

## Article

# Design Models and Practices of Competencies-oriented Cross-Disciplinary Aesthetic Curriculum in Primary School

Qiao Mao<sup>1,2</sup><sup>1</sup> Department of Fine Arts, National Taiwan Normal University, Taiwan<sup>2</sup> Language and literature branch, Shaoxing University Yuanpei College, China\*Correspondence: [cxhmao@gmail.com](mailto:cxhmao@gmail.com); Tel.: +886-13735327696

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**Abstract:** This study aims to explore the design models and practices of the competencies-oriented cross-disciplinary aesthetic curriculum in primary schools. Using observation, interview, and document analysis, case studies are performed to analyze and explore the effects, difficulties, and possible solutions in the competencies-oriented design. Classroom observation records, teacher interview records, student works, teaching design, and research notes are collected for this study. Research findings include the following. (1) Teachers can flexibly choose the design mode of the competencies-oriented interdisciplinary aesthetic curriculum according to students' needs, social resources, and the social context. (2) Combined with the art domain curriculum guideline, we develop a competencies-oriented interdisciplinary aesthetic curriculum and teach with local characteristics. (3) Developing and implementing a competencies-oriented interdisciplinary aesthetic curriculum promote the professional growth of teachers.

**Keywords:** Core competencies, Cross-disciplinary aesthetic curriculum, Curriculum design mode

## 1. Introduction

To cultivate the talents needed for international competitiveness and industrial economy in the 21st century, a cross-disciplinary curriculum reform emphasizing “core competencies” has been launched around the world (Zhong, 2016; Tsai, 2012; Yang, 2020). “Core competencies” has become the key to the integration of curriculum coherence and curriculum in various fields and subjects (Tsai, 2018). Scholars believe that art education plays an important and valuable role in the holistic curriculum (Parsons, 1998; Chao, 2021). In 2014, Taiwan launched the Cross-Disciplinary Aesthetic Curriculum (CDAC) (Chao, 2016; Chao, Huang, 2019), and after the promulgation of the Arts Domain Curriculum Guideline (the “New Art Curriculum”) in October 2018, it began to emphasize cross-disciplinary/subject integration through “core competencies” (Ministry of Education, 2018), which posed new challenges to the development of CDAC.

The cultivation and development of competencies need to be linked to the educational reform and curriculum transformation in the educational context (Huang, 2016). As interpreters of the curriculum and determinants of students' learning content, teachers' teaching practices influence the development of the curriculum and the effectiveness of student learning (Chao, 2014). Teachers, as key figures in curriculum design and implementation, act as “teachers as researchers”, viewing “curriculum” as “research hypotheses to be tested by teachers in classroom contexts” and using action research to validate them (Tsai, 2000). In the context of the new art syllabus, how to develop CDAC that integrates core competencies, visual arts teachers have become a key factor and are worth exploring.

Based on the above research background and motivation, we use the case study method in qualitative research with teacher A, a visual arts teacher of a primary school in New Taipei City, as the research object. Through purposive sampling, we aim to explore the mode, process, effectiveness, difficulties, and solutions of primary school competencies-oriented CDAC design. Based on the above research objectives, the proposed research questions are defined.

- (1) What are the design models of primary school competencies-oriented CDAC?
- (2) What is the design process of primary school competencies-oriented CDAC?
- (3) What are the effectiveness, difficulties, and solution strategies for primary school visual arts teachers in implementing competencies-oriented CDAC?

## 2. Literature Review

### 2.1. Core competencies and curriculum integration

“Core competencies” are coined by the initiative of “Definition and Selection of Competencies” launched by the Organization for Economic Co-operation and Development (OECD) in late 1997. “Competency” is defined as not just knowledge and skills, but the ability to meet complex needs through the use and mobilization of psychosocial resources (including skills and attitudes) in specific contexts (OECD, 2005). Cui (2016) believed that “core competencies” is a class concept or a family word, which includes knowledge, skills, abilities, emotional attitudes, and values and needs to determine the core competencies of individuals with the needs of individuals and society as a logical starting point. According to the context of this study, “core competencies” is defined as the knowledge, ability, and attitude that a person must have to adapt to the present life and face the challenges of the future (Ministry of Education, 2014). Zhong (2017) believes that “core competencies” helps to refine the inherent essential characteristics of disciplines and “discipline competencies” and strengthen the softening of disciplinary boundaries and the connection between “subject groups” or “interdisciplinarity”. In short, curriculum development of core competencies breaks the hierarchical relationship between disciplines and eliminates the opposition between sub-disciplines and integration (Cui and Shao, 2017).

In the reform of Taiwan's 12-year national basic education curriculum outline, an emphasis is placed on the “core competencies” needed by contemporary students (Tsai, 2019a), and through the integrated learning of core competencies, the new concept is implemented in the “ministry-regulated curriculum” and “school curriculum”. Especially, it facilitates the development of a school-based curriculum and the unified design of the curriculum. The gap is shortened between the ideal curriculum, the formal curriculum, the perception curriculum, the operational curriculum, the courses obtained by learning, and the curriculum evaluated through examinations (Tsai, 2018). The Taiwan New Art Curriculum places special emphasis on “core competencies” in the field of art as the main axis of curriculum development to benefit the coherence between various stages of education and the integration of various fields/subjects. The development of the art curriculum adheres to the principles of “competencies orientation”, “progressive development”, “coherence”, “integration principle”, “balanced combination” and “multiple adaptabilities” (Ministry of Education, 2018). In addition, it emphasizes the concept of “teachers as researchers” in curriculum development. Teachers are not only the implementers of the curriculum reform by ministry but also the professional curriculum designers of the “core competencies” in the development of school-based curricula (Tsai, 2019b).

