



Developing Guidelines of STEAM Education for Primary School Students' Learning on Designing Floral Craftsmanship based on Thai Royal Court

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Abstract. An important goal of effective primary school education in the modern world is to pave the way for learner's creativity. However, how to use the floral craftsmanship on enhancing learners' creativity at early stages of education has not been focused on current pedagogical literatures. In the context of Thailand, the floral craftsmanship based on the royal court is an exquisite art and a valuable national heritage. This study aimed to develop guidelines of STEAM education for primary school students' learning on designing floral craftsmanship based on Thai Royal court. The guidelines were developed through Nakhon Phanom University Demonstration School Professional Learning Community (NPU PLC). Methodology regarded qualitative research. The developing guidelines were categorized based on NPU PLC planning about the learning activities of STEAM education. The findings revealed that the possible guidelines of activities that could engage students to build physical, social, emotional and intellectual potential primary school students through project-based learning management approaches; aware of occupational and technology for future careers; and build up creativity of designing floral craftsmanship based on valuable national heritage. These activities may allow students to practice knowledge about science (e.g., materials) and mathematics (e.g., floral pattern) based on ethical significance (e.g., virtue of nation, religion and the monarchy) and aesthetics and beauty in form of flower arrangement.

Keywords: STEAM Education, virtue, floral craftsmanship, designing

1. Introduction

The children of the twenty-first century are increasingly prepared to bring knowledge and abilities to solve issues, make sense of information, and know how to acquire and assess evidence to make judgments." Improving such skills is central to STEM and STEAM education (Sutaphan & Yuenyong, 2019; Sutaphan and Yuenyong, 2023; Williams, 2011). To equip kids with the skills and knowledge they will need to be successful innovators in a 21st century job; there is an increasing emphasis on STEAM — the educational discipline that engages students in the fields of Science, Technology, Engineering, the Arts, and Math (Sohsomboon and Yuenyong, 2021).

Discussion of technology and/or engineering philosophy may provide a better understanding of incorporating other information into STEM/STEAM integration. According to Sutaphan and Yuenyong (2019), T-technology provides a strong link between science and society (including the arts). According to the four modes (object, knowledge, activity, and volition) of technology philosophy (de Vries, 2017), students' learning in STEM/STEAM education involves creative thinking skills. The ability to think creatively is essential for designers to achieve the fit between physical and functional nature, and for consumers to discover new ways to use technology (Nugraheni and Yuenyong, 2022; Suparee and Yuenyong, 2021). Literatures (Koes-H et.al., 2021; Phan et.al., 2021) suggested how to practice technology based on four modes of technology into STEM/STEAM education.

Regarding technology concepts, it suggests that other disciplines such as arts need to be included in creatively designing. We must define "sense of arts"; arts in the postmodern paradigm or in STEAM education do not focus solely on the beauty of painting; sense of arts here could refer to any of the arts. Yakman (2008) clarified arts into categories including language arts, fine arts, physical arts, manual arts, and liberal arts. At the start of teaching STEAM, teachers must consider teaching topics that include arts. Some teachers may focus primarily on the arts component while designing prototypes, with the response STEAM. There is nothing wrong with that notion, but it may be too restrictive for the arts definition, which focuses solely on fine arts. We may look at it via the liberal arts perspective (Sohsomboon and Yuenyong, 2021). For example, Maneelam et.al. (2023) express arts in her STEAM approach education as an ethical problem story through the issue of plastic awareness. Maneelam taught not only about plastic, but also about its ethical, moral, and value issues. This plastic awareness gives meaning to students' ethics, and it has the potential to provide beauty to society. In this stage of STEAM, ethnography could inspire ethical consciousness by telling a tale about their society's propensity of utilizing plastic. So, at this point, teachers do not need to worry about how to incorporate arts into STEAM activities because the arts are already mentioned in the title.

Regarding Thai context, this study brings the issue of royal floral arrangement as the moral and ethical value in Thai context to engage students to practice STEAM integration knowledge. The Royal Floral Arrangement of the Thai Royal Court in the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great generates the moral and ethical value because it showed the gratitude towards the King. This event made palace people be gathered, exchange their belief, show goodwill, share, and encourage each other, in which it builds up friendship among people in the society (Chanthanaphalin, 1989). As you can see from the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great that courtiers and people offered their best work making the floral work with their full effort. The decoration of the Royal Crematorium displayed the valuably exquisite craftsmanship to other people so that the participants can involve with inheriting the valuable tradition, belief, ritual, exquisite craftsmanship, and artwork of the Royal Court Tradition further. With the remembrance and realization in the gratitude of His Majesty King Bhumibol Adulyadej the Great for his hard working in improving live living of Thai citizens, the people who offered the Royal Floral Arrangement including Princess Maha Chakri Sirindhorn who visited at the Boromraj Sthitya Maholan Hall and knitted the crown flower net decorated with red ixora and shiny golden lace, which used in decorating the Ninth Floor of the Royal Crematorium. It emphasized that the Royal Floral Arrangement of the Royal Court Tradition has moral and ethical value and needs to be conserved for the next generation.

