK is found to be suitable for use in VAE teaching and learning.

DISCUSSION AND IMPLICATIONS OF THE STUDY

This study reveals that all the variables of critical thinking which are Routine Thinking, Advanced Thinking, Conceptual Thinking and Strategic Thinking are capable of having a significant influence in the processes of producing visual artworks. The results also display that the Conceptual Thinking variable is the best way to think critically in the process of producing visual artwork with a significance value of $ß = -36.263$, $t = 34.281$, $p = 0.000$. This finding explains that although creativity can be taught through the method of spontaneous sketching, imagination or through design, analytical mastery of concepts, skills and techniques is still essential. Therefore, there is no denying that this way of thinking conceptually allows teachers, students and even visual artists to think rationally before making a sensible decision. The findings also suggest that the practice of critical thinking needs to be lived and practiced by VAE teachers in the classroom. This is because critical thinking not only helps VAE teachers improve their teaching methods, but also helps students think critically and creatively in publishing quality visual artworks while influencing problem solving as best as possible. This way of thinking critically is also able to train VAE teachers and students to make rational judgments in every hypothetical action that needs to be taken. In addition, the practice of this way of critical thinking should also be appreciated by curriculum designers and VAE exam question setters, especially for practical exam questions such as the question papers for 2611/2 (Fine Art) and for 2611/3 (Visual Art Design Study-Folio) which more likely relies on Bloom's Cognitive Taxonomy (modified, 2000). This is because ARD TPK can help these designers to not only plan and organize ideas in a more systematic way but also to be based on psychomotor skills. The ARD TPK also allows the designers to explore in more depth the construction of high-level questions (open responses) in the process of producing visual artworks such as comparing the differences of information, organising an idea or making predictions about a situation or the implications of creative actions to be taken.

According to Alsaleh (2020), the inclusion of the elements of critical thinking in teaching and learning 'enlivens' and 'moves' learning thus increasing students' interest in learning. Critical activities allow teachers and students to interact well, solve problems effectively and make appropriate decisions. All of these will help teachers to achieve the goals of teaching and learning in addition to training students to balance the functions of the right and left brain. Therefore, the use of this ARD TPK needs to be highly encouraged so that diversity in the processes of producing visual artworks will attract students' attention to follow the teacher's teaching while improving the critical thinking skills of VAE students. This study used VAE teachers from secondary schools around Peninsular Malaysia only as respondents. It is recommended that VAE teachers from secondary schools located in Sabah and Sarawak could be included as respondents. Besides that, respondents from the Malaysian Art Schools (SSeM) could also be consulted in the forming of a new framework against the ARD TPK. Researchers can also expand this study to professionals such as real artists, designers or craftmans in the forming a new framework for the ARD TPK. This study focuses more on the psychomotor aspect in the process of producing visual artworks instead of the existing cognitive aspect based on Bloom's Taxonomy that was in practice. It is suggested that the affective aspect in the of forming a new framework for ARD TPK is deemed necessary too.

CONCLUSION

Overall, this study has achieved the research objectives set. This study is expected to give a clearer picture of the importance of applying critical thinking skills to enhance creativity in the process of producing visual artworks. In addition, it is hoped that the development and use of ARD TPK on enhancing the creativity of secondary school students in the process of producing visual artworks that

have never been developed before will become a reality and benefit VAE teachers and other skilled artisans.

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