In summary, the development of Taiwan's New Art Curriculum is featured by “core competencies” orientation with the importance of the development of a school-based curriculum. Cross-field/subject integration is emphasized through “core competencies” in the field of art, being flexible in “departmental curriculum” and “revised curriculum”. Teachers are the designers and implementers of the school-based curriculum with “core competencies”, which is the key to shortening the distance between the ideal curriculum and the student experiential curriculum.

### 2.2. Model of cross-disciplinarity and curriculum integration

Jacobs (1989) argues that “cross-disciplinarity” is a view of knowledge and a curriculum orientation. The cross-disciplinary view of knowledge and the discipline-based view of knowledge are mutually exclusive, the former emphasizing connection rather than clear demarcation. Cross-disciplinary emphasis is placed on interpreting life's problems from different perspectives. In the field of education and arts education, the definition of the interdisciplinary curriculum has been difficult to define due to mutual borrowing (Krup and Cohen-Evron, 2000). The cross-disciplinary curriculum with arts as the core involves the “learning” of students and the “teaching” of teachers, so it is defined as the process of teaching and learning in which students connect more than two disciplines/fields through arts to solve problems to carry out the process of teaching and learning that integrates knowledge, skills, abilities, and values and promote the integration of students with nature and society.

“Curriculum integration” originates from progressivism’s teaching point of view, which is the educational trend of curriculum reform that emerged in the United States. From the late 1980s, when the term “curriculum integration” appeared in literature and seminars (Beane, 1997), curriculum integration flourished in the United States in the 1990s, and many scholars proposed their models of curriculum integration. For example, Jacobs (1989) believes that curriculum integration can be divided into six types, including Discipline-based content, Parallel discipline, Complement discipline, Interdisciplinary units, Integrated day, and Complete program. Fogarty (1991) proposed ten ways to integrate the curriculum in *How to integrate the Curricula*, including (1) integration within the field: discrete, joint, nesting, (2) cross-domain integration: parallel, common, tensile, string, unified, and (3) in the mind of the learner: immersive, networked. The integrated curriculum proposed by Beane (1997) takes the central theme as the starting point, explores important concepts and concepts related to the theme, and expands the design of appropriate teaching activities. That is, the theme or problem is taken as the starting point and the problem solving as the learning end. Jensenius (2012) lists five disciplinary types, including “intradisciplinary”, “multidisciplinary”, “cross-disciplinary”, “interdisciplinary”, and

“transdisciplinary”. These views on curriculum integration have also gradually spread to countries and regions around the world. In the 21st century, with the need to cultivate talents to enhance national competitiveness, it has become a good recipe for education reform through the competencies-oriented cross-field integrated curriculum (Cui and Feng, 2018).

Taiwanese scholars Huang and Tsai (2015) proposed in *New Theories on Curriculum Development and Design* that teachers can understand and deal with “curriculum integration” in six ways. (1) “Integration of subject contents” means the integration of elements within the subject, such as the horizontal and vertical integration of facts, concepts, general principles, and technical ability. (2) “Integration of discipline relations” means the integration of disciplines or between disciplines that emphasize the horizontal relationship between different disciplines in order to eliminate the boundaries of discipline separation. (3) “Integration of students' personal experience” means taking into account individual differences, and focusing on students' interests, motivations, attitudes, and goals so that students can obtain a unified learning experience. (4) “Integration of school subjects and activities” means that the formal curriculum and joint class activities, club activities, and so on are integrated according to the interests of students. (5) “Integration of on-campus and off-campus fields”, that is, the integration of school curriculum and social life outside the school. (6) “Integration of curriculum organizers”, namely to ensure the effectiveness of curriculum development and implementation, in combination with students' learning experience, teachers, students, parents, school administrators, and social elites need to understand the process of curriculum design.

In summary, the integrated model of the curriculum presents the characteristics of diversification and dynamic development, and its coverage is becoming extensive. The purpose of curriculum integration is not to replace sub-subjects, but to link the various disciplines that are divided, so that learners can acquire knowledge and learn to apply it at the same time (You, 2000). Admittedly, each model has its advantages and disadvantages with the focus on selecting the most suitable model according to the needs of students and the teaching situation. In this study, we explore how primary school visual arts teachers use the integrated approach of these models in the process of competencies-oriented cross-disciplinary aesthetic curriculum design and practice through case studies.