Put the arts in term of aesthetics value, the Royal Floral Arrangement of the Thai Royal Court in the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great generates the aesthetics value because its beauty in the exquisite craftsmanship was displayed and being widely accepted by all people. Chanthanaphalin (1985) described the

floral work that affects the people's emotions and feelings after seeing, smelling, touching. They will feel gentleness, soothes, and tenderness because of its well-crafted Royal Floral Arrangement. The good smell was up in the air, and it made the people refreshed and want to know who created it. It is a good combination of beauty (Bunnak, 2017). The beauty of the Royal Floral Arrangement of the Thai Royal Court in the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great illustrated the Royal Court Tradition by using the artwork composition generating the exquisite craftsmanship. The aesthetic value means to derive the senses through over the six entries which are ears, eyes, nose, tongue, and mind. The aesthetics value can be perceived from watching beautiful artwork and being pleasure and like the artwork using the mentioned entries. Plus, the floral artwork made the creator and the participants learned how to appreciate the beauty of the nature that is a mind-healing. In additions, people, especially foreigners, who saw the Royal Floral Arrangement felt amazed and appreciated the aesthetics value.

Designing the royal floral arrangement would also provide students the value of innovation. In the globalization era, new generation people have grown as known in, "Gen C people". There are a lot of changes in terms of facilities, advanced technologies, and beliefs compared with the past in Baby Bloomers Generation (Tanthichuwet, 2017). Anyhow, adults can also use and access technology because society keeps changing all the time. People are eventually learning to adapt themselves in the new context (Tanthichuwet, 2017). The Royal Floral Arrangement is one of many customs that have been passing on from the past until the present. In the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great, it is found that innovation, new methods, and materials were adapted with the traditional Royal Cremation appropriately, effectively, and fashionably. The artisans also needed to adapt themselves and develop their innovative thinking to conform with the current society. Consequently, their artwork was not out-of-date and is still valuable according to the Royal Court Tradition.

The Royal Floral Arrangement according to the Royal Court Tradition in the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great reflects Thai belief, tradition, ritual, and history passing on from generation to generation for ages. To cooperatively making the Royal Floral Arrangement, the citizens and relevant sectors showed their fealty to the Royal Family, their love and harmony, and the unity of the Royal Artisans in creating the floral artwork by combining the tradition with the innovation appropriately nowadays. The generating of the excellent artwork, in which it is widely accepted. With an ability to manage the resources well, the Royal Floral Arrangement had been done perfectly with the utmost respect displaying the most valuable Thai Royal Floral Arrangement to both Thai and other nations to be able to sense the proudness of Thai people.

2. Methodology

This study aimed to develop guidelines of STEAM education for primary school students' learning on designing floral craftsmanship based on Thai Royal court. The guidelines were developed through Nakhon Phanom University Demonstration School Professional Learning Community (NPU PLC). Methodology regarded qualitative research.

2.1 Participants

Participants in this study included members of NPU professional learning community addressing in the part of planning the design thinking of STEM lesson plan. The members included five expert panel committees. The five STEAM education experts included (1) male expert who has been working as science educator at Faculty of Education, Khon Kaen University for about 20 years, (2) male expert who has been working as physics lecturer at Faculty of Education, Rajabhat Mahasarakham University for 10 years, and (3)

three female experts who has been working as primary school educator at Faculty of Education, Nakhon Phanom University for more than 8 years.

2.2 Method of inquiry

The developing guidelines of STEAM education for primary school students' learning on designing floral craftsmanship based on Thai Royal court were categorized based on NPU PLC planning about the learning activities of STEAM education. The first draft ideas of designing floral craftsmanship STEAM education were developed by a primary school teacher who was working at Nakhon Phanom University Demonstration school. Then, the PLC member meeting was organized two times to improve the appropriate guidelines. The issues of revising STEAM education lesson plan were collected through the report of expert suggestion on expert panel discussion. The suggestion then was categorized to develop assumptions for further revising guidelines of STEAM education for primary school students' learning on designing floral craftsmanship based on Thai Royal court.