### 2.3. Integrated model of cross-disciplinary curriculum with arts as the core

In 1963, Bruner's *the Process of Education* was published, which greatly influenced art education. Based on Bruner's ideas, Barkan (1962) proposed the concept of the structure and discipline of art education. The idea of art as a distinct discipline was further advanced by the 1965 Pennsylvania State University Research and Curriculum Development Symposium, as well as the publishing of *Aesthetics and Criticism in Art Education* and Eisner's *Readings in Art Education* (Gruber and Hobbs, 2002). By the end of the 1980s, the development of cross-disciplinary curricula in the educational world began to have a wide impact on the art education community. In 1996, the National Art Education Association (NAEA) promoted the Transforming Education through Art Challenge (TETAC), a five-year program (from fall 1997 to summer 2001) sponsored by the Annenberg Foundation and the Getty Trust, hosted by Ohio State University where “Comprehensive art education” (CAE) was used to promote an integrated curriculum with art as the core through “important concepts” and “important agendas” (OSUTETACM, 2002). Parsons (1998) argues that art education plays an important and valuable role in integrating the curriculum because contemporary issues often transcend disciplinary boundaries, such as gender, the environment, war, and community, which necessitates discussions from different perspectives. Because art or visual culture provides a favorable way for us to explore and interpret social and cultural life and works of art reflect complex cultural contradictions and connect knowledge and experience that are originally independent and fragmented, it is more meaningful to unify with art. Walker (2001) developed the curriculum structure of “Designing Art Curriculum with Big Ideas” from the TETAC program, with the basic elements of the curriculum including “big ideas,” “rationale,” “key concepts”, and “essential questions”. The curriculum model proposed by Walker (2001) mainly emphasizes that (1) the design of the curriculum should be based on the issues of life, (2) the creation and thinking of art act as the core in the construction of art and humanities curriculum, and (3) the essentials of the basic structure of the curriculum should be put forward and developed. Krup and Cohen-Evron (2000, pp.265–268) proposed that the art integration curriculum incorporates four models: (1) using the arts as resources for other disciplines, (2) enlarging organizing centers through the arts, (3) interpreting subjects, ideas, or themes through the arts, and (4) understanding life-centered issues. These models of artistic integration began to have a profound impact on Taiwan's art education community in the early 2000s.

Since the beginning of 2004, Taiwan has consistently implemented the programs in “arts and humanities”, and until the release of the new curriculum, cross-disciplinarity is still the focus of the curriculum model. In Taiwan's art education circles, Chao (1978) carried out the “Experimental Study on Appreciation Ability and Learning Effectiveness of Middle School Students by the Integrated Teaching Method of Art History and Art Criticism”, which was an empirical study to discuss the integrated teaching of art curricula earlier. Since around 2000, there has been an increase in research and seminars related to the integration of art curricula. For example, Lin (2003) believes that, as the 21st century is a new era, with cross-disciplinary, cross-border, decentralized, and

post-modern pluralistic values gradually entering all levels of life and society, the art curriculum must be constructed according to the learning situation of the student as the main body, with social issues in mind, and more deeply integrate art culture and life. Hsu (2002) synthesized the curriculum integration models of Krup and Cohen-Evron and Beane and other scholars and proposed three types of art integration curricula, including subject-with-subject integrated curriculum, pluridisciplinary curriculum, and the Integrated Project Curriculum. Kao and Wilson (2003) combined the teaching strategies of “ultra-breadth” and “super-depth”, as well as the concept of Julia Kristeva's “intertextuality” and proposed “art and humanities teaching orientation with ultra-breadth and ultra-depth”, emphasizing that each teaching unit can make its content more interesting, rich and far-reaching through the connection of intertextuality. Synthesizing the views of Krup and Cohen-Evron, and Huang and other scholars, Chen (2004) from the perspective of art education proposed that the art integration curriculum model should include two major aspects: (1) “discipline-based integration” (covering the integration of single subjects, interdisciplinary integration, and inter-disciplinary integration) and (2) “learner-based integration”. Chao (2005) also proposed taking visual culture as the core of the integrated curriculum to develop the visual culture integration curriculum. Emphasis is put on “meaningful visual experience” as the main axis connecting visual arts, music, and performing arts.

With Taiwan's active promotion of aesthetic education, the “Interdisciplinary Aesthetic Curriculum” has become the most representative interdisciplinary course with art as the core. In 2014, Taiwan began to promote the Cross-Disciplinary Aesthetic Education Project (CDAEP). By 2019, the program has entered the third phase, from 10 seed schools in the first phase to 16 teacher-partnership universities and 153 partner schools. The program aimed to develop CDAC with the arts at its core, nurturing the innovative capacity needed by future citizens with aesthetic competencies. CDAC constructs an “art-based” cross-disciplinary curriculum based on art media, art concepts, aesthetic elements, and artistic resources such as media, resources, strategies, and main axes for activating, assisting, and integrating other disciplines (Chao, 2016, pp.16). CDAC adopted Jensenius' definition of “cross-disciplinary”, which places the field of art at the center of the school's curriculum structure and connects outward to other subject areas (Chao, 2016).

In summary, the art-centered curriculum integration model advocated by Krup and Cohen-Evron, Parsons and Walker has had a far-reaching impact on Taiwan's art education community and laid a theoretical foundation for the development of art-centered cross-disciplinary courses in Taiwan. In particular, the “Cross-field Aesthetic Course” is the most salient characteristic of the art-centered cross-disciplinary course model in Taiwan.

#### 2.4 Research related to cross-disciplinary aesthetic education

In 2016, the CDAEP team published the book *Huimei Rongyi: Theory and Practice of Cross-disciplinary Aesthetic Curriculum* in order to construct CDAC discourse, which comprehensively discussed the theory and practice of CDAC from the perspective of curriculum concept, teaching strategy, learning evaluation, core ability and teaching implementation experience (Chao, 2016). Chao (2016) explained the concept and definition of the cross-disciplinary aesthetic curriculum, proposing two types of courses. One is to use art as a medium, resource, and strategy to revitalize and assist the learning of other disciplines, and the other is to use art as the main axis of integrating the curriculum structure. Li (2016) proposed that the implementation of cross-disciplinary aesthetics courses is divided into five stages, namely dialogue, empowerment, co-learning, research, and promotion. There are eight teaching strategies for reference: problem-oriented teaching of applied art materials, situational teaching of virtual reality, experiential learning and teaching of online resources, inquiry-based teaching of digital archives of applied arts, cooperative learning and teaching, thematic discussion teaching, collaborative teaching, and creative thinking teaching (Gao, 2013). Lin (2016) argues that the teaching evaluation of cross-field aesthetic courses needs to conform to the trend of educational development and return the evaluation to student learning. From the perspective of talent cultivation of “looking to the future and looking at the world”, Huang (2016) proposed that the eight core competencies expected to be achieved in cross-field aesthetic education include: creativity, discovery, invention, problem-solving, critical thinking, imagination, interactive communication, and cross-cultural global mobility capabilities. The above research explores the trend of educational development from an international perspective and then discusses the previous experiments in Taiwan's education field and cross-disciplinary aesthetic curriculum. These research results provide CDAC theoretical foundation with local characteristics as the core of art for the follow-up promotion of CDAEP as well as the development and implementation of CDAC in universities, middle schools, and primary schools and promote the development of relevant empirical research, and also become a practical guide for teaching sites.

With the continuous promotion of CDAEP, there are 256 CDACs in primary schools alone on the official website of cross-field aesthetic education. They show diversified and local characteristics. Research on interdisciplinary aesthetic courses is also increasing. These action studies are used to explore the effectiveness of the interdisciplinary aesthetic curriculum, the influence, and promotion of the art discipline on other disciplines and the formation of competencies beneficial to students. For example, several studies have shown that CDAC helps to increase students' interest in learning and performance in other subjects, adding value to

the effectiveness of each subject (Ni, 2019; Lu, 2019). Other studies have suggested that CDAC promotes student competencies such as improving students' problem-solving ability, aesthetic competencies, and cross-field ability (Lu, 2019; Kao, 2020). Other studies have found that the types of CDAC are diverse, teachers adopt collaborative teaching, evaluations are diversified, and also school administrative support is necessary (Yu, Chao, Lin and Li, 2015; Yu, 2016; Wang, 2020).

In summary, with the implementation of cross-disciplinary aesthetic education in recent years, related research has gradually increased, and CDAC has gradually become a trend in Taiwan's art curriculum reform. However, the existing research mostly uses actions to explore the effectiveness of CDAC, the influence, and promotion of art disciplines and student competencies formation. Researchers have explored and summarized the concepts, meanings, and construction models of curriculum programs produced by ten experimental schools participating in the "First Phase of Cross-field Aesthetic Education Plan" (2014–2015) through document analysis to understand the curriculum panorama. However, only the experimental results of the course are used as evidence of the construction of the cross-field aesthetic curriculum model, and the real teaching setting has not been entered to interview and observe the implementers of curriculum development to understand the specific development of the cross-field aesthetic curriculum. In addition, as the cross-disciplinary aesthetic education has entered its third phase, and after the promulgation of the New Art Curriculum, under the emphasis on competencies, it has a new impact on the CDAC design model. However, only one relevant study used the action research method to explore the curriculum practice of cross-disciplinary competencies-oriented aesthetic teaching in lower grades in primary schools (Kao, 2020). Given this, we adopt a case study method through observation, interview, and document analysis to analyze and explore the mode, process, difficulties, and strategies of the competencies-oriented design of a cross-field aesthetic curriculum in a small and medium-sized primary school. It provides a reference for visual arts teachers to develop competencies-oriented cross-field aesthetic courses.

### 3. Research Method

#### 3.1. Research objects and methods

To achieve the research purpose and respond to the research questions, the case study method was used to collect data through observation, interviews, and supplemented by document analysis. Through purposive sampling, Teacher A, a visual arts teacher at a public primary school in New Taipei City, was invited as the research object. Teacher A has been teaching for 10 years, teaching a total of 8 classes in the fifth and third grades and participated in the CDAP as the head of the school affairs team in 2018. She began to develop and implement CDAC that integrates "core competencies" until the first semester of 2019.

Teacher A leads teachers in other fields to carry out collaborative class preparation and integrate cultural assets into the curriculum, taking Lin Family Mansion and Garden<sup>1</sup> and the school's historical architecture art classroom<sup>2</sup> as curriculum resources and teaching fields (both inside and outside the campus). She develops core competencies-oriented cross-disciplinary aesthetic courses, involving art, information, synthesis, nature, and other fields, and guides students to think and understand the ancestors' clothing, food, housing, transportation, education, and music through the cultural assets around them. Through teaching activities such as field survey, badge design, clay making, micro-old objects, text reading, and pass-through games, they know the surrounding historical sites and observe environmental changes, connect land memories, implant self-feelings and generate local identity.

Specific curricula are listed in Table 1.

**Table 1.** Specific curricula

Semester	Name of the course	Class hours	Cross disciplines	Brief introduction to the course contents
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<sup>1</sup> Lin Family Mansion and Garden is located in Banqiao area, New Taipei City, 1.7 kilometers away from Z Primary School. This residence can be traced back to 1847. It is the most complete traditional garden building in Taiwan and is listed as a historic site. In 1976, Lin Benyuan's family donated part of the garden to the Taipei County Government at that time, and it has been restored and opened for visit ever since.