3. Findings

The findings revealed that the possible guidelines of activities that could engage students to build physical, social, emotional and intellectual potential primary school students through project-based learning management approaches; aware of occupational and technology for future careers; and build up creativity of designing floral craftsmanship based on valuable national heritage. The guidelines were concluded into three issues including 1) arts as core content of valuable national heritage for blending into STEAM projects, 2) principles of integrating arts about royal floral arrangement into STEAM projects, and 3) strategies for organizing the royal flower craftsmanship.

3.1 Arts as core content of valuable national heritage for blending into STEAM project

The valuable national heritage could be provided as core content for designing floral arrangements. The royal flower craftsmanship is a valuable cultural cost of Thailand, a perfect blend of cultures, beliefs, traditions, and arts through exquisite craftsmanship. Therefore, this valuable cultural cost is a very important social cost that should be preserved continuing to create sustainability in the future. The guidelines for inheriting the value of the royal flower craftsmanship could be shown through the history as following.

The Royal Floral Arrangement of the Thai Royal Court in the Royal Cremation of His Majesty King Bhumibol Adulyadej the Great used the artisans who has been inherited its Royal Craftsmanship from Sukhothai era until Ratanakosin Era, specially in the King Rama V era. All royalties paid interested in developing craftsmanship in the courtiers , especially Sri Bajarindra. She had a skill in the Royal Floral Arrangement, and the uniqueness of her floral work was “exquisite”, in which it reflected the way of how high class people made the floral artwork (Bunnak, 2017). This is correspondence to the studying of Thotong (2012) that mentioned an artisan means the person who handcrafted and created the beautiful artwork for a special occasion, festival, and rituals. The Royal Floral Arrangement, for example, requires the high skilled artisans and a lot of practice and preparation. They had a floor to present the masterpiece to Thai people and the global in mutually inheriting Thai tradition and culture for good.

3.2 Principles of integrating arts about royal floral arrangement into STEAM project

Principles of integrating arts about royal floral arrangement into STEAM project related to the great King Rama IX on the principle of exploding from the inside. It is believed that any action will be sustainable and successful, it must be developed from the inside before it can go outside. In another word, the community development dimension, the community must be developed to be ready to support inside first before the

development from outside can be implemented. The development of operations in the manner of cultural inheritance should be provided starting from raising awareness of the value. And the benefits of that culture from within the person's self will support the development and inheritance of such culture outside. Therefore, setting a framework for driving the development of human resources of the country to realize the importance of and can create added value to extend the valuable wisdom. In this case, it is floral arrangement.

The main objective of the floral arrangement STEAM education is to create human resources of the country that recognizes the importance ready to develop and continue creatively in the cultural cost of fresh flower wisdom. The value of cultural heritage could be classified into three aspects. Firstly, it could be creating Thai identity. The creation of the Thai identity integrates the beautiful beliefs, culture, history, traditions, religions, and practices of Thailand that have been passed down for a long time. It is the root of being Thai. Second is creative value of raising awareness. Creating value is to raise awareness and see the importance of cultural costs in the field of fresh royal flowers to be ready for conservation, continuation, and creativity to create sustainability in society. Third is to create a career for people. Career building is to create a career for people who are skilled and interested in career building. Because the royal flower craftsmanship is a high-class craftsmanship with a long history There are intricacies and stories that are of great value in the general public perception, so in such craftsmanship is that there is a story that is the process of creating added value to the product. If it is promoted and marketed at an economic upper level, it is an opportunity to create a new career that can build stability both at the individual and local level. Elevate your flower work from normal craftsmanship to highly skilled craftsmen.

3.3 Strategies for organizing the royal flower craftsmanship

Strategies for organizing the royal flower craftsmanship will be clarified through the succession of the royal flower craftsmen called the MALAI Model for creating sustainability. The goal of learning about the Model of the garland (MALAI Model) included building yourself, creating value and building careers. The MALAI Model was organized regarding on 5-component strategy including creating sustainability through creation, creating sustainability through the preservation of Thai identity, and creating sustainability through education.

3.3.1 *Creating sustainability through creation.*

Creating sustainability through the creation of new occupations to create career opportunities. To build income security for those who are interested and have the skills to be able to rely on themselves. And gives rise to the intention of continuing this cultural work Including finding suitable marketing channels and marketing research to develop knowledge Laid on a cultural foundation that has a long inheritance.