<sup>2</sup> The art classrooms of Z Primary School were transformed from a historical building with truss structure. The original building was called Banqiao Fuzhou Ronggong (Management of Engineering Affairs of the People) Repair Factory built in 1956.

Table 1. cont.

2019-1	Floating into the Classroom-Reshaping the Relics	3	Art and Synthesis	Start from knowing the historical architecture art classroom; Understand the culture, history and ecology of Fuzhou area; Guide students to extract animals, plants, insects and other elements in truss or in Fuzhou areas to carry out badge design; Make class-specific playing cards.
2019-2	Pottery Makers	10	Art, Synthesis, and Information	Explore the symbol and characteristics of window grilles in Lin Family Mansion and Garden, and create small clay dishes; Making small wind chimes; Carry out visits and day-reading activities in the Garden; Explore the use of computer graphics to design display boards and hold exhibitions by pottery makers.
2020-1	Jasmine and Pottery Garden in Fuzhou - Movable Blue and White Flowers	4	Art, Information, Nature, and Chinese	Explore the history of jasmine literature in Fuzhou; Read blue and white flowers and their auspicious meanings through "My Forbidden City Appreciation Book" and Quizizz APP game; Develop action museums and experience blue and white painting; Design blue and white theme clothes; Experience AR augmentation reality.
2020-2	Complexion, soul, and Change of Cultural Assets in Fuzhou-My Truss Structures, the DNA of Lin Family Mansion and Garden and Escape from Secret Chamber of Cultural Assets	6	Art, Information, Synthesis, and Nature	Recognize and understand the history of cultural assets in Fuzhou, extract relevant patterns and symbols for badge design; Appreciate old objects with microscopic tools; Read the text to detect the relationship between cultural assets and daily life, and play the passing-through games.

Source: This study was organized. For details, see the curriculum library page of the Excellence in Aesthetic Education Excellence Program website. (<https://www.inarts.world/courses/>)

Specific research procedures include the following.

Stage 1: According to the purpose and questions of the research, the primary school visual arts teacher is selected, Researchers know the research objects through intermediary recommendation. Then, with the consent of the subjects, the time of classroom observation and interview is agreed on.

Stage 2: Observation. After formulating observation questions and observation plans and outlines according to the research objectives and problems, the researchers participate in the competencies-oriented cross-field aesthetic class to make observations, record the reactions and behaviors of teachers and students in the classroom, and subsequently organize and analyze the observation data for the interview.

Stage 3: Lesson Plan Analysis. The lesson plans by the case teachers are analyzed, and also analyzed are the elements and patterns of course design.

Stage 4: Interviews. In response to the research objectives and problems, as well as the main points and questions in the preliminary observation and lesson plan analysis, the researchers formulate the interview outline and questions, conduct expert validity tests, and after repeatedly modifying the semi-structured interview tool, carry out face-to-face interviews while recording resources and reflecting in time.

Stage 5: Observation records, interview records, lesson plan data, observation notes, and interview notes are collected, after data collation, coding and classification, data analysis and interpretation are carried out.

Stage 6: Research reports are written and research reflections are conducted.

### 3.2. Data collation and analysis

The collected data include two lessons of classroom observation and reflection and two word-for-word interviews based on literature discussion and pre-observation, gradually focusing on the semi-structured interview outline of the post-design. After the validity tests by three experts, a face-to-face interview with Teacher A was conducted for a total of two hours and a telephone interview of half an hour, to fully understand the curriculum mode, course, effectiveness, difficulties and solution strategies of Teacher A's CDAC competencies-oriented design and implementation. In addition, a total of three CDAC teaching designs developed by Teacher A since participating in CDAEP are collected, including "Pottery Guest", "Jasmine Pottery Garden", and "Floating into the Classroom – Molding the Relics". There are two classroom teaching videos, one recording of the teaching workshop and students' works.

In the process, we collected, collated, analyzed, and encoded the collected data. Among them, observation records were represented by A, interview records were represented by B, documents and archives were represented by C, and researchers' reflections and notes were represented by D. According to the purpose and questions, the original data repeatedly was carried out three-level open coding. The coding steps include decomposing data into segments, developing topics, forming categories, and exploring patterns (McMillan and Schumacher, 2010). Among them, the first-level code 01-05 is the subject code, the secondary codes 1-4 are category codes, and the three-level codes a, b and c are model codes. In the subsequent analysis, reference is made according to the code. For example, B-20210331-1105 indicates the meaningful contents in the first model, the first category, and the fifth topic in the interview draft conducted by researchers on March 31, 2021.

### 3.3. Validity and research ethics

The research results use triangulation to test the validity of the research, including the following.

(1) Theoretical pluralism: comparisons and analyses are approached by the application of curriculum integration theory and cross-field theory with art as the core.

(2) Personnel diversity: professors participate in the guidance of data collection and analysis throughout the process; peers are invited to participate in the data analysis and discussion, the data are given back to the research participants for verification after data collation, and check the accuracy of the content.

(3) Multiple sources of information. The data such as curriculum observation records, teacher interview records, teaching design, and other materials, as well as research reflection notes, are collected and analyzed to increase the complementarities, richness and saturation of the data.