3.3.2 *Creating sustainability through the preservation of Thai identity.*

Creating sustainability through the preservation of Thai identity Is to raise public awareness and see the importance of the cultural heritage of Thailand. Build awareness and correct understanding of the wisdom that has been accumulated and transmitted through valuable fresh flower making work that is different from other normal craftsmanship.

3.3.3 *Creating sustainability through education.*

Creating sustainability through education is important to the operation for sustainability. By creating sustainability through the education system. The Model of the garland (MALAI Model) could provide the spectrum of creating sustainability in STEAM education. These included 1) Building up physical, social, emotional and intellectual potential students, 2) connect to teaching and learning about occupational and technology, 3) career and generate income from creating garland, 4) provide mindset of economic value, and 4) opportunities and create spaces for exchange of knowledge in the community

Building up physical, social, emotional and intellectual potential students

Linking with experience management to build physical, social, emotional and intellectual potential, may be based on activities or project-based learning management approaches. Including learning management in STEAM that allows learners to experiment and integrate knowledge from various areas for learners to practice. Where garlands or fresh flowers may start from hundreds of large materials Which corresponds to the curriculum of early childhood education and standards of early childhood education aimed at developing the use of small groups of learners Especially the small muscles that contribute to writing. Including the creation of Thai identity for students to absorb the value of culture Thai traditions Especially the fresh flowers

Connect to teaching and learning about occupational and technology

Connect to teaching and learning about occupational and technology Which aims to develop students' skill skills and learn to be Thai and raise awareness of the importance through social studies history in addition, if the learners are interested, those involved may have a club activity group or other learner development activity so that learners have the opportunity to develop their potential and abilities in fresh flowers. In order to further expand into the competition

Career and generate income from creating garland

Linking the succession of fresh flowers in the royal court by integrating with academic, basic work, occupation and technology for learners to practice Study details in terms of history, values, and create future conservation action approaches. By aiming for the students to see development opportunities in order to further their career and generate income for themselves Including organizing competitions or creative contests for motivation to develop the skills of interested learners.

Provide mindset of economic value

Develop short- and long-term courses to build a career with specialization. Especially moving towards highly skilled workers. That will result in both self-worth and higher economic value. Aiming to develop research and study in depth in the area of history, history, innovation development approach Business Channel Development opportunities to generate income Which is an academic study to fill and strengthen the body of knowledge in addition, there may be a project-based study to inherit and create a new development approach that is more consistent with the present.

Opportunities and create spaces for exchange of knowledge in the community

Create a lifelong learning system for all ages. Provide opportunities and create spaces for exchange of knowledge in the community. Create a series or short course of learning that facilitates training. Which is the creation of knowledge Basic skills and an awareness of the value of a royal flower fair. And conducting advanced skills development courses to develop new skills Restore the original skills that are suitable and create quality human resources for society. Creating sustainability through skill development Is training for skill

development in both short-term and long-term courses Which in the past there were guidelines for developing the original skills and rejuvenate to add new skills Operated by the Department of Skill Development Ministry of Labor It is the creation of skilled labor skills for creating a career in the future. Building sustainability by connecting people's daily lives. By creating attitudes and perceptions that fresh florist work is something that can be found in daily life and the practice of the daily routine can be a part of the conservation and continuation of the culture of using fresh flowers, such as the selection of fresh flower crafts products according to traditions, cultures, festivals that are appropriate for each period. And campaigning for general recognition that it is a legacy that deserves to be preserved and inherited

4. Conclusion

Guidelines of activities allow students to practice knowledge about science (e.g., materials) and mathematics (e.g., floral pattern) based on ethical significance (e.g., virtue of nation, religion and the monarchy) and aesthetics and beauty in form of flower arrangement. These guidelines may support teachers to focus primarily on the arts component while designing prototypes as STEAM knowledge with cultural heritage. In summary, the royal flower craftsman's work is valuable in both cultural aspects. history That has been accumulated for a long time Therefore, actions should be taken to continue the inheritance of this cultural heritage in the future. And has been developed to be appropriate Consistent with the context Create development and monetization opportunities that are cultural business opportunities. The researcher has therefore proposed a method for the inheritance of the royal flower works. It presents the character of the garland with three objectives: build oneself, create value and create careers. Through five key elements: creating a new career Conserving Thainess Attention to education the development of craftsmanship attitude and adherence to daily life by driving such actions, networks should be created. According to the method of building a ring-type network that integrates operations in a form of strengthening between 7 sectors: government agencies, educational institutions, communities, private sector, mass communication, local government organizations and civil society That all play a role in promoting, preserving, developing, preserving the royal flowers in the royal court for sustainability.

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