### 3.4. Scope and limitations of research

In this study, based on the method of case studies and the conditions of intentional sampling, the research participants were required to be a visual arts teacher at the primary school level, who participates in the "Cross-field Aesthetic Education Program", develops and implements the competencies-oriented cross-field aesthetic curriculum design. Only one representative research object is selected as the participant of the study. The above conditions are the scope of this study and the limitations of this study as well.

## 4. Research Result

### 4.1. Integrated model and approach of competencies-oriented CDAC by diversification and flexibility.

The results of the study show that the teacher does not choose a single strategy in specific teaching fields when applying the competencies-oriented CDAC integration model, but flexibly uses relevant strategies according to the actual needs of students and teaching. Teacher A has carried out curriculum integration from various approaches in the development and implementation of competencies-oriented CDAC, and this result confirms the curriculum integration approach proposed by Huang and Tsai. The details are as follows.

(1) Integration of subject content. Teacher A is a visual arts teacher who carries out the integration with a music teacher. For example, when Teacher A is conducting the "Jasmine Pottery Garden" course, to let students know and understand blue and white flowers better, she remarks, "*I am cooperating with teachers from other schools, and the music teacher teaches them to understand the Chinese pentatonic scale*"(B-20210331-a103).

(2) Integration of disciplinary relations. Teacher A's four art-centered competencies-oriented, cross-disciplinary aesthetic courses include "Floating into the Classroom-Reshaping the Relics" (C-2019-1), "Pottery Guest" (C-2019-2), "Jasmine and Pottery Garden in Fuzhou" (C-2020-1), and Complexion, soul and Change of Cultural Assets in Fuzhou (C-2020-2). All integrated the art field and other subject areas.

(3) Integration of students' personal experiences. Teacher A believes that when developing the curriculum, “*Students actually give us what they want to learn, we want to do it, and then see what kind of resources we can find*” (B-20210331-a303).

(4) Integration of School Subjects and Activities. When developing and implementing competencies-oriented CDAC, it is necessary to integrate the cultural assets of the community into the curriculum, and at the same time integrate them with an evaluation of the formal curriculum of the school.

“*We have now a course like a linear level organization running like this. Maybe now these classes are about art, but before we may have had natural classes to explore (Lin Family Mansion and Garden) , and social classes to understand cultural assets, as children recently do in visiting several famous cultural assets in Taiwan. They shall know better that they are combined with the current social textbooks and that we will learn about our hometown with the comprehensive courses*” (B-20210331-a205).

(5) Integration of on-campus and off-campus fields. Teacher A selects course themes and contents which are combined with on-campus and off-campus resources. “*Look at some of the resources around our school and then extract them from them*” (B-20210331-a104). Teacher A also focuses on “*using cultural assets(Lin Family Mansion and Garden) and combining campus resources to do cross-disciplinary courses*” (A-20210331-a102) . For example, the resources in the local Culture and History Association outside the school are used to integrate the local cultural curriculum.

“*After we decide on a topic, we look up the materials and texts. For our jasmine (course), we have an association, who has compiled some books on jasmine... We also go to attend the lessons about local culture and history. Then libraries also have such resources, where formal texts are available.*” (B-20210331-a201).

(6) Integration of Course Organizers. When Teacher A develops and implements competencies-oriented CDAC, her main co-teachers are Information teachers and science teachers in the school. In addition, artists, parents, and social talents from outside the school are also invited to participate in the course according to the needs of the curriculum. For example, “*Mostly I teach Visual Arts, and then if I teach Arts Performance, I invite artists from the Art Cultivation Program to teach for some periods*” (B-20210331-1102). Furthermore, “*We have a teacher Y, who is not a teacher (a parent of students) in our teaching staff, but an important resource for us, as he is a graduate of the Institute of Botany of NTU. So we make a lot of plants as we did in the Jasmine (pottery) course last year. He taught us to know jasmine and then let the children do it*” (B-20210331-a102).

#### 4.2. Development process of competencies-oriented CDAC in corrective pattern of cyclical rolling.

(1) The selection of competencies-oriented CDAC content needs to be divergent and refined. The focus also needs to be on art disciplines themselves. For example, “*Like when we want to introduce cultural assets, then what do you want to have in hand? A lot, right? Then pick what you might be able to manage, and do the easiest ones at the moment*” (B-20210331-a204). The specific process and emphasis are, “*first spread out, then retract, and finally see how to make it more refined.*” (B-20210331-a204).

(2) In competencies-oriented CDAC, core competencies are transformed into core competencies and learning focus in the art field through curriculum integration. In the four courses developed by Teacher A, the transformation among core competencies, artistic core competencies, and learning focus is not achieved overnight but is a process of continuous exploration, practice, and revision. “*Teacher A selects the theme and content of the course according to the children's life situation*” (D-20210401-A301). When developing the course, she emphasizes that “*returning to the ground and returning to life, the core competencies are something that can be used in a life situation ... We hope that children can have the ability to meet future challenges*” (B-20210331-A301).

(3) The process of competencies-oriented CDAC development is a process of continuous growth, continuous deepening, and thick planting, which requires continuous implementation, reflection, correction, and improvement. Competencies-oriented CDAC is generally conducted in a thematic style, “*In general, there is a big theme covering several small ones*” (B-20210331-a202). For example, in the four courses developed by Teacher A, “*The big theme of cultural assets is always there, but each issue has a new (content)*” (B-20210331-a202). “*In 2018, we only had a little bit, and we only had to go to the Lin Family Garden. In 2019, we added some pre-courses. Then this year something new is added, and it has been revised, revised year by year*” (B-20210331-a203).

These findings are consistent with Beane's (1997) theory that the curriculum is integrated with a central theme as a starting point. At the same time, there are similarities with the research results of Kao (2020), that is, the development process of competencies-oriented CDAC is a corrective process of circular rolling, and core competencies can be integrated into CDAC.

#### 4.3. Difficulties and solutions

According to the research results, in the process and implementation of the competencies-oriented design of a cross-field aesthetic curriculum, teachers face many difficulties such as shortages in teachers for preparing, studying, and using teaching equipment together. However, these difficulties also allow teachers to improve their professional qualities such as obtaining expert



guidance, studying, and empowering themselves through application and participation in the “Cross-field Aesthetic Education Program”.

#### 4.3.1. Difficulties are found as follows.

(1) Shortage in teaching staff. Teacher A faces many subjective and objective difficulties in developing competencies-oriented CDAC. First, due to the shortage of teachers in the school, only several classes can implement competencies-oriented CDAC. *“We only have two (visual arts) teachers with just a few lessons, and there are only a few classes to attend (CDAC)” (B-20210331-c102).* The second is cross-field curriculum and teaching, which involves teachers in different fields, *“to find a qualified teacher is not easy” (B-20210331-c101).* Third, as the organizer and core figure of curriculum development, it will increase personal workload. *“You may be doing (in charge) a lot more, although I have a friend and a few friends (in collaboration with teachers) can help... Actually, I myself have to write these (lesson plans), and the teachers can provide me with things and I have to sort them out myself” (B-20210331-c101).*

(2) Difficulty in collaborative preparation and time to study. First, there are great difficulties in organizing, meeting, and studying with teachers. *“It is not easy for teachers to get together, because teachers have their own business” (B-20210331-c103).* The second is the division of labor in curriculum development and implementation, *“I think it is more difficult to slowly burden this matter (curriculum design) to others, and then let him or she grow up, because each of us has a different family background, and everyone's situation is different every year” (B-20210331-c104).* Third, teachers in various fields generally have the pressure of curriculum progress, and it is difficult to allocate the time for collaborative classes. *“Like an information class teacher, sometimes when I invite him to class, he will say that he doesn't know if there is curriculum progress lying ahead!” (B-20210331-B202).*

(3) Difficulties in teaching equipment. One is the shortage of teaching equipment, *“As for practice, there may be problems in hardware last year” (B-20210331-c105).* Second, there is a greater risk in the use and storage of teaching equipment, *“in fact, there will be a burden. You know an iPad is worth 15,000 New Taiwan dollars. I am afraid of losing it and having it damaged” (B-20210331-c105).* In addition, teaching equipment such as iPads needs to be cleaned up in time after students have finished using them. *“When they return them, I still have to clean up the inside. They used the equipment like a child shooting randomly, and I have to clean up every one of them again” (B-20210331-c105).*

The results show that teachers need to solve related problems by expanding interpersonal relationships, expert guidance, studying for empowerment as well as applying for projects and online teaching seminars to solve the above problems and difficulties.

(1) Expanding interpersonal relations and realizing the sharing of resources, which is conducive to solving the problem of collaborative teachers. Through workshops, exchange meetings, and other means, teachers are supposed to meet many peers and teachers in different fields, thus increasing the possibility of obtaining social resources for curriculum development and collaborative teachers. *“I have met a lot of new people. For example, we don't know how to do, and then imagine we can do it like this (development course). Maybe next time we will do differently” (B-20210331-c201).* In addition, it is also necessary to maintain good interpersonal relationships with teachers. For example, *“If we are going to ask him or her to go to have a class, we really have to make more friends and make good ones” (B-20210331-c201).*

(2) Studying for empowerment and sharing peer experience are conducive to promoting the sharing and transformation of the curriculum, as well as promoting the professional growth of teachers. First, CDAEP provides expert guidance and organizes sharing meetings, which is helpful for the sharing of course resources and the exchange of experience among peers. *“We are guided by Professor Y, who is in charge of seven schools. We shared with him last time and learned from each other” (B-20210331-c202).* Second, horizons and insights need to be obtained in the trends of curriculum development. *“There should be one or two workshops every year” (B-20210331-c204).* Teachers get the opportunity to learn, communicate and make friends, and promote their professional growth. *“You can know for each other what you're doing (lessons), and after I have listened, and maybe next time we can add a little bit of element in.” It is also possible to meet some new friends, and then the new friends may have new resources, and students can learn more” (B-20210331-c202).* The third is to exchange curriculum resources and innovate the curriculum through the teacher community. *“I gradually teach another teacher or invite another teacher, and everyone comes together to 'play' (develop the curriculum), so that in the future if we make up multiple sets of courses, we can 'borrow' from each other like this, then it will be better” (B-20210331-c202).*

(3) Application and participation in the program. The teachers can access funds, purchase new teaching equipment, and solve the shortages of teaching hardware. First, the support of the funds can enable one to purchase teaching equipment, which helps in curriculum development. *“The interdisciplinary aesthetic education program is also supported by money, and we can buy this (teaching equipment)” (B-20210331-c205).* Second, the support of funds can enrich the form of teaching and expand the field of teaching. *“In fact, this plan (the cross-field aesthetic education program) has supplied us some funds, and we can pay teachers to teach. Then we also want to combine different resources” (B-20210331-a105).* In addition, there are funds to charter buses to take

students to carry out outdoor teaching, “*We have been taking a tour bus (Lin Family Garden) for two years, and it takes less than 5 minutes*” (B-20210331-b105). “*Actually, the cross-disciplinary aesthetic education program in the Normal University is very good, giving us very direct resources (B-20210331-a105).*”

## 5. Conclusions

Through this study, it is found that teachers can flexibly choose the competencies-oriented cross-field aesthetic curriculum design mode according to the needs of students, social resources and the situation of the times. The broad and inclusive nature of the artistic activity, which is inherently cross-disciplinary, enables all disciplines to discover the elements of cross-disciplinary integration with the art field in their expertise (Chao, 2021). The integrated curriculum with art as the core help stop the art discipline from simply becoming a tool in other fields in the cross-field unified curriculum and losing the ontology of the art discipline. Just as Fogarty points out, there is no specific or fixed pattern to follow in the curriculum integration. Thus, teachers must constantly explore and develop their patterns. As Cheng (2003) argued, each way of integration has its pros and cons, and the key to curriculum integration is how students build and apply knowledge. In other words, the curriculum integration model presents a pluralistic appearance, each with its characteristics, and advantages and disadvantages. In the development of competencies-oriented CDAC design, it is necessary to focus on the interests and needs of students according to the situation of the times, combined with teacher resources, schools, and local curriculum resources. It is necessary to flexibly select the most suitable curriculum integration model and help students apply knowledge in life and solve complex problems in real life. At the same time, we need to also avoid the superficial “cross-disciplinary integration for the sake of its own” and actively consider the learning implications of teaching units in various disciplines (Chao, 2016).

Combined with the New Art Curriculum, a competencies-oriented CDAC with local characteristics can be developed for the needs of students with the resources around the school. For the development of competencies-oriented CDAC, the curriculum shows the characteristics of localization and diversification. This result is consistent with the findings of Kao (2020). Secondly, after the promulgation of the New Art Curriculum, front-line teachers need to participate in the study for empowerment, design CDAC that integrates core competencies, and gradually develop a school-based curriculum with school characteristics. This also echoes the development of “core competencies” in the school-based curriculum proposed by Tsai (2019b) and the integrated design of the curriculum shortens the gap between the ideal and obtained course. Secondly, the competencies-oriented cross-disciplinary aesthetic curriculum needs to be involved in the student's life situation and the stage of continuous experimentation. The learning of core competencies presents characteristics that span a variety of social fields and learning areas (Tsai, 2020). In other words, the acquisition of core competencies requires learners to look back at the local areas and return to specific life situations, but not limited to a specific field and a certain field of learning. When designing competencies-oriented CDAC courses, teachers need to break the space limit of the classroom and school campus and connect the courses to the off-campus field in the context of student life situations.

Developing and implementing competencies-oriented CDAC promote the professional growth of teachers and enable teachers to become “teacher as researchers”. The results of the research show that through CDAEP, opportunities for dialogue, empowerment, co-learning, research, and promotion can be obtained (Li, 2016). The opportunities prompt teachers to step out of their comfort zone, understand the new trends of education reform and curriculum development, actively learn and accept new teaching concepts, dare to cooperate with teachers in other fields, and constantly broaden their horizons and experiences. Guidance and exchange experiences with peers are obtained to share course resources and constantly broaden your horizons and experiences. This is similar to Kao's (2020) study, which found that participating in teacher community and empowerment workshops enhances teachers' professional growth. In addition, the participants in relevant projects also obtain funds to purchase related equipment for curriculum development and implementation, which benefits curriculum development and student learning, forming a good circle of mutual benefit for the common good.

## 6. Research reflections and recommendations

The present researcher has always been interested in the cross-disciplinary aesthetic curriculum with art as the core, and at the beginning of the research, she has developed a high degree of curiosity about how the competencies-oriented interdisciplinary aesthetic curriculum develops in the teaching field. In the process of research, the research questions are focused on understanding the mode of curriculum development, the course, and the problems in the course development process. Other topics such as teaching methods and learning assessment are therefore extended.

Suggestions for future studies are as follows. First, according to the literature in the early stage of the study, there are few studies on the design and implementation of competencies-oriented interdisciplinary aesthetic curriculum, and relevant action research can continue to be carried out in the future to increase relevant empirical research results. Second, new issues continue to

emerge in the research process. For example, with the impact of COVID-19 on teaching, the gradual popularity of new teaching and empowerment methods such as online courses and online learning have infinitely expanded the resources and space of cross-disciplinary aesthetic courses, which can also be used as the direction of future research. Third, according to the research results, it is found that the mode of curriculum development is not unique, but pluralistic. Schools and teachers can develop a diverse curriculum based on the resources of students or local areas, which can be used as a direction for future research. Fourth, the scope of case selection can be expanded. In subsequent research, the first is to expand a single case to multiple cases with comparisons and analyses. The second is to expand the selected grade such as primary, secondary, or high school. Third, the location selected by the individual case can also be expanded, such as urban and remote villages, or the school areas from all directions.

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